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ABSTRACT BOOK

ORAL PRESENTATIONS

Oral Paper Session 1

Adrenals & NET A

30. The finding of necrosis in preoperative imaging and histology of benign and malignant adrenal tumors

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Background

Recently, necrosis in postoperative histology had been reported to be specific for adrenocortical carcinoma (ACCs) when compared to adrenocortical adenomas (Martin K. Walz, 2020). We, therefore, retrospectively examined the sensitivity and specificity of preoperative radiological and postoperative microscopic findings of necrosis in adrenal tumors of our patients.

Method

326 adrenalectomies were performed in our clinic between 2008 to 2020. 25 adrenal tumors were diagnosed as ACC. 40 benign tumors measuring at least 40mm, including Cushing- and Conn-adenomas, hormonally inactive adenomas, one schwannoma, one fibroma and one oncocytoma, were depicted as controls. Preoperative imaging was available in 23 malignant and 35 benign adrenal tumors.

Results

10 of 35 (28%) benign adrenal tumors and 22 of 23 (96%) ACCs showed signs of possible necrosis in preoperative radiologic imaging. Pathologic examination depicted tumor necrosis in 22 (96%) malignant but not in one benign tumor (0%). The specificity of possible necrosis in preoperative imaging and necrosis in histology for diagnosing ACC was 71% and 100%, respectively, while sensitivity accounted for 96% in both examinations.

Conclusion

Signs of possible necrosis in radiologic imaging and tumor necrosis in histology proved to be very good predictive markers for diagnosis of malignant adrenocortical tumors and should be included in the evaluation of adrenal tumors.

167 International survey on opinions and use of minimally invasive surgery in small bowel neuroendocrine neoplasms

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Background

Although minimally invasive surgery is becoming the standard technique in gastrointestinal surgery, implementation for small bowel neuroendocrine neoplasms (SB-NEN) is lagging behind. The aim of this international survey was to gain insights into attitudes towards minimally invasive surgery for resection of SB-NEN and current practices.

Method

An anonymous survey was sent to surgeons between February and May 2021 via (neuro)endocrine and colorectal societies worldwide. The survey consisted of questions regarding experience of the surgeon with minimally invasive SB-NEN resection and training.

Results

A total of 58 responses from five societies across 20 countries were included. Forty-one (71%) respondents worked at academic centers. Thirty-seven (64%) practiced colorectal surgery, 24 (41%) endocrine surgery and 45 (78%) had experience in advanced minimally invasive surgery. An open, laparoscopic or robotic approach was preferred by 23 (42%), 24 (44%), and 8 (15%) respondents, respectively. Reasons to opt for a minimally invasive approach were mainly related to peri-operative benefits, while an open approach was preferred for optimal mesenteric lymphadenectomy and tactile feedback. Additional training in minimally invasive SB-NEN resection was welcomed by 29 (52%) respondents. Forty-three (74%) respondents were interested in collaborating in future studies, with a cumulative median (IQR) annual case load of 172 (86–258).

Conclusion

Among respondents, 69% applies minimally invasive surgery for resection of SB-NEN. Arguments for specific operative approaches differ, and insufficient training in advanced laparoscopic techniques seems to be a barrier. Future collaborative studies can provide better insight in selection criteria and optimal technique.

143 A Cohort Review of Pheochromocytoma-Induced Takotsubo Cardiomyopathy

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Background

A rare presentation of pheochromocytoma(PCC) is catecholamine-induced-cardiomyopathy, or Takotsubo cardiomyopathy(TCM). PCC-induced TCM(PCC-TCM) can present as a typical or atypical type, based on the location of cardiac wall motion abnormalities. In this review, we sought to assess features and outcomes for PCC-TCM, and to compare typical and atypical subtypes.

Method

A computer-assisted search was conducted on two databases (PubMed and Embase) for case series or reports on PCC-TCM from 2006-2020.

Results

One-hundred-and-two papers with a total of 104 cases of PCCPCC-TCM were retrieved: 67(64.4%) typical and 37(35.6%) atypical subtypes. Overall median age was 50[range:23-86] years, the atypical group about a decade younger(p<0.001). A female preponderance was seen for either subtype(~75%). The most common presentations were chest pain(n=60;58%), dyspnoea(n=46;44%), and headache(n=41;39.4%). Those with atypical subtype more often presented with fluid overload(typical:3% *versus* atypical:60%); acute pulmonary oedema(35% *versus* 60%); and cardiogenic shock(22% *versus* 43%)(all p<0.05). Six patients(6%) died pre-operatively(typical:8% *versus* atypical:3%;p=0.32). Non-fatal pre-operative complications occurred more among those with atypical TCM(p<0.001), specifically cardiac arrest (typical:5% *versus* atypical:32%) and respiratory failure(9% *versus* 24%)(both p<0.05). Overall, 98 underwent surgery, majority undergoing laparoscopic adrenalectomy (81%); similar among the subtypes(p=0.71). No robust data was provided on short-term outcomes, although two patients suffered from post-operative complications.

Conclusion

Although quite similar in presentation to either standalone TCM or PCC, PCC-TCM seems to be associated with a higher degree of morbidity and mortality. The atypical PCC-TCM subgroup seems to have a more severe course with possibly a poorer outcome. Further research is needed to make more reliable inferences.

92 Adrenal metastasectomy in a large nationwide study: Clinical outcomes, safety, and prognostic factors

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Background

Data regarding adrenal metastasectomy is limited. Here, we evaluated clinical outcomes, safety, and prognostic factors in patients undergoing adrenal metastasectomy in a large nationwide study.

Method

Patients undergoing adrenal metastasectomy 2000-2018 were identified in the Danish National Pathology Registry using pathology codes for “adrenal gland” and “metastasis”. Medical records were reviewed to confirm eligibility and to collect clinical data. The primary outcome was overall survival, assessed by Kaplan-Meier method. Cox multivariable regressions analyses adjusted for baseline factors.

Results

In total, 435 patients underwent adrenal metastasectomy; the primary cancer origin were renal (n=195, 45%), lung (n=121, 28%), colorectal (n=50, 11%), and other (n=69, 16%). Median age was 66 years (IQR 59-71), and 280 (64%) were men. The 5-years OS was 31%. The 30-day mortality was 1.8%. Complications were more frequent and severe in patients who underwent open surgery compared to laparoscopic surgery (Clavien-Dindo III-V, 31.5% vs 11.8%, respectively, p<0.001). Factors associated with poor survival included non-radical pR2-resection (HR=3.57, CI95% 1.96-6.48), tumour size >50 mm (HR=1.79, CI95% 1.26-2.52), lung cancer origin (HR=1.77, CI95% 1.31-2.40), open surgical approach (HR=1.33, CI95% 1.04-1.71), presence of extra-adrenal metastases (HR=1.31, CI95% 1.01-1.71), and increasing Charlson Comorbidity Index factors (HR=1.14 per 1 point increase (CI95% 1.03-1.27)).

Conclusion

Adrenal metastasectomy is safe, and may result in long-term survival in a subset of patients; but non-radical resection, large tumour size, lung cancer origin, open approach, presence of extra-adrenal metastases, and comorbidity were associated with inferior outcomes. This information may guide patient counselling and treatment decisions.

155 Adrenal gland and lesion identification in ct scans with machine learning

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Background

Whereas 5-10% of the population present incidental adrenal lesions in imaging, most are benign. Artificial intelligence (AI) could assist clinicians in their interpretation in CT scans, facilitate assessment of potential malignancy and functionality, and orientate towards surgery when necessary. As a crucial step for AI to enable robust non-invasive diagnosis, the aim of this retrospective clinical study was to automatically segment normal adrenal parenchyma versus adrenal lesions in CTs via machine learning.

Method

Manual annotation of parenchyma and lesions was performed in 106 CT scans, 56 from the local DALI adrenalectomy dataset (36L/20R, 01/2012-12/2017, 42 benign/14 malignant), and 50 from an open access database (AbdomenCT-1K, 3 lesions). A deep learning algorithm (randomly initialised nnU-Net) was trained to automatically segment parenchyma and lesions and was evaluated with a 5-fold cross-validation approach. AI segmentations were compared to the manual ground truth. Performance assessment included Dice similarity coefficient (2TP/(2TP+FP+FN)), precision (TP/(TP+FP)), and sensitivity (TP/(TP+FN)).

Results

The AI segmentation achieved detailed segmentation of parenchyma and lesions. Its performance reached a mean dice score of 0.83±0.12, precision 0.84±0.13, and sensitivity 0.84±0.13 for normal parenchyma, and a mean dice score of 0.64±0.37, precision 0.77±0.34, and sensitivity 0.69±0.35 for adrenal lesions. Segmentation performance was significantly higher for lesions ≥4cm than <4cm diameter (dice p=0.0003, precision p=0.0011, sensitivity p=0.0006).

Conclusion

An adrenal gland segmentation dataset distinguishing between normal parenchyma and lesions was developed. AI adrenal segmentation surpasses reported performances and paves the way towards automated tumour identification, and potentially diagnostic subtype classification.

146 Introduction of Indocyanine Green (ICG) in Laparoscopic Adrenalectomy: initial experience

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Background

The most challenging steps in any Laparoscopic Adrenalectomy (LA) are the identification of the adrenal vein and the tumor. ICG fluorescent imaging facilitates the assessment of tissue vascularity and tissue distinction. The aim of this study is to present our initial findings of the potential benefits of the use of ICG in LA.

Method

This is a prospective study including all patients that underwent LA in our Department since June 2020. An initial dosage of 5 mg was administered upon exposure of the retroperitoneal space. An additional dosage of 2.5 up to 7.5 mg of ICG was administered after initial dissection and identification of the adrenal gland. Patient demographics, indication for surgery, the time between the administration and the visualization of the vasculature and operative time were also measured.

Results

34 patients underwent LA using near-infra-red fluorescence in our department, with 14 of them being Left adrenalectomies, 19 right adrenalectomies and in 2 cases both adrenal glands were excised. Operative time varied between 120 and 160 minutes. The time between ICG injection and visualization of the vein varied between 60 and 70 seconds. The vein was clearly visualized in 12/19 right adrenalectomies, 11/14 right adrenalectomies

Conclusion

In our initial experience, the addition of ICG fluorescence in LA is a safe technique which has proven useful in some cases, although our data is inconclusive on whether it should be a standardized technique. Further evaluation is needed to prove its advantages over classic LA.

Oral Paper Session 2

Benign thyroid

232 Intraoperative neuromonitoring and staged thyroidectomy - our experience after 3100 monitored operations

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Background

The aim of this study is to present the role of intraoperative neuromonitoring (IONM) in cases with loss of signal on the first side of resection in both malignant and benign thyroid conditions.

Method

This is a retrospective study of 3106 patients who underwent a scheduled total thyroidectomy with or without neck dissection in our department over the last nine years (2013-2021). Of those patients, 536 were excluded because of previous operation, lobectomies and pre-existing vocal cord paralysis. 2570 patients were enrolled in this study. All patients were subjected to pre- and postoperative laryngoscopy, while the same experienced team performed all surgeries using IONM.

Results

The incidence of vocal cord palsy (VCP) was 5,09% (131/2570 patients). Five of them (0,19%) were permanent VCP and the rest were transient VCP (4,9%). Fifty-two (2,02%) with LOS on the first side of resection underwent lobectomy instead the initially scheduled total thyroidectomy. Among the candidates for staged thyroidectomy the VCP resolved within two months for 48/52 patients (92.3%), while three of them persisted for more than six months (permanent VCP) and one recovered four months after surgery. We did not experience any permanent bilateral RLN palsy after the implementation of the staged procedure.

Conclusion

The IONM real time information about RLNs' functional integrity allows the surgeon to modify the initially planned bilateral procedure and practically eliminates the risk of bilateral RLN injury.

173 Clinical and Anatomical Factors Affecting Recurrent Laryngeal Nerve Paralysis During Thyroidectomy via Intraoperative Nerve Monitorisation

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Background

Despite all the technical developments in thyroidectomy and the use of intraoperative nerve monitorisation (IONM), recurrent laryngeal nerve (RLN) paralysis may still occur. We aimed to evaluate the effects of anatomical variations, clinical features and intervention type on RLN paralysis.

Method

The RLNs identified till the laryngeal entry point, between January-2016 and September-2021, were included in the study. The effects of RLN anatomical features considering the International RLN Anatomical Classification System, intervention and monitoring types on RLN paralysis were evaluated.

Results

1412 neck sides of 871 patients (672F, 199M) with mean age of 49,17±13,42 years (range, 18-99) were evaluated. Eighty-three nerves (5.9%) including 78 nerves with transient (5.5%) and 5 (0.4%) with permanent vocal cord paralysis (VCP) were detected.

The factors that may increase the risk of VCP were evaluated with binary logistic regression analysis. While the secondary thyroidectomy (OR:2.809, 95%CI: 1.302-6.061, p=0.008) and Berry entrapment of RLN (OR:2.347, 95%CI:1.425-3.876, p=0.001) were detected as the independent risk factors for total VCP, the use of intermittent-IONM (OR:2.217, 95%CI:1.299-3.788, 0.004), secondary thyroidectomy (OR:3,257, 95%CI: 1.340-7.937, p=0.009), and nerve branching (OR:1.739, 95%CI:1.049-2.882, p=0,032) were detected as independent risk factors for transient VCP.

Conclusion

Preferrance of continuous-IONM particularly in secondary thyroidectomies would reduce the risk of VCP. Anatomical variations of the RLN cannot be predicted preoperatively. Revealing anatomical features with careful dissection may contribute to risk reduction by minimizing actions causing traction trauma or compression on the nerve.

217 Mortality after thyroid surgery for benign multinodular goiter with or without thyroid hormone replacement therapy

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Background

Hypothyroidism following hemithyroidectomy has been reported in more than half of the patients. Thyroid hormone replacement therapy (THT) in subclinical hypothyroidism may show benefits on mortality in adults aged < 65 years. However, THT suppressing TSH has been shown to be associated with atrial fibrillation and lower bone mass. It is not known how THT following surgery for benign thyroid disease affects mortality or morbidity

Method

A retrospective observational study was conducted by using population based registries in Sweden. Overall mortality was compared for patients with or without THT in patients operated with hemithyroidectomy or total thyroidectomy (TT) for benign non-toxic nodular goitre.

Results

Between July 1, 2005 and December 31, 2017, a total of 5574 patients were included in the study. The mean follow -up was in median 5.8 (0.2-12.5) years

1661 (30 %) of patients had TT and were by default prescribed THT. In the hemithyroidectomy group 35 per cent were prescribed THT during the study period . The HT group not treated with THT had a standard mortality rate (SMR) of 1.31 (CI 0.93-1.60). The mortality was not increased in patients with THT.

Conclusion

Less than 35 per cent of patients operated with HT for benign thyroid disease in Sweden were prescribed THT with a median follow up of 5.8 years. Patients undergoing HT without THT had a 30 per cent higher risk of death compared to the normal Swedish population.

40 Uncovering IONM data errors that challenge established normal ranges and threshold values - A R based tool to validate IONM raw data

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Background

Intraoperative Neuromonitoring is widely used in thyroid surgery to prevent unilateral and especially bilateral RLN paresis. To assess RLN function and to predict postoperative vocal cord mobility, standard values for amplitude and latency for the RLN and vagal nerves have been published. However, measures that exclude errors of the underlying data due to immanent software errors and false data labeling are not described. Adequate tools to evaluate IONM raw data prior to statistical analysis do not exist.

Method

An application (MIONQA) was developed using R, a programming language and free software environment for statistical computing and graphics, that allows visualization, correction, and analysis of complete raw data from IONM. MIONQA was used to evaluate IONM data generated and exported from the C2 neuromonitoring system (INOMED) into csv-files.

Results

IONM data files of 1935 patients consecutively operated from June 2014 to May 2020 were selected. Of these 1921 were readable. 34 files were excluded for missing data labeling. 46 files included systematic errors which were corrected. Plausibility checks revealed less than 2% device errors for EMG signal detection but 988 files (~50%) contained at least one potential labeling error or inconsistency necessitating review.

Conclusion

IONM data must undergo in-depth review and multistep cleaning processes to ensure sufficient data quality prior to statistical analysis. MIONQA is an easy-to-use tool that supports this process. Published data lacking data validation must be questioned.

139 Is it time to give up serum calcium levels measurements on POD1 after total thyroidectomy? Using intraoperative PTH measurement alone is enough to predict postoperative hypocalcemia.

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Background

Postoperative hypocalcemia is the most common complication after total thyroidectomy (TT). The aim of this study was to compare intraoperative parathyroid hormone (PTH) levels at 20 minutes after TT (IO-PTH20) and serum calcium levels on POD1 (CaPOD1) for the detection of postoperative hypoparathyroidism.

Method

From 11/2017 to 11/2021, all consecutive patients with TT in one step were included. In the first study period (11/2017-05/2020), IO-PTH20 and CaPOD1 were used to find the best test for predicting hypocalcemia. In the second study period (06/2020-11/2021), we used only IO-PTH20; when levels were <20 pg/mL, patients were treated with calcium and alfacalcidol.

Results

In the first study period, 1,965 TT (1,548 female, mean age: 51ys) were performed, including 732 patients (37%) with thyroid carcinoma. A total of 314 patients (16%) experienced hypocalcemia: only 58% (183 patients) were detected with CaPOD1<8.0mg/dL; this rate increased to 90% (282 patients) when using IO-PTH20 ($p<0.001$). A few patients with CaPOD1≥8.0 mg/dl and IO-PTH20 ≥20 ng/L finally developed hypocalcemia (13 patients, 0.7%). Hypoparathyroidism was permanent in 20 patients (1%), with a higher predictive value of IO-PTH20 over CaPOD1, 18/20 (90%) vs. 8/20 (40%, $p<0.01$). In the second period, 1,000 patients were included in the study, with a mean IO-PTH20 of 24±19.7. Only 37 patients developed a symptomatic hypocalcemia, including 3 patients (0.3%) with IO-PTH20 >20.

Conclusion

IO-PTH20 is reliable to predict hypocalcemia and CaPOD1 should no longer be used. Systematic prophylactic oral calcium and vitamin D supplementation should be adapted to IO-PTH20 to reduce the risk of symptomatic postoperative hypocalcemia after TT.

41 Smart data quality validation in EUROCRINE using Microsoft PowerBI

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Background

Medical registers have gained significant importance to evaluate the health care quality. In absence of high-quality evidence such as randomized controlled trials in endocrine surgery, studies based on registry data have a significant impact on recent guideline recommendation. However, the data quality of registries has been questioned. Means to check data quality such as plausibility, completeness and accuracy are rarely described. To ensure the credibility of registry-based studies, registries must use all technical and operational means available to guarantee data quality.

Method

To ensure high data quality in EUROCRINE a stepwise process was established that includes the following measures:

1. Questionnaire to identify coding problems and distribution of manuals for coding
2. Real-time plausibility checks during data entry
3. Reminder notifications for missing data
4. Data quality reports designed in Microsoft Power BI that support data contributors to identify and correct implausible and missing data autonomously
5. Audits in participating clinics

Results

A multitude of technical possibilities (for instance design of the input screens, real-time plausibility check during data entry) are not sufficient to eliminate human errors (typos, skipped variable field) at data entry. It is very important to provide data entry clerks with an efficient, smart tool to identify implausible entries or missing entries any time, as they have the clinical information to correct these errors.

Conclusion

Data quality reports generated with Microsoft Power BI enable clinics participating in EUROCRINE to self-audit their data at any time and thus increase the credibility of the data on which studies are built.

Oral Paper Session 3

Parathyroid A

212 Primary hyperparathyroidism – a potential trigger of migraine? The result of a nationwide study.

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Background

Primary hyperparathyroidism (pHPT) is often associated with neuropsychiatric symptoms. Hypercalcemia, the main characteristic of pHPT, was recently identified as a risk factor for migraine. The aim of this study was to analyze consumption of antimigraine medication among pHPT patients before and after parathyroidectomy, PTX.

Method

Design: A combined retrospective case-control and a forward-looking cohort study of dispenses of antimigraine medication before and after PTX.

Methods and material: 8,279 patients with pHPT registered after PTX between 1st July 2008 to 31stDecember 2017, identified in the Scandinavian Quality Register of Thyroid, Parathyroid and Adrenal Surgery and the Swedish Cancer Register, were compared to a control cohort from the total population (n = 82,790), matched by age, gender and county. Information of expedited drug prescriptions were collected from the Swedish Prescribed Drug Register (SDR). Regression analyses were used for calculation of drug dispenses before and after index date, defined as time for PTX in patients and their matched controls.

Results

Expedited prescriptions of antimigraine medication were more common in PHPT patients within 3 years before index date (4.0 vs. 2.8 %; OR 1.47 (95% CI 1.30-1.65)). The OR´s were inversely correlated to ionized calcium levels (*P*=0.0007) and age (*P*=0.047). Patients with prevalent dispenses within 1 year before index normalized their consumption within the first year after indexdate (RR 0.90 (0.81-1.02)).

Conclusion

Dispenses of antimigraine medication is minimally but significantly more common in untreated pHPT. The inverse association to the calcium level indicates a complex relationship, with involvement of other factors than hypercalcemia.

204 Contrast-Enhanced Ultrasound - Potential New Player in Differentiation of Parathyroid Lesions?

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Background

Preoperative differentiating of enlarged parathyroid glands may be challenging in conventional B-mode ultrasound. The aim of prospective study was to analyze qualitative and quantitative characteristics of parathyroid gland lesions using multiparametric ultrasound protocol - B-mode, Color Doppler (CD), and contrast-enhanced ultrasound (CEUS) and to evaluate correlation with morphology in patients with hyperparathyroidism (HPT).

Method

Consecutive 75 patients with 88 parathyroid lesions and confirmed prior to parathyroidectomy were enrolled in the study. B-mode ultrasound, CD, and CEUS were performed with the subsequent qualitative and quantitative evaluation of acquired data. Correlation with post-surgical morphology was evaluated.

Results

Seventy parathyroid adenomas (PA) were hypoechoic and well contoured with increased central echogenicity (44.3%), peripheral-central vascularization (47%), polar-feeding vessel (100%). Twelve hyperplasias presented with similar ultrasound appearance and were smaller in volume ($p=0.036$). Subtypes of PA included chief-cell, water clear-cell and oxyphil. PH had a tendency for homogenous, marked vs. peripherally enhanced PA with central wash-out in CEUS post-processing analysis ($p<0.01$). Oxyphil PA had tendency of higher wash-out rate vs. other PA subtypes ($p=0.79$). CEUS achieved 90.9% sensitivity, 72.7% specificity, 93% PPV, 87.3% NPV and 87.3% accuracy in the differentiation of parathyroid lesions. Quantitative CEUS post-processing lesion analysis increased sensitivity up to 98%, specificity 80%, PPV 98%, NPV 80% and accuracy 96.4%.

Conclusion

CEUS of parathyroid lesions shows potential in the differentiation of adenoma from hyperplasia and between adenoma subtypes. The quantitative analysis improved the sensitivity and specificity of differentiation between parathyroid lesions.

194 Evaluation of accuracy of intraoperative fluorescence techniques in predicting parathyroid hormone levels after thyroidectomy

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Background

Post-operative hypocalcemia is the most common post-thyroidectomy complication. Autofluorescence (AF) and ICG angiography (ICG-a) have been recently introduced to enhance intraoperative localization and viability assessment of parathyroid glands (PGs). However, the correlation between intraoperative findings and post-operative PTH levels remains unclear. We prospectively evaluated the accuracy of fluorescence techniques in predicting post-thyroidectomy PTH levels.

Method

Among a series of 144 neck endocrine procedures performed in May 2021, we included all the consenting patients who underwent AF+IGC-a. The number of identified (AF-score) and well vascularized (ICG-a-score) parathyroid glands were correlated to PTH and calcium levels using the ROC analysis.

Results

Forty patients were prospectively enrolled. For PTH≥14 pg/ml the Area Under the Curve (AUC) was 0.872 ($p<0.001$), the ICG-a-score cutoff was >2, the sensitivity was 70.4% and the specificity was 80.6%. For calcium level≥8 mg/dl the AUC was 0.982 ($p<0.001$), the ICG-a-score cutoff was >1, the sensitivity was 88.9%, and the specificity was 75.0%. For ΔPTH<50% the AUC was 0.655 ($p=0.160$), the ICG-a-score cutoff was >3, the sensitivity was 35.4% and the specificity was 91.7%. At 6-months only one patient required vitamin-D supplementation.

Conclusion

Due to limitations related to qualitative, non-quantitative evaluation, AF and ICG-a should be integrated and cannot replace post-operative calcium and PTH measurement. Nonetheless, for ICG-a-score=4 post-operative supplementation is not necessary, for ICG-a-score<1 early supplementation is mandatory. In intermediate grey-zone calcium and PTH levels measurements are still necessary to define the correct management.

64 Diagnostic rechallenge with ^{18}f-fch pet/ct often allowsminimally invasive parathyroidectomy while maintaining exceptional cure rates

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Background

minimally invasive parathyroidectomy (MIP) has gained acceptance as the preferred surgical procedure for management of primary hyperparathyroidism (pHPT). Appropriate selection of patients for a MIP is a crucial step in its utilization. The aim of the study was to evaluate the role of 18F-FCH PET/CT as second line imaging for accurately directing MIP.

Method

This is a retrospective single center study. Seventy-two patients with biochemical evidence of pHPT and a non-conclusive or negative first-line imaging (ultrasound and dual isotope subtraction scintigraphy) received ^{18}F-FCH PET/CT between January 2018 and February 2020. All imaging studies were performed at our institution. Assessment of therapeutic changes and outcomes was performed.

Results

Of the 72 patients imaged with ^{18}F-FCH PET/CT, 54 subsequently underwent parathyroidectomy. When Considering the ability of ^{18}F-FCH PET/CTalone to predict a uniglandular disease, thesensitivity, specificity, PPV and NPV were 92.7% (95%CI: 80.1-98.5), 46.2% (19.2-74.9), PPV 87.3% (80.5-92) and NPV 61.2% (31.4-84.5), respectively. When we combined the data provided by ^{18}F-FCH PET/CTwith the data already collected from 1stline imaging we were able to complete a minimally invasive surgery in 38 of the 41 (92%) patients with a uniglandular disease. Thirteen patients (24%) had a multiglandular disease, all of them except one underwent bilateral neck exploration based on the data collected by all imaging modalities combined. Overall, cure was achieved is 53 (98%) patients.

Conclusion

^{18}F-FCH PET/CTwhen used as second line after optimal first-line imaging allowed us to increase utilization of minimally invasive parathyroidectomy while maintaining exceptional cure rates.

24 Is the indocyanine green score an accurate predictor of postoperative parathyroid hormone level?

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Background

Hypoparathyroidism is common after total thyroidectomy, primarily due to inadvertent disruption of the parathyroid gland (PG) blood supply during thyroid dissection. Indocyanine green (ICG) helps determine the degree of vascularization and correlates with PG vitality. It is difficult to determine how the ICG score affects postoperative parathyroid hormone (PTH) levels because all four PGs must be evaluated during surgery. We determined whether there is a correlation between intraoperative ICG score and postoperative serum parathyroid hormone levels.

Method

We retrospectively studied patients who underwent total thyroidectomy where we could identify all four PGs and establish a global ICG score. Each PG was scored from 0 to 2 depending on ICG uptake. The global ICG score was the sum of the individual scores for each gland. The scores were then correlated to PTH and calcium levels on days 1 and 10 after surgery.

Results

We included 83 patients, 11 of whom presented with postoperative transient hypoparathyroidism; all but one had an ICG score lower than 4/8. There was a significant correlation between the global ICG score and postoperative PTH level. A global ICG score > 3,75 can exclude postoperative hypoparathyroidism with a true negative value of 98%. ICG angiography is a better diagnostic test to predict a post-operative transient hypoparathyroidism compared to visual perfusion scoring.

Conclusion

These findings suggest that the ICG score based on intraoperative ICG angiography predicts PG function. It is a valuable instrument to predict hypoparathyroidism after total thyroidectomy.

Oral Paper Session 4

Adrenal & NET B

165 SimLife Model Training in Endocrine Surgery (adrenalectomy, thyroidectomy and neck dissection). First National French-AFCE Session

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Background

The SimLife Model consists of a simulated patient using a fresh human body donated to science, energized by pulsatile vascularization with simulated blood heated to 37°C and mechanical ventilation. We report the First French-AFCE Session of SimLife Training in Endocrine Surgery.

Method

A two-days session on endocrine surgery procedures was designed by AFCE. Each day was composed by a first theoretical part in endocrine pathology and surgical techniques, followed by a wet-lab session on SimLife Model. The primary outcome was to evaluate learners' performance by specifically designed scoring scale to assess competency. Learners' satisfaction was evaluated using a Likert scale of 1 to 10 on four items (ease of learning, anatomic correspondence of landmarks, realism, and impact on actual. surgical practice).

Results

Six junior surgeons completed the session. Each one acted once as first surgeon and then as assistant in a laparoscopic adrenalectomy, standard thyroid lobo-isthmectomy and ipsilateral neck dissection. Each couple was supervised by a senior certificated (DES endocrine surgery) surgeon. Learners' performance mean score was of 15.9/20 on adrenalectomy, 18.9/20 on thyroid lobectomy, 16.1/20 on neck dissection. Satisfaction scores for the specified four items ranged between 8.85 (SD 0.65) and 9.25(SD 0.96). No major vascular lesions were reported during the session.

Conclusion

SimLife is a hyper-realistic training model that allows to train junior surgeons in difficult endocrine surgical procedures for acquisition of skills and to correctly evaluate performance progression. It will be implemented by AFCE as a cornerstone in endocrine surgery training to enter academic career in France.

144 Long term outcome after surgery for pheochromocytoma/paraganglioma

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Background

Pheochromocytoma/Paraganglioma (PHEO/PGL) are rare catecholamine-secreting tumors, usually benign and unifocal; malignant in 10% and hereditary in 30% of cases. Prognosis of PHEO/PGL is difficult to predict at the time of diagnosis; long-term follow-up data are scarce and even lacking for apparently benign and sporadic PHEO/PGL. The aim of the study was to analyze the long-term outcome in term of survival and recurrence in PHEO/PGL patients.

Method

A monocentric series of 170 patients undergoing surgery for PHEO/PGL have been analyzed. Recurrence was defined as disease relapse in organs containing chromaffin tissue after postoperative cure; metastatic disease as the presence of PHEO/PGL tissue in organs where it is normally absent.

Results

Long-term follow-up (mean 10 yrs) was available in 101 patients (20% Hereditary, 80% Sporadic). Recurrent disease occurred in 11% of cases (8 Hereditary and 3 Sporadic PHEO/PGL; p=0.0001); metastatic disease in 11 patients with sporadic PHEO/PGL. The 10-year risk of recurrence in all patients was 12%; it was higher in hereditary tumors, and still significant also in apparently sporadic variants (31% vs 5%; p=0.0001). Moreover, 4 patients with sporadic PHEO/PGL died for metastatic disease. The 10-year survival rate was 94%, with significant lower survival in metastatic compared to benign PHEO/PGL (33% vs 100%, p<0.01).

Conclusion

Life-long follow-up is required not only in hereditary PHEO/PGL, but also in apparently sporadic and benign tumors because of the risk of long-term recurrences, and even death in case of malignancy.

49 Robotic adrenalectomy for large adrenal masses: is it the preferred approach?

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Background

Laparoscopy is currently the preferred approach for adrenalectomy.The implementation of robotic surgery provides several advantages for surgery of large adrenal masses, especially in obese patients. However, standard indications of robotic adrenalectomy have not been yet validated. The aim of this study was to evaluate the value of robotic-aided adrenalectomy for adrenal masses.

Method

From October 2020 to October 2021, 59 consecutive patients who have been operated via robotic surgery were retrospectively included. Tumor characteristics (size, secretion status), BMI, postoperative follow-up and complications, operative time have been examined.

Results

Among the 59 adrenal masses, 40 were originated from the left adrenal gland and the remaining 19 from the right one. In 20 cases (34.5%), tumor size was >5 cm (ranging from 5 cm to 14 cm). In 15 patients (25.8%) the BMI was >30kg/m2 and among them 5 patients (33.3%) had adrenal mass > 6 cm. The average operative time was 124 minutes (average of the last 25 procedures: 107 minutes). Hematoma at the insertion site of the optic trocar was observed for the first two procedures. No conversions were performed. 16 pheochromocytomas, 11 Cushing's syndromes, 13 Conn adenomas, 2 metastases and 17 indeterminate masses were found. R0 resection was achieved in all patients, and capsular destruction was not described in any case.

Conclusion

Based on our longstanding experience on laparoscopic surgery, robotic adrenalectomy appears to provide advantages for large masses > 5 cm and this is even more evident for obese patients.

177 Hypocortisolemia following unilateral adrenalectomy

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Background

A regularly observed postoperative complication after unilateral adrenalectomy (UA) is adrenal insufficiency. Its occurrence in Cushing Syndrome is well known, but several studies reported hypocortisolism and adrenal insufficiency following UA for other indications like pheochromocytoma and primary hyperaldosteronism

Method

Retrospective study (2012-2020) looking for hypocortisolemia following UA in patients operated for Cushing Syndrome and other endocrine tumors. We included 115 patients with UA, excluding patients with previous UA. Endocrine laboratory findings pre- and postoperatively were assessed

Results

The analysis of perioperative anesthesia reports showed that 53/115 patients received dexamethasone (DEX). 51/115 patients had a control of postoperative cortisol level. Hyporcortisolemia was observed overall in 28/51, excluding Cushing patients in 24/45, in 19/53 patients who received perioperative dexamethasone (DEX) and in 7/48 in those without DEX

Conclusion

The fact that, some patients received DEX for nausea and vomiting prophylaxis (ERAS pathway), complicated the interpretation of the cortisol levels at postoperative day one (D1). DEX is known to supress the hypothalamic-pituitary-adrenal axis (HPA axis) at D1. Thus, claiming that hypocortisolemia is the result of a cortisol co-secretion (adenoma with double secretion), also able to supress the HPA axis, is not possible in the group of patients who received DEX. These results suggests 1) to fully investigate all hormone functions in case of adrenal mass and 2) not administrating DEX in patients undergoing UA, in order to adequately assess the HPA axis function postoperatively.

203 Robot-assisted vs laparoscopic lateral transabdominal adrenalectomy in a high-volume center: a propensity score matching analysis

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Background

Robot-assisted adrenalectomy (RAA) is a safe approach with the drawback of costs. We evaluated outcomes and cost-effectiveness of robot-assisted (RA-LTA) and laparoscopic (L-LTA) lateral transabdominal adrenalectomy in a high-volume Center.

Method

Among 356 minimally-invasive adrenalectomies (January 2012 - August 2021), 286 were LTA: 191 L-LTA and 95 RA-LTA. The two groups were matched for lesion side and size, hypersecretion and BMI with propensity score matching (PSM) analysis. Outcomes and costs were compared.

Results

PSM analysis identified 184 patients, 92 RA-LTA and 92 L-LTA. The two groups were well matched. The median lesion size was 4 cm (p=0.533). Median operative time (OT) was longer in RA-LTA group (90.0 Vs 65.0 minutes) (p<0.001). There were no conversions. One Clavien-Dindo II postoperative complication was registered in each group (p=1). The cost margin analysis showed a positive income for both procedures (3137 Vs 3968 € for RA-LTA and L-LTA). At multiple logistic regression analysis, independent risk factors for complications were hypercortisolism (OR=24,197, p=0.028), OT >75 min (OR=12,441, p=0.026), lesion size >6 cm (OR=24,298, p=0.032). In the subgroup analysis considering hypercortisolism and lesion size >6 cm the median OT of RA-LTA and L-LTA was 90.0 Vs 75.0 minutes (p=0.545) and 90.0 Vs 89.0 minutes (p= 0.620) respectively.

Conclusion

RA-LTA and L-TLA had similar outcome in our experience. Despite the higher cost, RAA appears to be cost-effective and economically sustainable in a high-volume center, especially if performed in challenging cases.

4 Local treatment of neuroendocrine liver metastases: surgery or microwave ablation?

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Background

Surgical resection of neuroendocrine tumor liver metastases (NETLM) has been proven to improve survival, but the benefit of microwave ablation (MWA) as an alternative or adjunct has yet to be assessed. We hypothesize that MWA is equal to surgery in terms of local recurrence and survival.

Method

Retrospective analysis including all patients treated with MWA and/or surgical resection for NETLM in our institution between 2008 and 09/2019. Indication for MWA and/or surgery was determined by the interdisciplinary tumorboard. Follow-up consisted of imaging every 3-6 months.

Results

A total of 56 patients and 81 interventions were included: 40 liver resections, 25 MWAs, and 16 combined procedures. The majority of patients (41/56, 73.2%) underwent curative procedures, 15 patients (26.8%) debulking procedures. 145 individual lesions were treated with ablation, representing median 4 lesions per session (1-30). When comparing patients who underwent MWA only versus those who underwent surgery with or without MWA, we observed significantly less complications (p=0.004) and shorter length of stay (p=0.006) in the MWA group. Local recurrence rate was similar for lesions treated with MWA or resection (p=0.579). Liver-only disease progression was detected in 26.8% of the patients and overall progression in 66%. Mean survival was 71.1 months (6 to 374) and was comparable in both groups (p = 0.5990).

Conclusion

Depending on the extent of the liver metastases, MWA might be a safe alternative or addition to resection for NETLM with low morbidity and high local efficiency.

Oral Paper Session 5

Malignant thyroid A

129 Total thyroidectomy in papillary carcinoma: a 5-year retrospective review

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Background

Current guidelines by ATA and ESMO suggest that for selected low-risk tumours (T1a/b,T2 N0) first line treatment should be thyroid lobectomy. Lobectomy has an increased risk of local recurrence but does not seem to decrease overall survival (OS). We have conducted a retrospective review of 541 patients who received a total thyroidectomy between 2016 and 2021. The aim was to identify the percentage of multifocal papillary thyroid carcinomas (PTMC) and the number of T1a/b,T2 tumours that had lymphatic spread in histopathology reports. These patients would benefit from a total thyroidectomy despite current guidelines.

Method

541 patients with total thyroidectomy were included in the study. Their clinical notes and histopathology reports were obtained with permission from the University Clinical Research Board. Patients with benign thyroid disease were excluded.

Results

150 patients had papillary thyroid carcinoma (PTC), including 58 patients (38.7%) with PTMC and 92 with solitary PTC. 118 were female (78.6%) and 32 were male (21.3%). Median age was 48.78 years. 9 patients (0.06%) with T1a/b and T2 tumours were found to have positive lymph nodes in their histopathology reports.

Conclusion

From our cohort, 67 patients (44.7%) had an indication for total thyroidectomy when they would have been offered a thyroid lobectomy based on the current guidelines. We are suggesting a review of the current guideline and note the need for further research in this domain.

163 One-year use of Near-Infrared Parathyroid Auto-Fluorescence (NIRAF) in a referral center for thyroid surgery. Prospective cohort study of long-term follow-up

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Background

Transient post-operatory hypoparathyroidism may affect up to 38% of patients undergoing total thyroidectomy, resulting in prolonged hospital stay or hospital readmission. When permanent (up to 7%) it strongly affects patient' quality of life. Since its introduction in current surgical practice NIRAF demonstrated to reduce post-operatory hypoparathyroidism rate.

Method

Patients undergoing not less than total thyroidectomy by two senior surgeons between January 2020 and June 2021, and for whom a complete follow-up of six months was available, were included in the study. They were allocated in two different cohorts: NIRAF Group(NG) and Control Group(CG). In NG NIRAF started by the beginning of thyroid bed dissection, while in CG visual inspection was used.

Results

Two-hundred-thirty-one patients underwent total thyroidectomy, 112 in NG and 119 in CG. No differences were present in patients' demographics between groups. In NG 415/448 parathyroids were detected while in CG were 385/478($p<0.00001$). Accidental parathyroidectomy was reported in 7/448 patients in NG and in 31/476 in CG($p=0.0001$). No accidental parathyroidectomy was reported in all patients in NG (n=31) who had concomitant central neck dissection. Mean calcium levels were comparable between groups, while mean values of PTH(ng/ml) at post-operative day-1 were higher in NG compared to CG (28,2 versus 25,4)($p=0.0008$). Post-operative transient hypoparathyroidism occurred in 15/112 patients (13,3%) in NG and in 40/119 patients (33%) in CG($p=0.0003$), remaining definitive in 1/112 patients (0.9%) in NF and in 8/119 patients (6.7%) in CG($p=0.02$).

Conclusion

NIRAF use is effective to decrease parathyroid's morbidity by 2.5-fold for transient hypoparathyroidism and by 7-fold for permanent hypoparathyroidism.

20 Poorly Differentiated Thyroid Cancer: Clinical, Pathological, Mutational, and Outcome Analysis

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Background

PDTC remains a challenge not only for pathologists and surgeons because of difficulties associated with the diagnostic process and the compelling need of difficulty thyroidectomy

Method

This is a retrospective analysis of operated cases of poorly-differentiated thyroid carcinoma during the year 1990-2019. All histology slides were reviewed by two independent experienced pathologists keeping only those slides which fulfilled the Turin criteria. Mutation analysis was done for BRAF, RET/PTC, RAS and PI3KCA. The slides were also studied for P53 immunostaining

Results

There were 39 patients, median age= 53 years, 4 patients were more than 55 years. At presentation, 38.4% had compressive features and median tumor size was 9cm. At operation 67.7% had extra-thyroidal extension. R0 resection was achieved in 41% with 12 cases resulting in a difficult thyroidectom;. necrosis in 65.7% and mitosis in 73.3% with well-differentiated component in 41%. The commonest mutation was RAS(23.1%) . Survival analysis revealed higher survivalof the operable group (54.26, 95% CI: 30.83-77.70 vs. 20.25, 95% CI :0-54.07) months respectively; however,10 year survival was only 5%.

Conclusion

Aggressive surgical resection in the form of extended/radical thyroidectomyresult in better loco-regional control and improve survival. RAS is the commonest mutation . It will be worthwhile to identify adverse prognostic factors like presence of atypical mitosis in an attempt to identify less favourable PDTC tumors.

46 Clinical issues concerning active surveillance for low-risk Papillary Thyroid Carcinoma

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Background

Small papillary thyroid carcinomas (PTC) are frequent in healthy adults and may have indolent behavior. Aim of our study: to asses the feasibility of surveillance versus immediate surgery in patients with FNA Bethesda V -VI thyroid nodules.

Method

Single center prospective surveillance study 2011-2021. 117 patients (age 25-75) chose observation instead of immediate surgery.
Inclusion criteria: FNA suspected low-risk PTC d<10mm (Bethesda V or VI) ; patient preference.
Exclusion criteria: nodules >10mm, non-PTC hystology, high risk locations, elevated basal Calcitonin, suspicious lymph nodes.
Switch to surgery : significant nodule enlargement, suspected nodal progression, patient request.
Surveillance protocol: Every 6-12 months TSH and Neck ultrasound (5-69 months follow up).

Results

19 out of 117 patients underwent surgery for size enlargement (n=4), ultrasound suspected lymph nodes (n=6), patient request (n=9), or elevated Calcitonin (n=1). Histology revealed 13 PTCs, one MTC and 5 benign lesions. TNM Details: pT1aNoMo (n= 12); pT1bNoMo (n= 4); pT1apN1aMo (n=2); pT1bpN1aMo (n=1). 98 patients were followed up without evidence of progression. None of the patients showed distant metastases or died.
Clinical issues hindering active surveillance were as follows: Patient's background – acceptance of surveillance policy (n=117), fear of disease progression, surgery due to anxiety (n=9). Thyroid ultrasonography issues – access to high quality ultrasound examination, data collection. Arguments by other doctors – easy treatment with lobectomy, cost of active surveillance.

Conclusion

Active surveillance without immediate surgery seems a proper decision in low risk PTC.

3 Feasibility of thyroid lobectomy according to the ATA 2015 guidelines in clinical practice: a 5-year single center retrospective study

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Background

According to the latest ATA guidelines (2015), endocrine surgeons have the option to choose between lobectomy (TL) or total thyroidectomy (TT) in various cases of suspected DTC based on the FNA and preoperative ultrasound. In our center TT is preferred in the majority of cases. This study retrospectively analyses the potential need for reoperation if TL was the initial therapy.

Method

Out of 1277 patients operated between 1/1/2016 and 31/12/2020, 320 fulfilled the criteria for TL on initial diagnosis. Patients included had an FNA ranging from I-VI on the Bethesda classification system. Based on the final histopathology results, parameters leading to reoperation for complete excision would be multifocality, extrathyroidal extension (ETE), positive lymph nodes attached to the specimen and upstaging to myeloid or non-differentiated cancer.

Results

207 out of 320 patients (65%) would require reoperation or tight surveillance. Main factors would be multifocality (54%), ETE (25%), positive lymph nodes (18%) and myeloid/non-differentiated cancer (3%). The need for reoperation based on the preoperative Bethesda score ranged from 54%(I) to 81% (II).

Conclusion

Although this study is retrospective and the effect on morbidity and survival cannot be measured since no actual patient underwent TL, it portrays the need for initial treatment with TT in most cases.

Oral Paper Session 6

Malignant thyroid B

138 Impact of a prophylactic lymph node dissection on complications and recurrence in papillary thyroid carcinoma. An AFCE (French-speaking Association of Endocrine Surgery) multicentre study based on Eurocrine® national data.

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Background

Prophylactic lymph node dissection (PLND) remains controversial in the surgery of preoperatively and intraoperatively node-negative (cN0) papillary thyroid carcinoma (PTC).

Method

Patients undergoing thyroidectomy with PLND or without LND (no-LND) for PTC in nine French surgical Departments between January 2015 and June 2021 were included in a cohort study using the EUROCRINE® national data in France. Therapeutic LND were excluded. Demographic, clinicopathologic characteristics, complications and recurrence rates were compared using multivariable regression analysis.

Results

A total of 1,905 PTC patients was reported, including 1,534 PLND and 371 no-LND: 1,546 (81.2%) were female patients, median age was 49 years (range: 15-89). PLND patients were more likely to have multifocal tumors (524(34.2%) vs. 68(18.3%), p<0.001), and largest tumor size (15.3 vs 10.2mm, p=0.01) when compared to no-LND patients. Out of PLND patients, 559

(36.4%) had positive LN (N1) with a median of 3 N1 (IQR 1-10). PLND was associated with a higher temporary hypocalcemia rate: 125 (8%) vs. 15 (4%, p<0.001). Permanent hypocalcemia, temporary and permanent RLN palsy were not significantly different between the 2 groups (p=0.2). The recurrence rate was 4.9% in the PLND group vs. 2.4% in no-LND group (p<0.001). After adjustment for covariates (age, sex, multifocality, and Tstage) in a multivariable cox PH model, type of LND (PLND vs. no-LND) was not associated with PTC recurrence (p=0.2).

Conclusion

PLND in PTC does not reduce recurrence and is associated with a twofold increase in transient hypoparathyroidism.
This data should be taken into account in further guidelines regarding cN0 PTC patients.

229 The potential role of microvesicles in the management of thyroid nodules

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Background

While most thyroid nodules are benign, 10-15% are malignant. Patients with indeterminate cytology, such as thy3f (Bethesda-4) often undergo unnecessary diagnostic surgical resection. The objective of this study is to assess the plasma level of annexin-V positive microvesicles (MVs) and the subpopulation positive for C-X-C chemokine receptor type 7 (CXCR7+MVs), in patients presenting with thyroid nodules.

Method

A total number of 58 patients with a histological diagnosis of thy3f-thy5 (Bethesda-4 to 6) and 32 age and gender matched healthy controls (HC) were included in this study. The final histology confirmed benign (BT) and malignant tumours (MT) in 24(41%) and 32(59%) patients respectively. The Total annexin-V+ MVs and CXCR7+MVs were evaluated in the plasma of the patients and HC using flow cytometry.

Results

Total plasma MVs were significantly higher in patients with BT (median=1017, range=292 to 2729 MVs/mL) and MT (median=806, range=134 to 4140 MVs/mL) in comparison to HC (median=171, range=24 to 493 MVs/mL) ($p<0.0001$). After excluding patients with multinodular goitre, a subgroup analysis of patients presenting with thy3f-thy5 CXCR7+MVs plasma level was significantly higher in MT (median=22, range=4.6 to 805 MVs/mL) compared to BT (median=10.3, range=2 to 88 MVs/mL) ($p=0.009$). The area under the receiver operator curve (AUC) to discriminate between BT and MT using CXCR7+MVs was 75% (95% CI=60-91%, $p=0.01$), with sensitivity and specificity of 44% and 92% respectively (cut-off point=42 MVs/mL).

Conclusion

MVs as biomarkers have a high diagnostic value for thyroid neoplasia. CXCR7+MVs subpopulation may improve the diagnostic strategy for patients presenting with indeterminate thyroid nodules.

206 Does Prophylactic Lymph Node Dissection effects on Surgical Outcomes and Adjuvant Radioactive Iodine Treatment Rates in Papillary Thyroid Cancer Patients

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Background

To evaluate the effects of ipsilateral prophylactic lymph node dissection(PCLND) on surgical outcomes and radioactive Iodine(RAI) treatment rates in clinically node negative patients with papillary thyroid carcinoma(PTC).

Method

Data of 718 patients, who underwent surgery for PTC between January 2010 and December 2020 were evaluated retrospectively. Of these 718 patients, 274(38.2%) underwent total thyroidectomy (TT) and ipsilateral PCLND(Group 1) and 444(61.8%) underwent TT(Group 2). Demographic and histopathologic features, postoperative stimulated thyroglobulin (sTg) levels, lymph node (LN) status , local recurrence, adjuvant RAI treatment rates and response to treatment were compared between the two groups.

Results

Demographic data showed no significant difference between the groups. Tumor size were similar in both groups (16.1±10.4mmvs15.4±12.5mm,p=0.4). Aggressive histopathological subtypes were more frequent in Group 1 compared to Group 2 (7.2%vs3.8%,p=0.03). Postoperative sTg values were similar in both groups (7.5±57.5vs6.7±31.6,p=0.1). Local recurrence rates showed no difference between the two groups (0,018%vs40,01%,p=0.2). Adjuvant RAI rate was significantly higher in group1 compared to group 2 (263(74%)vs 259(58%),p=0.001). Central LN metastasis was detected in 79(%28) patients in Group 1 and incidentally found in 7(0.1%) patients in group 2. The rate of excellent response to treatment showed no significant difference between the two groups (95.6% vs 96.3%).

Conclusion

Ipsilateral PCLND does not have any impact on local recurrence rates and excellent response to treatment in clinically N0 PTC patients but it results in increased rates of RAI treatment.

26 Extension of prophylactic surgery in medullary thyroid carcinoma. Differences between sporadic and hereditary tumours according to calcitonin levels. Multicenter study (MECANO STUDY)

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Background

Currently, there is no consensus on the indication of prophylactic surgery of the nodal compartments in the treatment of medullary thyroid carcinoma (MTC).The aim of our study was to perform a correlation study between preoperative calcitonin values and lymph node involvement to establish a criterion on which to base prophylactic surgery in these patients.

Method

We conducted an observational, retrospective and multicentre study with 29 hospitals. Diagnosis of MTC with a pre-surgical calcitonin registry patients were included. The minimum surgery in all patients had to have been total thyroidectomy (TT) with central compartment lymph node dissection (CCLND).An analysis of receiver operating characteristic (ROC) curves were employed to calculate preoperative calcitonin cut-off values as predictors of postoperative lymph node involvement.

Results

244 patients were included. Baseline calcitonin (basalCT) was a good predictor of nodal involvement (AUC 0.718 and 95%CI 0.66-0.978).A subgroup analysis was performed and we identified the tumour's hereditary nature as a preoperative factor correlated with the tumour's basalCT values (p=0.000). With a probability of lymph node involvement below 10%, new cut-off points were established by hereditary nature (Figure 1).

Conclusion

The basalCT value is a good predictor of postoperative lymph node involvement in MTC, although the cut-off points reported in previous publications and guidelines can change depending on the tumour's hereditary nature. This represents a change with respect to the protocols established so far.

69 Differentiated thyroid carcinoma in pediatric patients younger than 15 years: a propensity score-matched analysis

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Background

The incidence of thyroid cancer in childhood has been increasing gradually for the last few decades both in Korea and throughout the world. It has been suggested, that it present at more advanced stage, with larger tumor size and more aggressive pathological features, higher incidence of logo-regional and distant metastasis.

Method

This retrospective study included 52 pediatric patients younger than 16 years who underwent initial thyroid surgery and were diagnosed with DTC between January 1992 and December 2014 at Yonsei University in Seoul, Korea. For 1:4 propensity score matched analysis, adult patients with matched gender and cancer size were included.

Results

Mean age was 12.56±3.02. The majority of the patient (85.4%) did not have any family history of thyroid cancer. Total thyroidectomy (72.9%) without lateral lymph node dissection (45.8%) was the most performed surgery. Central (73.9%) and lateral neck node metastasis (64.6%) were common. In propensity score matched analysis, central lymph node metastasis and lateral neck node metastasis were significantly more frequent in pediatric patients. In univariate analysis, pediatric patients were more likely to have recurrence (HR 4.919 (1.098-22.043). In Kaplan Meier analysis, recurrence free survival was significantly different comparing adult and pediatric patient (p=0.021).

Conclusion

Pediatric patients showed more aggressive patterns compared to adults with the same cancer size. Central lymph node metastasis and lateral neck node metastasis were more frequent. Recurrence was more significantly observed in Kaplan Meier analysis in pediatric patients compared to matched adults.

150 Prophylactic and Early thyroidectomy in RET germline mutation carriers in children and adults: long-term outcome of a series of 69 patients

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Background

Early and Prophylactic Thyroidectomy (EPT) in RET-germline-mutation carriers allows the definitive cure by the thyroid removal before medullary thyroid carcinoma (MTC) develops or while it is confined to the gland. This study was aimed to assess the clinicopathological features in RET-mutation carriers according to the age at surgery and the long-term outcomes after EPT.

Method

An analysis of 69 operated asymptomatic RET-mutation carriers diagnosed after family screening was performed.

Results

Twenty-four RET-mutation carriers were operated at pediatric age (< 18yrs) and 45 in adulthood (> 18yrs). No differences in terms of sex and RET-risk category were observed between the two groups. C-cell hyperplasia and microMTC occurred in 19 and 50 patients, respectively. Adult RET-mutation carriers had significantly higher levels of calcitonin (0.6 vs 1.35-fold higher than normal; P=0.01) and greater frequency of microMTC at pathology (50% vs 84.4%; P=0.004). Permanent postoperative morbidity occurred in 7.8% (hypoparathyroidism in 3 cases; unilateral vocal cord paresis in 2), without any statistical difference between the two groups. Biochemical postoperative cure was achieved in all patients. However, at a median follow-up of 12 years, all C-cell hyperplasia patients are disease-free; conversely, five patients with microMTC developed a biochemical relapse; one of them had a clinically detectable recurrence 13 years after initial surgery.

Conclusion

EPT is safe and effective in achieving definitive cure in asymptomatic RET-mutation carriers. However, recurrences may occur at long-term follow-up in case of microMTC; EPT should be possibly performed earlier at pediatric age to prevent microMTC and obtain definitive long-term cure with acceptable morbidity.

Oral Paper Session 7

Parathyroid B

27 Could the PTH rise on the first week after total thyroidectomy predict the development of permanent hypoparathyroidism?

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Background

Postoperative hypoparathyroidism is the most frequent complication after total thyroidectomy.There are no reliable immediate postoperative biochemical parameters that allow the identification of those patients with hypocalcemia that will develop protracted or permanent hypoparathyroidism. The aim of this study is to evaluate the parathyroid hormone recovery during the first week after surgery as a predictor of permanent hypoparathyroidism.

Method

A prospective, observational study that includes 100 consecutive patients who underwent a total thyroidectomy was performed.

Results

Transient hypoparathyroidism was present in 42% of patients, 11% developed protracted hypoparathyroidism (1 month after surgery) and 5% permanent hypoparathyroidism.Patients with postoperative transient, protracted and permanent hypoparathyroidism had a greater mean PTH decrease during the first 24 hours (81.7 ± 17.2% vs. 33.4 ± 26.3; p=0.000; 93.7 ± 2.4% vs. 48.4 ± 31.7%; p =0.000 and 94.1 ± 2.3% vs. 51.2 ± 32.6%; p =0.000, respectively).The median PTH rise was similar in patients with protracted hypoparathyroidism and those without it (190 ± 127,6% vs. 188,8 ± 144,6%; p=0,984).Nevertheless, patients with permanent hypoparathyroidism had a lower mean PTH ascent than those without it (111,6 ± 15,6% vs. 197,7 ± 144%; p=0,002).The prevalence of permanent hypoparathyroidism was higher between those with a PTH increase lower than 117% one week after total thyroidectomy (17.6% vs. 2.4%; p =0.009).

Conclusion

Parathyroid gland function recovery and parathyroid hormone rise the first week after total thyroidectomy could predict the development of permanent hypoparathyroidism. Further studies are needed.

47 Retrospective observational study on the management and evolution of normocalcemic primary hyperparathyroidism

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Background

Despite the recommendations of most clinical guidelines regarding the management of normocalcemic primary hyperparathyroidism (nPHPT), it is usually managed differently than hypercalcemic hyperparathyroidism and there is still a resistance to surgical treatment in these patients. We performed a retrospective observational study to describe the evolution and management of nPHPT patients.

Method

Between 2015 and 2017, 6498 patients had PTH levels which where above normal range. After excluding all patients with incomplete follow-up or with an alternative diagnosis, there were 107 patients with nPHPT. We recorded their biochemical parameters, clinical features, localization tests and management at diagnosis and 3 years later.

Results

At diagnosis, 28% of patients had osteoporosis and 15.9% had renoureteral lithiasis. Parathyroid SPECT-CT was performed in 57.9% of patients (50% negative). After 3 years, 7.5% of patients became hypercalcemic, 10.3% developed new onset osteoporosis and 4.9% had a new renal lithiasis episode. We likewise observed a worsening of the T-score values in femur (-0.881 vs. -1.060; p=0.082) and radius (-2.050 vs. -2.200; p=0.087). 51.4% of patients had surgical indication at diagnosis and 56.1% at the end of follow-up. Only 17 patients (15.9%) underwent parathyroidectomy. The finding of a single parathyroid adenoma on SPECT-CT correlated positively with the performance of parathyroidectomy (44,8% vs. 5.1%, p<0.001; OR 15.031, 95%CI 4.332 – 52.157).

Conclusion

Patients with nPHPT might develop relevant clinical manifestations. However, surgical treatment is infrequently performed, probably influenced by the low accuracy of localization imaging tests.

214 What happens to the bone structure after normocalcemic primary hyperparathyroidism surgery?

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Background

The aim of our study was to evaluate the bone changes in patients undergoing parathyroidectomy based on the biochemical profile 1 and 2 years after surgery.

Method

This prospective study included 87 consecutive patients diagnosed with primary hyperparthyroidism who underwent surgery between 2016 and 2018. Bone densitometry were performed preoperatively and postoperatively. Postoperative changes in bone mineral density and bone markers were compared and evaluated according to the clinical characteristics and the individual biochemical profile.

Results

One year after the surgery, we observed a significant decrease in P1NP (33.05 ± 13.16, P 1⁄4 .001), osteocalcin (15.80 ± 6.19, P 1⁄4 .001), and BCTX (0.26 ± 0.32, P .001) levels. One year after surgery, all patients showed an increase in bone mineral density at the lumbar site (mean, 0.029 g/cm2; range, 0.017e0.04; P < .001) and femur neck (mean, 0.025 g/cm2; range, 0.002e0.05; P < .001); however, there were no changes in the distal third of the radius (mean, -0.003 g/ cm2; range, -0.008 to 0.002; P 1⁄4 NS). There were no significant differences when comparing normo- calcemic primary hyperparathyroidism and hypercalcemic primary hyperparathyroidism. Serum osteo- calcin (37 ± 17.41), P1NP (67.53 ± 31.81) and BCTX (0.64 ± 0.37) levels were elevated before surgery. One year after the surgery, we observed a significant decrease in P1NP (33.05 ± 13.16, P 1⁄4 .001), osteocalcin (15.80 ± 6.19, P 1⁄4 .001), and BCTX (0.26 ± 0.32, P < .001) levels.

Conclusion

Our findings indicate that parathyroidectomy has similar benefits for normocalcemic pri- mary hyperparathyroidism and hypercalcemic primary hyperparathyroidism in terms of bone improvement. Although the most substantial improvement occurred during the first postoperative year in both groups, we consider that studies with longer follow-up are warranted.

195 Comparing medication costs after total parathyroidectomy and subtotal parathyroidectomy for secondary hyperparathyroidism

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Background

Subtotal Parathyroidectomy (SPTx) and Total parathyroidectomy with immediate autograft (TPTx) are well recognized techniques for treatment of refractory secondary hyperparathyroidism (2HPT), with similar improvement in the quality of life. The long-term costs after these operations may impact on decision making, according to the health care system. We analyzed medication costs after SPTx and TPTx for severe 2HPT in a randomized trial.

Method

The medication prescribed at 1, 12 and 18 months of 27 SPTx patients were compared to the that of 36 patients after TPTx with immediate autograft of 90 parathyroid fragments. The costs were estimated according to government payment system values, converted to US Dollar (US$).

Results

Median (minimum-maximum) medication costs at 1 month were US$ 149.7 (20.7-629.5) for SPTx and 200.2 (42.3-1539) for TPTx (p=0.14). At 12 months, the costs were US$ 286.2 (0-3236) for SPTx and US$ 82.6 (0-2007) for TPTx (p=0.06). At 18 months US$ 466.3 (0-2018) for SPTx and US$ 88.2 (0- 3316) for TPTx (p=0.02).

Conclusion

Although SPTx and TPTx are equally effective in controlling advanced 2HPT with improvement in survival and quality of life, they may impact differently in the health system in the long run.

166 Socioeconomic factors associated with treatment choice in primary hyperparathyroidism - a population-based study

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Background

Recent data indicate disparities in patientcare of primary hyperparathyroidism (PHPT) with regards to age, ethnicity, and social background. The aim of this study was to analyze socioeconomic factors in selection for parathyroidectomy.

Method

Patients with PHPT who underwent parathyroidectomy in Sweden 2008-2017 were compared with the randomly selected population controls matched by age, gender and county (n=86,260). Socioeconomic data were collected from national registers. Differences between patients and controls were studied by descriptive statistics, and conditional logistic regression with results presented as odds ratios (OR) together with 95% confidence intervals (CI).

Results

The median age of patients (n=8626) was 63 years (range 12-96 years; IQR 18 years) with 77% women. Most patients were born in Sweden (83%). Patients with African ethnicity were overrepresented amongst cases (n=102; 1.2% vs n=741; 0.9%). A Nordic background excluding Sweden was also overrepresented amongst cases (n=471; 5,5% vs. n=3998; 4,6%). Compared with Swedish-born, this difference was statistically significant for African (OR 1.4; CI:1.1-1.7) and other Nordic backgrounds (OR 1.2; CI:1.1-1.3). There was no statistical difference in median family income. Fewer patients had finished only primary education (24% vs 26%) and a larger proportion had a higher education degree (32% vs. 31%, OR 1.1; CI:1.0-1.2). After mutual adjustment with multiple logistic regression analysis, the differences in ethnicity and education remained statistically significant.

Conclusion

Ethnicity and education level is associated with selecting parathyroidectomy in Sweden.

37 Patterns of recurrent and persistent hyperparathyroidism according to whether initial parathyroidectomy was performed at high or low volume centers

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Background

High surgical volume correlates with successful parathyroidectomy. Its influence on the pattern of persistent or recurrent hyperparathyroidism, however, has been scarcely assessed. This is a retrospective analysis of the influence of parathyroid surgery volume at centers where initial parathyroidectomy was performed on the patterns of persistent or recurrent hyperparathyroidism.

Method

Chart review of redo parathyroidectomies for primary (N=49) or secondary hyperparathyroidism (N=4). Patients were referred from low (≤20 parathyroidectomies/years n=30) or high (>20;n=38) volume centers. The prevalence of persistence vs. recurrence and their etiology were recorded.

Results

Some 68 patients underwent 79 redo parathyroidectomies for persistent (78%) or recurrent (22%) hyperparathyroidism. Persistence was more common than recurrence in patients initially operated in low volume centers (90/10% *vs.* 68/32%, P=0.042). Consistently median time between first and redo surgeries was shorter after a first parathyroidectomy in low volume centers (3 *vs*.7 years). Prevalence of missed adenomas at first surgery was in patients inicial operated in low volume centers (63 vs 21%, $p < 0.001$) whereas ectopic glands, double adenomas, remnant hyperplasia and local recurrence were more common after parathyroidectomy at high volume units.

Conclusion

Patterns and proportion of persistence *vs.* recurrence differ according to whether initial parathyroidectomy was performed at high or low volume centers. Persistence after surgery in low volume centers is most often due to missed adenomas in orthotopic location.

Best Oral Paper Session

38 Lenvatinib & Pembrolizumab induces long lasting response in patients with UICC Stage 4C anaplastic and poorly differentiated thyroid cancer

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Background

Anaplastic and poorly differentiated thyroid carcinoma (ATC, PDTC) have increased mutational burden and elevated levels of PD-L1 are common features, suggesting TKI plus checkpoint inhibitors for treatment.

Method

In an ongoing phase II trial (ATLEP) Lenvatinib and Pembrolizumab was given to 36 individuals with ATC (29) or PDTC (7) at a starting dose of 20-24 mg/d (LEN) and 200 mg i.v., q3 w. (PEM) for up to 24 months. Tumors were characterized by WES and PD-L1 expression.

Results

21women;15 men; mean age of 63.75 (39-82) and ECOG ≤1 in 27. 30/36 had surgery; only 6 had no cervical radiotherapy. The primary endpoint (objective response rate (ORR) >10% at 3 months) was reached in ATC and PDTC with an ORR of 38,5% (PR 10/26, SD 15/26 and PD 1/26). After 24 months of treatment ORR in ATC patients was 68,5% (11/16), stable disease was noted in 31,5% (5/16) for a clinical benefit rate (CBR) of 100% (16/16). CTCAE grade III/IV toxicities were recorded in 19/36 and included aspergillus pneumonia (4/36), hemorrhage (4/36), fistulas (4/36), as well as sepsis (3/36) and thrombosis or embolism (5/36). Median PFS was 10 and median OS was 11 months for ATC.

Conclusion

A combination of Lenvatinib and Pembrolizumab is effective in patients with metastasized ATC, including some long-term remissions. More cases w. PDTC will need to be studied to ascertain comparable effectiveness.

134 Prospective clinical trial of a novel, reusable, pocket size Point of Care device to measure ionized calcium in venous and capillary blood: Interim analysis

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Background

Hypocalcaemia after thyroid and parathyroid surgery is common and patients require frequent calcium measurements. Current venous blood measurements are cumbersome, especially after hospital discharge.
The aim of this study was to evaluate whether ionised calcium(iCa) can be accurately measured by a new point of care device(POCD) called LAQUA and to assess equivalence between adjusted calcium(adjCa) and iCa in venous and capillary blood.

Method

Ethical approval was obtained. Patients undergoing thyroid and parathyroid surgery underwent daily measurements of venous blood adjCa and iCa (Cobas-Calcium-Gen.2 and Blood Gas Analyser-ABL90) as "gold standard" and iCa in venous and capillary blood using LAQUA. iCa values were converted to adjCa using normal values ratio (adjCa 2.2-2.6 mmol/L; iCa 1.12-1.32; averaged ratio=1.97).

Results

38 sets of measurements were obtained from 17 patients. "Gold standard" venous adjCa and iCa levels(mean=2.39mmol/L(2.16-2.92) and mean=1.19mmol/L(1.06-1.51) were equivalent($r=0.91, p<0.001$) and average difference between measurements was 0.025mmol/L(95%CI:-0.048-0.098).
We observed statistically significant positive correlation between venous adjCa and LAQUA iCa($r=0.36$, $p=0.029$) with average difference between measurements of 0.16mmol/L(95%CI:-0.11-0.44). Similar relationship between venous adjCa and LAQUA capillary iCa($r=0.46$, $p=0.0051$) with average difference 0.24mmol/L(95%CI:0.00-0.48) was observed. Correlation between venous and capillary iCa by LAQUA was $r=0.54, p<0.001$ and average difference between measurements was 0.074mmol/L(95%CI:-0.19-0.34).

Conclusion

iCa could replace adjCa for monitoring hypocalcaemia and LAQUA is a new promising device which might allow calcium measurements to be done at home by patients themselves.

85 Could endocrine surgeons improve the information provided to thyroid cancer patients?

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Background

Nowadays one of the most important challenges of the humanization of health care is to improve communication with the patients. We assess the difference between supply and demand for information about the treatment of thyroid cancer.

Method

Descriptive cross-sectional study by online survey of 24 items through the Spanish Association of Patients with Thyroid Cancer (AECAT) and Spanish Association of Surgeons (AEC).

Results

79% of patients demand more information. The most interesting areas for patients (n=105) are also important for expert endocrine surgeons (n=35): survival rates (88,6% vs 74,3%), surgical technique (87,6% vs 100%), admission (88,4% vs 88,6%), hormonal treatment (84,8% vs 97,1%). Items more interesting for patients are: impact of COVID-19 (72,4% vs 48,6%; p=0,018), neuromonitoring (74,3% vs 51,4%; p=0,02), need for help (74,3% vs 40%; p<0,001), weight gain (81% vs 17%; p<0,001), dietary restrictions (76,2% vs 11,4%; p<0,001), hair loss (62,9% vs 5,7%; p<0,001), risk of osteoporosis (75,2% vs 8,6%; p<0,001), menstrual disorders (62,9% vs 5,7%; p<0,001), impact on moods (83,8% vs 37,1%; p<0,001). However, changes in voice (81% vs 97,1%; p=0,04) or needs for calcium supplements (76,2% vs 94,3%; p=0,036) are more important for surgeons.

Conclusion

Three out of four thyroid cancer patients demand more information. Endocrine surgeons are focused on reporting on surgical technique and main complications. Patients demand more updated information about COVID-19, technological advances and possible unspecific and difficult to treat sequelae. Endocrine surgeons should adapt the information to the current needs of patients.

112 European multicentre study on outcome of reoperative parathyroidectomy for sporadic primary hyperparathyroidism

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Background

International multicentre outcome studies of reoperative parathyroidectomy for persistent or recurrent sporadic primary hyperparathyroidism (pHPT) are scarce. The rate of postoperative hypocalcemia, persistent hypercalcemia, and recurrent laryngeal nerve damage should be evaluated.

Method

Eurocrine is a European database for endocrine surgery. Data are registred according to predefined data fields. Outcomes for patients who underwent reoperative parathyroidectomy for sporadic pHPT from January 2015 to October 2020 were analysed. Multivariable analysis was performed to identify risk factors for postoperative hypocalcemia and persistent hypercalcemia.

Results

Some 636 patients (median age 63, females 79.7%) underwent reoperative parathyroidectomy (focused, unilateral and bilateral neck explorations in 192 (30.2%), 309 (48.6%) and 135 (21.2%) patients, respectively). Preoperative localization procedures were performed in 614 patients (96.5%). At first postoperative follow-up, 354 patients (55.7%) were normocalcemic, 241 patients (37.9%) hypocalcemic, and 41 patients (6.4%) had persistent hypercalcemia. Nerve damage was registered in 36 patients (5.9%; data missing in 29 patients). Non-concordant localization procedures were more frequent in patients who underwent unilateral and bilateral explorations (<0.001) and in patients with postoperative hypocalcemia and persistent hypercalcemia (<0.001). Nerve damage rate was higher in patients with postoperative hypocalcemia and persistent hypercalcemia (<0.001). Preoperative calcium > 2.75 mmol/L was predictive for persistent hypercalcemia risk (odds ratio (OR) 4.27; 95% CI 1.15-15.7; p=0.029). A single lesion on preoperative sestamibi was predictive for less postoperative hypocalcemia risk (OR 0.57; 0.36-0.91; p=0.020).

Conclusion

Postoperative hypocalcemia, persistent hypercalcemia, and nerve damage are frequent after reoperative parathyroidectomy. Preoperative localization procedures had a significant impact on outcome.

74 Parathyroid autofluorescence may help to reduce post-thyroidectomy hypocalcemia

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Background

Autofluorescence (AF) is a new tool that have been introduced to increase the rate of parathyroid glands identified during thyroidectomy and potentially preserve their function. This study evaluated the utility of AF to decrease the rate of hypocalcemia after thyroidectomy.

Method

This is a randomized prospective study. Patients undergoing total thyroidectomy were randomly divided into 2 groups: Group A included patients in which AF was used to identify parathyroid glands (PGs); Control Group (Group B) included patients undergoing conventional procedure with naked eye PGs identification. Data were analyzed to compare the rate of post-operative hypocalcemia and the rate of PGs identified.

Results

A total of 200 patients were enrolled. 100 were included in Group A and 100 in Group B. In Group A, a significant higher mean number of PGs were identified by means of AF (3.83) compared to naked eye visualization of Group B (2.94) (**p=0.0001**). The rate of transient hypocalcemia in Group A and Group B was 12% and 18%, respectively (p=0.2348). The rate of symptomatic hypocalcemia in Group A and Group B was 6% and 17%, respectively (**p=0.0148**). The rate of definitive hypocalcemia in Group A and Group B was 1% and 4%, respectively (p=0.1742).

Conclusion

The use of AF may help to identify an higher number of PGs. This leads to improve the early postoperative hypocalcemia rate and significantly decrease the rate of symptomatic hypocalcemia.

BJS Prize Session

231 Quantitative parameters of intraoperative neuromonitoring can accurately predict the non-recurrent laryngeal nerve before dissection

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Background

Quantitative parameters of intraoperative neuromonitoring (IONM) can be a reliable assistant in cases of anatomical variations of the recurrent laryngeal nerve (RLN). This study aims to examine whether the latency of the right vagal nerve can be a predictor of the non-recurrent laryngeal nerve's (NRLN) course before dissection.

Method

This case-control study includes 27 cases with NRLN and 504 control cases with typical RLN. All cases refer to the right-side nerves only and patients' characteristics match regarding demographics and pathology. All patients where operated with the standardized IONM method and all the data were recorded both electronically and in paper.

Results

26/27 (96,3%) cases of NRLNs had vagal nerve latencies less than 3ms, whereas only 4/504 (0,8%) cases with typical RLN's course had latencies less than 3ms. Moreover, cases with NRLN had significantly shorter latencies compared to controls (median 2,47 ms Vs 3,88 ms). When setting 3ms as a threshold for distinguishing RLN's course, accuracy, sensitivity, specificity, positive and negative predictive values are 99%, 96,3%, 99,2%, 86,6% and 99,8% respectively.

Conclusion

Patients with RLN's anatomical variations, such as NRLN, are in greater risk of injury during thyroid surgery. Evaluation of IONM quantitative parameters, like vagal nerve latency, may accurately predict inferior laryngeal nerve course before its dissection and therefore prevent nerve's accidental injury. According to our results, setting a latency threshold at 3ms for the right vagal nerve can accurately predict this rare course and timely alert the surgeon.

192 A New Method For Defining Parathyroid Tissue In Focused Parathyroidectomy: Aspartate Aminotransferase (AST)/Lactate Dehydrogenase (LDH) Ratio From Tissue Aspirate

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Background

Intraoperative detection of parathyroid tissue is essential to avoid postoperative hypoparathyroidism in patients undergoing parathyroidectomy. Intraoperative parathyroid hormone measurement and frozen section of excised tissue is used to confirm removal of the etiology of primary hyperparathyroidism. Kikumori et al. reported that the aspartate aminotransferase (AST)/lactate dehydrogenase (LDH) ratio for the saline suspension of a suspicious tissue can differentiate parathyroid tissue from other tissues. In this study, our aim is to define a cost-effective and faster diagnostic method that can replace rapid parathormone and frozen tissue sampling in focused parathyroidectomy by evaluating the AST/LDH ratio from tissue aspirate for per-operative parathyroid tissue identificatio.

Method

We prospectively analyzed 72 specimens from 54 patients who underwent thyroid or parathyroid surgery between March 2021 and November 2021 in our institution. Washout was performed from the tissue removed for frozen section in patients who underwent parathyroidectomy and from the thyroid tissue removed in patients who underwent thyroidectomy. AST and LDH levels were measured.

Results

AST/LDH levels were statistically significantly higher in the benign hyper-functioning parathyroid tissue group than in the other groups. ($P < 0.001$). The optimal cut-off value was 0.254 according to the receiver operating characteristic curve, with 95,8% sensitivity and 100% specificity.

Conclusion

This method could be a faster and cost effective alternative to frozen sections to reduce the incidence of postoperative hypoparathyroidism in low-resource areas.

123 Minimally invasive cortical sparing adrenalectomy: outcomes in 20 years' experience. A multicenter study

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Background

The concept of "cortical sparing adrenalectomy" (CSA) was born in the 90s with the purpose of preserving a part of functional tissue and preventing definitive adrenal deficiency in patients undergoing bilateral adrenalectomy or monolateral adrenalectomy in case of absence of the controlateral gland. New mini-invasive techniques show further advantages, as the reduction of perioperative morbidity compared to the open procedure and becoming the standard for the surgical treatment of benign adrenal pathologies. Numerous studies demonstrate the feasibility of CSA. However, there is a lack in follow-up data after 5 years from surgical treatment.

Method

This is an observational, retrospective, multicentric study from different Italian centers. It is made on a cohort of patients treated with a CSA with a mini-invasive surgical approach, in the period ranging from 01/01/2000 to 31/12/2020. We analysed our 15 years follow-up digital database and we evaluated, through appropriate statistical tools, the outcome and quality of life.

Results

The study enrolled about 35 patients. In accord to short term studies and clinical experience, estimates are at approximately 85% of patients who will not need replacement steroid therapy after CSA and a very low percentage of local recurrence.

Conclusion

Mini-invasive adrenalectomy is a safe and effective option for surgical treatment for adrenal benign pathology. The CSA allows to drastically reduce the need of replacement steroid therapy without an increase rating of recurrences in a long-term period and must always be considered in the therapeutic decision-making process.

202 Fascial versus standard neck dissection in patients with N1b papillary thyroid carcinoma

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Background

Optimal surgical technique for lateral neck dissection (LND) in thyroid cancer is matter of debate. Fascial ND (F-ND) implies the comprehensive removal of the superficial and middle layers of the deep cervical fascia *en-bloc* with lymph-nodes containing fibro-fatty tissue (levels II-V and levels VI-VII if central neck dissection is necessary). The present non-randomized control trial was designed to compare F-ND with standard non-fascial selective ND (S-ND).

Method

Among a series of 247 LNDs performed between 2/1/2018 and 31/10/2021, 74 pN1b PTC patients who underwent primary lateral with central F-ND were identified. Seventy-four controls who underwent S-ND during the same period were selected. Data of the two groups were compared.

Results

No significant difference was observed in patients' demographics, staging, operative time, post-operative hospital stay and post-operative complications. Nodal yield was significantly higher in F-ND for both central and lateral compartments (central: 20.58±9.9vs15.69±8.9, p=0.0136 and lateral: 56.53±28.1vs43.24±21.56, p=0.0015). Cosmetic result, evaluated by the Manchester Scar Scale was similar (7.7±1.7vs6.8±1.5 for F-ND and S-ND, respectively, p=0.256). At a mean follow-up of 15.2±9.6 months, local recurrence occurred in 2 cases of F-ND Vs 8 of S-ND, distant metastasis in 1 Vs 3 and disease related deaths in 0 Vs 2 cases.

Conclusion

F-ND was associated with a significantly higher nodal yield, without increasing the risk of complications or affecting the cosmetic result. That is indicative of a more radical resection that may lead to lower recurrence rates and improve prognosis.

119 Predicting clinical outcomes of patients with serum thyroglobulin antibodies after thyroidectomy for differentiated thyroid cancer: a retrospective study from a UK regional centre.

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Background

20%–25% of patients with differentiated thyroid cancer (DTC) can have elevated thyroglobulin antibodies (TgAb). The study aimed to find any prognostic significance of elevated TgAb during follow-up.

Method

This was a 10-year retrospective study from a tertiary centre including 79 patients with raised TgAb after total/staged thyroidectomy for DTC. We identified patients with stable (7.6%), increasing (15%) and decreasing (77.2%) levels of TgAb; groups 1, 2 and 3 respectively. During follow-up we analysed TgAb in subcategories by TgAb trend (>50% increase, <50% increase, >50% decrease, <50% decrease, positive to negative, negative to positive and stable levels), gender, age, surgery, autoimmune disease, histology, RAI uptake, distant metastasis, and recurrence.

Results

The incidence of raised TgAb levels was 33.2%, with female predominance. No relation was identified regarding other parameters and 11.4% had distant metastases. The highest mean TgAb level was in group 2 (1918.75IU/mL) and the lowest in group 3 (412.7IU/mL). The recurrence rate changed significantly between the 3 groups: 50% in group 1, 75% in group 2, and 25% in group 3 (p=0.002). Recurrence rates decreased to 15% in the subcategory where TgAb levels went from positive to negative (p=0.0001). In patients with negative to positive trend or >50% increase, recurrence rates were 100% (p=0.041) and 70% (p=0.012) respectively.

Conclusion

Patients with increasing TgAb levels during follow-up have a higher rate of recurrence distinctly for those with a negative to positive trend and >50% increase. These categories of patients need closer follow-up.

170 Does transient hypoparathyroidism impair patients' quality of life after total thyroidectomy?

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Background

While permanent hypoparathyroidism has a notable influence on patients' health related quality of life (HRQoL), the potential impact of transient hypoparathyroidism (thPT) has not been properly assessed. Our aim is to analyze the potential impact of thPT after total thyroidectomy on HRQoL.

Method

We conducted a prospective observational study of patients who underwent total thyroidectomy. All patients completed the SF-36 survey preoperatively, one week and one month after surgery. We analyzed biochemical parameters, clinical manifestations, treatment received, and the presence of other complications. We analyzed the evolution of patients over time, depending on whether they developed thPT.

Results

41 patients were included, 78% women, mean age 52.7±16.1 years. The indication for surgery was hyperthyroidism in 36.6% and thyroid cancer in 29.3%. 46.3% developed thPT, being symptomatic in 14.6% of patients. 26.6% and 14.6% of patients had hypoparathyroidism 1 week and 1 month after surgery, respectively. Physical functioning (75.7 vs. 68.2) and physical role (75.8 vs. 62.5) was impaired 1 week after surgery, and it returned to basal scores after one month. Moreover, patients with thPT had worse general health perception scores at 1 week (61.7 vs. 48.8) and 1 month (66.3 vs. 47.7) after surgery.

Conclusion

While total thyroidectomy itself seems to transiently worsen physical condition, patients with thPT seem to have a worse self-perceived health status. No other significant HRQoL impairing factors were observed.

POSTER PRESENTATIONS

PP001 Long-term results of adrenalectomy in a 1.1-year-old girl with Cushing's syndrome

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Background
Adrenal tumors in children are quite rare in children and according to various sources of literature make up only 0.2% per million children under 15 years old. Most often, such patients are detected Cushing's syndrome. The aim: to study the long-term results of adrenalectomy in children for example of a 1.1 years old girl with Cushing's syndrome.
Method
A girl aged 1.1 years old, over the past 8 months she began to rapidly gain weight, lag behind in development, did not go, sat with outside help: a moon-shaped face, acne, numerous striae, hair was almost absent on the head and prevailed throughout the body, redistribution of fatty tissue, clitoromegaly. Height-67 cm, weight-14.2 kg. BP (blood pressure)-160/100mm Hg, ACTH-41.6 (N8,3-57,8 pq/ml) ; DHEA-8.2 (N-0.9-1.8 µg/ml), testosterone-22.1 (N-0.19-2.67 nmol/l), cortisol-495.9 (N 50-230 ng/ml). ECG-tachycardia (143/m). Ultrasound: hepatomegaly, tumor of left adrenal gland with legible contours-3.8 x 5.6 cm. Diagnosis: Cushing's syndrome. After preoperative stabilization of BP and blood glucose, left-sided adrenalectomy was performed. In postoperative period, BP is stabilized by hydrocortisone with a dose reduction withdrawal after 15 days. Histology: dark cell adenoma (4.1 x 5.6 x 3.4).
Results
Repeated analyzes after 2 months, 2 and 10 years: results remained virtually unchanged. Testosterone-1.8 nmol/l, cortisol-107 ng/ml, DHEA-1.1 ng/ml.
Conclusion
Adrenal tumors in pediatrics are characterized by clinical, laboratory and biological features compared with adults. Early diagnosis, differentiated approach, adequate preoperative treatment, total tumor extirpation, outpatient monitoring allow patients to return to a normal lifestyle without complications leading to disability and mortality.

PP002 Anterior adrenalectomy: review after 10 years in a specialized unit

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Background
Adrenal surgery is safe but requires a dedicated team involving experienced surgeons who have achieved competency after completion of the learning curve. This study aimed to present the extensive experience of a specialized surgery unit in adrenalectomy in a large series of patients.
Method
We performed a descriptive retrospective chart review of patients operated between January 1, 2009 and November 31, 2019. Extracted data included demographic and clinical information, type of operation and intraoperative complication, imaging studies, histopathology results and postoperative complication rate.
Results
A total of 140 patients were included. The mean age was 57.1 years and 62.9% were women. 53.1% of our patients were ASA-SCORE II and 38.8% ASA-SCORE III. 80 (57,1%) were adenomas, 13 (9,3%) pheochromocytomas, 18 metastases (12,95%), 8 hyperplasia adrenal (5,7%) and 5 (3,6%) carcinomas. 87,5% had undergone laparoscopic adrenalectomy. Conversion was required in 5.1% of patients. Only 1 patient had to be reoperated for bleeding. In the laparoscopic access group 101 patients had a minor bleeding (< 500 ml) vs. 8 patients in open group (P=.001), but 19 patients had intraoperative complication vs. 5, respectively (p=,192). Patients in the laparoscopic group, compared with those in the open group, had less duration of hospital stay (3.4 vs. 9.1 days; P=.004) and less postoperative complications (7 vs. 5 patients; P=001).
Conclusion
Our results suggest that laparoscopic access is a safe technique, with less intraoperative time, lower bleeding rate, lower postoperative stay and lower postoperative complications in our center. The intraoperative complications were not statistically different between groups.

PP003 Influence of obesity and visceral fat on complication rate in laparoscopic adrenalectomy, still an issue?

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Background
Obesity and visceral fat are considered factors in the degree in technical dificulty during laparoscopic procedures. Our study aims to determine whether visceral fat, periadrenal fat, gland size and BMI (body mass index) are correlated with immediate postoperative complications after laparoscopic adrenalectomy.
Method
We reviewed patients who undergone laparoscopic adrenalectomy in our center, from January 1, 2009 to November 31, 2019. The cross-sectional components of fat were assessed by computed tomography included distance between the adrenal gland and peritoneum, periadrenal fat, and adrenal gland size. The patients were grouped into 2 groups according to the presence or not of a postoperative complication.
Results
130 patients were included: 118 (90,77%) had not complications and 12 (9,23%) presented postoperative complications. Patient´s age (55.6 vs. 69.2 years respectively, P=.001) and smaller adrenal gland (62.1 vs. 52.8 mm, P=.004) were significantly correlated with complications. BMI, visceral fat and periadrenal fat were not correlated with complications.
Conclusion
This study shows that BMI, visceral fat and periadrenal fat were not correlated to a higher rate of postoperative complications after laparoscopic adrenalectomy. The predictive variables of a higher complication rate were patient's age and the smaller adrenal gland size.

PP004 A Comparison of Short-Term Outcomes of Laparoscopic and Robotic Surgery on Adrenal Tumors

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Background
The number of robotic adrenalectomy operations has increased and been accepted as an alternative treatment option in addition to laparoscopic surgery. This study aims to compare the short-term outcomes of adrenal gland surgeries performed with robotic and laparoscopic techniques.
Method
The records of all patients (n=180) who underwent laparoscopic and robotic adrenalectomy between 2012 and 2019 in our department were retrospectively reviewed. The patients were divided into 2 groups as laparoscopic adrenalectomy (LA) and robotic adrenalectomy (RA). Then, patients in both groups were further divided into functional and non-functional subgroups and comparative analyzes were made.
Results
In cases where robotic adrenalectomy was performed, patient BMI was lower (p=0,001), the number of patients to whom steroid coverage was applied (p=0,048) and the number of patients with hormone active mass was higher (p=0,004). The size of the mass detected by preoperative imaging methods was found to be larger in the LA group (p=0,034). The amount of blood loss was found to be significantly less in the RA group (p=0,037). Of the cases who underwent RA and LA; the results were compared in terms of intraoperative complications, conversion rates, postoperative complications, length of hospital stay and need for readmission; no statistically significant difference was found. In the subgroup analysis performed by including functional masses, blood loss was found to be less in the RA group (p=0,028).
Conclusion
As result of our study, robotic adrenalectomy is an effective and reliable method that can be applied as an alternative to laparoscopic adrenalectomy.

PP005 Pheochromocytoma associated to igg4-related disease: a case report

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Background
Inmunoglobulin G4 related disease (IgG4-RD) is an increasingly recognized multisystemic immune-mediated fibroinflammatory condition whose pathogenesis has not yet been completely determined. The most common phenotypes mainly affect the pancreas and biliary tract, retroperitoneum, salivary and lacrimal glands and lymph nodes. We present the first case of association between IgG4-RD and pheochromocytoma.
Method
A 38-year-old woman presented with a 2-month history of pain in the right flank and weight loss. Images identified a right adrenal mass and a second retroperitoneal lesion which compressed the vena cava extending up to the right kidney. She underwent surgical bloc resection of the tumor requiring resection of a segment of the vena cava and right diaphragm. The definitive pathological report confirmed the presence of a pheochromocytoma and IgG4 retroperitoneal fibrosis. She was discharged at the 4º post-operative day with no complications.
Results
The case presents the association of two rare conditions. Unlike our case, IgG4-RD usually presents in older men and affects multiple organs at once. Among the forms of presentation, retroperitoneal fibrosis is one of the most common. There is controversy regarding the relationship between IgG4-RD and malignancy, and it had been studied as risk factor as well as a paraneoplasic syndrome. Up to now our patient has not shown any evidence of malignancy. Since pheocromocytoma has approximately 10% malignant potential, our patient will require long-term follow-up.
Conclusion
Further research is necessary to better understand the association between pheocromocytoma and IgG4-RD.

PP006 Carney complex with primary pigmented nodular adrenal disease: unexpected adrenal insufficiency after unilateral adrenalectomy

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Background
Carney complex (CC) is genetic multiple neoplasia syndrome (*PRKAR1A*-mutation) involving skin, heart, uterus, breast and endocrine glands. Cushing syndrome (CS) due to primary pigmented nodular adrenal disease (PPNAD), cardiac myxoma, acromegaly are challenging. Bilateral adrenalectomy is recommended for PPNAD-CS. We present results of unilateral adrenalectomy on PPNAD after previously removed somatotropinoma.
Method
Well-illustrated case of CC (39 y.o. woman) followed for 4 years since clinical manifestation.
Results
Patient admitted 2019/03 with symptoms of CS (rounded face, obesity, amenorrhea, arterial hypertension, high urine cortisol, suppressed ACTH) appeared 6 months ago. Paradoxical Liddle test (rising free urinary cortisol from 298 to 423 mcg/24H) suggested PPNAD, despite absence of typical CC skin. CT revealed adrenal hyperplasia. In 2017/03 she underwent pituitary resection (somatotropinoma 11x8 mm) with normalization of GH but declining of ACTH and TSH. Small cardiac myxoma was detected on echocardiography. 2019/05 left laparoscopic adrenalectomy was performed and PPNAD confirmed. After surgery serum cortisol dropped. Symptoms of adrenal insufficiency appeared and hydrocortisone supplementation started (20 mg/daily). Down titration of dosage led to unexpected episode of acute adrenal insufficiency despite normal urinary cortisol (93-126 mcg/24h). Since 28 months at 5 mg hydrocortisone and 75 mcg L-thyroxin patient feels well (no cushingoid, euglycaemia, normal BP and menses), but several Addison crisis happened. Suppressed corticotropin and thyrotropin still exist.
Conclusion
Unilateral adrenalectomy for PPNAD/CC stopped CS and even led to Addison crisis probably due to coexisting postoperative pituitary insufficiency. ACTH independence of PPNAD is questionable after this case.

PP007 Transition from transperitoneal laparoscopic to retroperitoneoscopic adrenalectomy – a single centre experience

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Background
Since 2017, switching from lateral transperitoneal laparoscopic(LTA), posterior retroperitoneoscopic adrenalectomy(RPA) is used as standard procedure in our institution. Aim of this study was to compare both techniques regarding operative time, length of stay and safety of the procedures.
Method
All patients operated in our institution for adrenal tumours were prospectively documented in the EUROCRINE-database and retrospectively analysed. Sex, age, body mass index(BMI), indication, operative time, conversion and complication rates, hospital stay and tumor-size were analyzed.
Results
105 RPAs and 117 LTAs were performed in a 8-year period. No difference was seen in age, sex and tumor localization. Adenoma(n=95) and phaeochromocytoma(n=53) were the most common indications for surgery. Other indications were hypercortisolism(n=33), hyperaldosteronism(n=25) and adrenocortical carcinoma(n=15). Compared to the LTA group, the RPA group had shorter operative time with a median of 50minutes(15-380) vs. 122.4minutes (25-420) and shorter hospital stay with a mean of 3.87 days(±4.7) vs. 8.3 day (±2.47). The decrease of the median operative time in RPA group, visualizing the learning curve of the procedure, was from 60 minutes(2017) to 45 minutes(2020). 4 conversions from RPA to open adrenalectomy had to be performed due to bleeding, whereas 15 LTA procedures had to be converted due to bleeding(n=5), unclear anatomy n=4), adhesions(n=2) or difficult access(n=4). 4 patients suffered from superficial wound infections in both groups, no other complications were administered.
Conclusion

RPA could be safely introduced with reduced operative times and shorter length of hospital stay compared to LTA.

PP008 Feasibility of posterior retroperitoneoscopic adrenalectomy for tumors >6cm

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Background
Adrenalectomy can be performed via open, lateral transperitoneal laparoscopic(LTA) or posterior retroperitoneoscopic(RPA) technique. Since 2017, switching from LTA, RPA is used as standard procedure in our institution. Current guidelines recommend endoscopic surgery for tumours <6cm. Aim of this study was analysing the outcome of RPA for large adrenal tumours(>6cm).
Method
All patients operated in our institution for adrenal tumours >6cm were prospectively documented in the EUROCRINE- database and retrospectively analyzed for this study. Conversion and complication rates, histology, body mass index (BMI), operative time and hospitalstay were analyzed.
Results
13 patients, undergoing RPA for tumours >6cm in a 3-year period were included. 6 patients were female, 7 were male, mean age was 53 years and mean BMI 28.6kg/m^2. Tumour size was mean 73mm (63-92mm), mean operative time 83 minutes (35-235 minutes). Mean hospital stay was 3 days (2-11 days). Five patients had bilateral tumours, 8 unilateral disease(left n=5;right n=3). One patient needed conversion due to adhesions and bleeding. No other perioperative complications were reported. Histological findings were adrenal cortical adenoma (n=7), pheochromocytoma (n=2), adrenal cortical hyperplasia (n=2), adrenal lymphoma (n=1) and metastasis (n=1). All patients underwent R0 resection. The mean hospital stay was 3 days.
Conclusion
RPA is feasible and safe also in patients with adrenal tumours >6cm. Yet, there is the need for a larger cohort size study in the future.

PP009 Adrenalectomy for pheochromocytoma without preoperative alpha-adrenergic blockade does not result in increased hemodynamic instability

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Background
Peri-operative mortality and morbidity associated with resection of pheochromocytoma has been reduced significantly following introduction of preoperative alpha-adrenergic blockade. However, the current protocol requires multiple day admission and dose escalation of alpha-blockage. Recently published retrospective data suggest equal safety using a new protocol based on intra-operative titration of alpha-blockage. The primary aim of this study is to prospectively assess the feasibility and safety of introduction of a new protocol without preoperative escalation of alpha-adrenergic blockade.
Method
Single institution prospective cohort including all patients who underwent adrenalectomy for pheochromocytoma without preoperative alpha-adrenergic blockade from May 2019 to November 2021. Primary outcome was intra-operative hemodynamic instability defined as duration of systolic blood pressure above 200mmHg in minutes. Secondary outcomes included complication rates, postoperative requirement of blood pressure support, hospital stay.
Results
We included 24 patients with de-escalated pre-operative alpha-adrenergic protocol and compared these patients with 17 patients who underwent adrenalectomy with pre-operative alpha-blockage. Median duration of systolic blood pressure above 200mmHg was 2.5 minutes [0-4] versus 0 minutes [0-1.5] (p=0.084), respectively. Median postoperative HDU admission was 17.9 hours [9.7-21.6] versus 19.1 hours [8.5-29.1] (p=0.539). Median length of stay in days was 2.9 [2.2-5.4] for patients without blockade compared to 6.5 [6.0-12.8] for the group with blockade (p=0.000). No significant differences in complication rates were observed.

Conclusion
Preliminary data suggest that adrenalectomy for pheochromocytoma with de-escalated preoperative alpha-adrenergic blockade protocol is safe and feasible and results in shorter length of hospital stay.

PP010 The Change in Surgical Practice From Conventional Open to Minimally Invasive Adrenalectomy In The Past 30 Years In a Tertiary Refferral Endocrine Surgery Center

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Background
To investigate the change in adrenalectomy procedures in the past three decades
Method
The records of 526 patients who underwent adrenalectomy from January 1990 to December 2020, were evaluated retrospectively. The data was classifed into three periods of time.;Period I: 1990-1999,period II: 2000 to 2009 and period III: 2010 to 2020.The indications for surgery,type of adrenalectomy and the volume of the removed adrenal gland (VA) were compared between these three periods.
Results
Minimally invasive adrenalectomy (MIA) and conventional open adrenalectomy(COA) was performed in 272(51.7%) and 254(48.3%),respectively. The indications included benign non-functional tumors in 151(29%), functional tumors in 347(66%) and adrenocortical cancer in 28(5%) patients,with similar rates in periods .All patients in Phase I underwent COA. There was a significant increase in the rate of MIA when the 3 periods were compared (Period I=0%vs PeriodII =33.7% vs Period III=87%;p=0.0001.).The rate MIA for functional and nonfunctional adrenal tumors significantly increased in Phase III compared to Phase II [91% vs 39%,and 77% vs 22.7%,respectively;p<0.0001]. The VA in MIA and COA procedures was 287.4±321cm^3 vs 1197±36cm^3(;p=0.069) in period II, and 375±961cm^{3}vs 2622±4320cm^3(p=0.0001) in period III.
Conclusion
The rate of MIA in nonfunctional and functional benign adrenal lesions significantly increased in the last two decades. In the last decade,MIA constituted 87% of the adrenal procedures and COA was performed in 13% of patients with significantly larger adrenal tumors.

PP011 Epidimiological data, clinical presentation and genetic predisposition of pheochromocytomas/paragaggliomas in Greece

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Background
Pheochromocytomas (PHEO) and paragaggliomas (PGLs) belong to a team of rare neuroendocrine tumors with metastatic potential. Up to 40% of those patients could be carriers of familial genetic mutations. The aim of this study is to describe the genetic background of PHEO/PGLs in Greece.
Method
We reviewed epidemiological, clinical and laboratory results of 23 operated patients with PHEO/PGLs. A genetic analysis was performed using MLPA methodology.
Results
The mean age of patients was 49.5±15.7 years. Twenty one patients had PHEO, 2 had multiple abdominal PGLs and 1 had both. Twelve had left and nine had right adrenal tumors. Eleven patients were diagnosed after incidental tumor diagnosis, eight had suspicious clinical presentation and four were diagnosed as part of Neurofibromatosis-type1(NF1) workup. There was no operative mortality. The mean maximum tumor diameter was 6.3cm ± 2.5cm. Mean Pheochromocytoma of Adrenal Gland Scales(PASS) score was 5±2.2. Two patients presented mutations on the succinate dehydrogenase (SDHx) gene, 4 on NF1 gene, one patient although genetically negative had family history and the clinical characteristics of VHL syndrome.
Conclusion
This is one of the first attempts to create a database with clinical and genetic backgrounds of patients with PHEO/PGLs in Greece. A clearly defined genetic component was evident in 30.4% of involved cases, highlighting the need for genetic counseling in patients affected with these rare tumors.

PP012 Adrenal Schwannoma: An Unexpected Finding After Adrenalectomy

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Background
Adrenal gland is an uncommon place for schwannoma tumors. Due to lack of pathognomonic features, its diagnosis mostly is made at the pathology. In these case, a rare finding after the surgery of adrenal incidentaloma will be discussed.
Method
61 years old female patient was admitted to the outpatient endocrinology and metabolism clinic with a mass which had a diameter of 31 mm in computed tomography scan due to COVID-19. In imaging studies, lesion had cystic necrotic components and suspected of adrenocortical carcinoma or pheochromocytoma. In laboratory evaluation, the lesion had no hormonal activity. Due to the suspicious imaging findings, a decision for surgery was made by multidisciplinary team.
Results
Laparoscopic transperitoneal adrenalectomy was planned to the patient and successfully applied by the surgery team. Lesion was partly spheric and gland apparently had two component which included a suspected mass and normal adrenal tissue. Pathological result was consistent with schwannoma and tumor had needle shaped cells without atypia. In immunohistochemistry, diffuse positive reactivity with S100 and no activity with CD34, SMA and Desmin were observed. Ki67 proliferation index was less than 1%.
Conclusion
Adrenal schwannoma is a rare entity and imaging studies may not be helpful making this diagnosis preoperatively. Clinical suspicion may arise in patients without pathological hormon activity and without clinical suspicion for cancer but aytpical incidental imaging studies.

PP013 17 years of laparoscopic adrenalectomies-311 adrenalectomies

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Background
Laparoscopic adrenalectomy has been established as the surgical treatment for the benign tumors of the adrenals. Purpose of this project is to present our 17 year of experience.
Method
We performed a retrospective study of the laparoscopic transabdominal adrnealectomies which took place in our department during the January 2004 -December 2021 period. All our cases were examined regarding the indications, the surgical approach, the intra- and the post-operative complications.
Results
During this period, 311 adrenalectomies in 295 patients have been performed. In 248 patients 268 adrenalectomies were performed laparoscopically ; whereas in 46 patients with suspected locally advanced malignancy the open approach was selected in order to secure optimal oncological results. The indications for the surgical procedure were: Conn syndrome (n=43), Cushing syndrome (n=102), Pheochromytomas (n=54), Non-Active Adenomas (n=64), Malignancy (n=48).17 patients underwent a bilateral adrnealectomy either for hyperplasia or for pheochromocytoma. In 27 patients with primary hyperaldosteronism, in order to define laterality, AVS (Adrenal Vein Sampling) was performed. The conversion rate was 3.1 %, the mortality 0.3% and the post operative complications 3.8%.
Conclusion
Laparoscopic adrenalectomy, regarding the indications, is a safe operation with low mortality, complications and conversion percentage.

PP014 Prevalence of radiological and anatomopathological correlation of adrenal injuries (2000-2020)

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Background
The diagnosis of adrenal injuries before surgery is a challange for radiologist, endocrines and surgeons, due to is not always easy to differenciate adrenal lesions and do the appropiate treatmeant. The main aim is to know the prevalence of association between images done by Axial Tomography Computed (TC) and anatomopathologycal study.
Method
Our study is based on 86 cases diagnosed in our hospital during 2000-2020, with a population older than 18 years old. We analyzed epidemiological variables, radiologycal images and anatomopathologycal results in a retrospective review.
Results
In our population we found a 55'81% of women and 44'18% of men.
The most commun adrenal injury was adenoma: 40 cases of which 30 were diagnosed by CT (75%), while 4% was feocromoticoma, 4% metastasis and 4% hyperplasia.
50% hiperplasia diagnosed by CT was hyperplasia. 11 cases was myelolipoma by imaging, but only 7 was real myelolipomas (63%). 100% of pheochromocytomas and metastasis seen in CT were in anatomophatology results. We founded 2 adrenal injuries suspicious of primary tumor by CT, one was an feocromocitoma and the other was a real adrenal tumor. The others diagnoses by imagen were different injuries such as cyst or indetermined lesions (22%).
Conclusion
The most commun adrenal injury detected was adenoma with CT and anatomopatology diagnosis as we found in literature review. Discovered adrenal masses require a wide diferential diagnosis, but the correct diagnosis previous surgery could help to plan the surgery and decrease comorbilities.

PP015 Adrenal cystic lesions: report of 6 surgically treated cases and review of the literature

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Background

Adrenal cystic lesions are a small percentage of all lesions on the adrenal glands (4-20%) according to the revise bibliography. The objective of the study is to find out the prevalence of this type of injury found among all the patients operated in our hospital. We have carried out a retrospective study and a bibliographic review.

Method

A retrospective study is carried out on a database of 180 patients operated in our Hospital, from 2000 to 2021, in a population over 18 years of age. Analyzing the characteristics of the patients, the radiological diagnosis, the size of the lesions, the type of surgery performed, and the laboratory's abnormalities.

Results

Six cystic lesions were found with a prevalence of 3,3%. Being mostly male patients (4 men vs 2 women). The mean age at the of surgery was 43 years old (range 21-77). In all cases except one the diagnosis coincided with the suspected diagnosis obtained by CT. The mean size of the lesions was 5,4 cm (range 3-8). All cases were operated laparoscopically. All lesions were bening with different pathological diagnoses. No patient had complications during their hospital stay, or required re-operations related to this pathology

Conclusion

Cystic lesions of the adrenal gland represent a small percentage, being our percentage slightly lower than the percentage found in the literature, although they coincide in values lower than 20% of all the lesions on this gland.

PP016 Adrenocortical carcinomas during the period 2010 – 2020

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Background
Our objective was to analyze adrenalectomy cases due to adrenocortical carcinoma during the period between 30/11/2010 and 1/12//2020.
Method
All adrenalectomies in our department are prospectively recorded.
Results
During the 10-year study period, 174 adrenalectomies were performed in 172 patients. Adrenocortical carcinoma was diagnosed in 7 (4%) of them who composed our study population. Women constituted 57.1% of these cases while their mean age was 52.9±7.4 years (range: 36-71 years). Five patients (71.4%) underwent an open operation, one (14.3%) a successful laparoscopic adrenalectomy and one (14.3%) was converted to an open procedure. The tumor was located in the right adrenal in 57.1% and in the left in 42.9%. Mean tumor diameter was 11±5.4 cm (range: 4-18 cm). Mean postoperative stay was 9.5±2.6 days. All patients received postoperative mitotane. Three cases (42.9%) suffered from postoperative complications: pneumonia, pleural collection, intrabdominal hematoma and portal vein branch thrombosis. Two cases (28.6%) required a reoperation because of recurrence one year after the initial operation. One of the patients with reoperation died on the 2nd day after the second procedure due to multiple organ failure. In addition, another patient deceased 6 months following surgery because of disseminated disease. During the short 48.5±7.2 months' follow-up period, the remaining 5 cases are free of recurrence.
Conclusion
Adrenocortical cancer is a rare entity with poor prognosis. The most appropriate treatment so far is radical oncological excision and adjuvant therapy with mitotane.

PP017 Unusual cases of adrenalectomy

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Background
Our aim was to identify and analyze the unusual cases of adrenalectomy performed in our department.
Method
Prospective study of all adrenalectomies from 30/11/2013 until 1/12/2021.
Results
During the 8-year study period, 151 adrenalectomies were performed (female: 60.9%, mean age: 54.1±12.8 years). Laparoscopic adrenalectomy was conducted in 78.8%, open 14.6% and conversion to open in 6.6% of cases. Final diagnosis was non-functioning adenoma in 32.4%, pheochromocytoma 16.6%, ACTH-independent Cushing's syndrome 15.2%, Conn's syndrome 10%, metastasis 6.6% and primary adrenal cancer in 4%. The remaining 23 (15.2%) cases presented less frequent clinical or histological entities and composed our study group. Three patients (2%) underwent bilateral adrenalectomy due to refractory ectopic ACTH-dependent Cushing's syndrome: one from an unresectable thymic adenocarcinoma and two of unknown primary origin. In addition, 20 patients (13.2%) had less common final diagnoses such as virilizing tumor, schwannoma, oncocytoma, ganglioneuroma, cavernous hemangioma, cyst, pseudocyst, myelolipoma, lipoma, angiosarcoma and primary adrenal melanoma.
Conclusion
This study illustrates the difficulties in the differential diagnosis of adrenal masses. Such rather unusual clinical and histological cases should also be included in the differential diagnosis of patients with adrenal diseases.

PP018 Predictors of postoperative complications after adrenalectomy

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Background
Our objective was to identify and analyze predictors of postoperative complications following adrenalectomy.
Method
This was a prospective study of all adrenalectomies in our department between 2009 and 2019. Recorded data were: age, sex, final diagnosis, malignancy, functionality, previous abdominal surgery, type of operation, adrenalectomy side, concurrent surgical procedure, intraoperative complications, operative time, adrenal gland weight and diameter, adrenal tumor diameter and hospital stay. Cases with postoperative complications were compared with those without complications.
Results
During the study period, 151 adrenalectomies were performed (female: 60.9%, mean age: 54.1±12.8 years). Diagnosis was non-functioning adenoma in 33.1%, ACTH-independent Cushing's syndrome 16.6%, pheochromocytoma 16.6%, Conn's syndrome 10.6%, metastasis 7.3%, primary adrenal malignancy 4% and other rare cases 11.9%. Laparoscopic adrenalectomy was conducted in 78.8%, open 14.6% and conversion to open in 6.6%. Twenty cases (13.2%) developed postoperative complications including respiratory, urinary, intra-abdominal and wound complications. Postoperative complications were encountered less often in Conn's syndrome whereas more frequently in primary adrenal malignancy ($p=0.04$). They were also more often in open and even more in conversions compared to laparoscopic procedures ($p<0.001$), in malignant cases ($p=0.03$) and in patients who presented intraoperative complications ($p<0.001$). Cases with postoperative complications had longer operative time ($p=0.01$) and hospital stay ($p<0.001$). No other significant differences were noted.
Conclusion
Post-adrenalectomy complications are not infrequent and significantly lengthen postoperative hospital stay. Patients with malignancy, intraoperative complications, prolonged operative time and open or conversion to open procedure are more likely to suffer from postoperative complications.

PP019 Laparoscopic adrenalectomy for metastatic disease

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Background
Patients with adrenal metastasis and oligometastatic state have a survival benefit after adrenal surgery. Laparoscopic adrenalectomy (LA) with R0 goal is a minimal invasive procedure in patients with decreased performance status
Method
Retrospective analysis of 24 consecutive patients (28 adrenalectomies) over 15 years in a tertiary center (208 adrenalectomies during that period). Statistical analysis: chi-square test for univariate analysis and Kaplan Meier survival curves
Results
Fourteen men and 10 women with metastatic cancers: lung (16), kidney (4), melanoma (3), and Merkel cell carcinoma (1), synchronous in 9 patients and metachronous (> 6 months) in 15. Mean duration of surgery was similar for LA (21 patients) and laparotomy (7). The mean largest diameter of adrenal compartments and metastases alone were 8.3 cm. and 4.8 cm. respectively, with R0 surgery in 24 adrenalectomies. No simultaneous bilateral adrenalectomy. Despite neoadjuvant treatment in 11 patients, viable cells were found in 25% to 100% of specimen. Median postoperative hospital stay was 5 days, with limited morbidity and no mortality. During the follow-up, 4 patients needed contralateral adrenalectomy and 3 others controlateral stereotactic radiotherapy. Thirteen patients died with a median survival of 22 months. Overall, median survival was 39 months
Conclusion
Laparoscopic adrenalectomy is a safe and oncologically appropriate procedure for adrenal metastases, achieving R0 in 86% of surgeries. Stereotactic radiotherapy has emerged as an efficient alternative to surgery, without comparative or randomized studies. Adrenal surgery remains the only treatment allowing a proven R0 resection

PP020 A rare case of primary adrenal lymphoma manifesting in a preexisting adrenal myelolipoma

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Background
Primary adrenal lymphomas are exceedingly rare entities, accounting for 1% of non-Hodgkin lymphomas. The aim of the present study is to report a case of a patient with a unilateral adrenal lymphoma arising in the setting of adrenal myelolipoma.
Method
The present case is about a 74 year old female with past medical history significant for coronary arterial disease, ischemic stroke, hypothyroidism and a 4x3 cm mass in the left adrenal gland, exhibiting radiologic features of adrenal myelolipoma, followed-up with yearly imaging without any significant change in size during the past 7 years.
Results
The patient underwent abdominal CT scanning for the evaluation of recurring abdominal pain. A significant enlargement of the left adrenal mass was noted (8x5 cm). Biochemical testing revealed increased DHEA-S (4μg/mL). Urine metanephrines, VMA and cortisol suppression testing were normal. The patient subsequently underwent laparotomy, due to high suspicion of malignancy, during which a large infiltrative tumor was identified in the anatomic space of the left adrenal gland in close proximity to the left diaphragmatic crura, the splenic artery and the celiac axis and was removed uneventfully. Histopathology revealed diffuse B-cell lymphoma, with positive CD20, C30 and c-MYC stains. As such, the patient was referred for initiation of immunotherapy and is alive and in good health after 18 months of follow-up.
Conclusion
The diagnosis of primary adrenal lymphomas is challenging due to the rarity of this disease. This is the third reported case of an adrenal lymphoma manifesting in a preexisting adrenal myelolipoma.

PP021 Statistical Revision of Adrenal Surgery: 6-year experience of a General Surgery Department in a tertiary hospital

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Background
Adrenalectomy is a challenging endocrine surgery and the mainstay of treatment of some adrenal diseases, such as hormonal syndromes, malignancy and other benign non-functional pathology. In a country where there are no reference centers for adrenal surgery, we analyze the statistic of a high-volume department, despite its integration in a tertiary hospital.
Method
Observational retrospective study of all patients submitted to adrenalectomy in our Department between January 2014 and October 2019 (5 years, 10 months).
Results
In this period, 32 patients were submitted to adrenalectomy. 75% of the surgeries were performed by laparoscopy. The main indications for surgery were hormonal disease (68%), incidentaloma (19%) and metastatic lesion from tumors of other locations (13%). The most frequent hormonal diagnosis was primary hyperaldosteronism (50%), followed by pheochromocytoma (27%), hypercortisolism (13%) and paraganglioma (9%). The incidentalomas presented a median size of 7.8cm of larger diameter and the most frequent diagnosis was myelolipoma.
On average the patients presented an ICU admission rate of 25% (mainly for hemodynamic monitoring), a mean hospital stay of 6 days and a complication rate of 9%.
Conclusion
Considering these results, we conclude that adrenalectomy is a surgery that should be performed preferably in high-volume centers.

PP022 Retroperitoneal Video-Assisted vs Transperitoneal Laparoscopic Adrenalectomy: long-term outcomes and health-related quality of life in Niguarda Hospital experience

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Background
Adrenalectomy is a surgical procedure with a long-lasting history. As we can easily imagine, the technological improvements provide to this kind of surgery the possibility to evolve and reach new frontiers. As with most retroperitoneal structures, the idea to approaching the organ posteriorly has not been slow to come to fruition. The first transperitoneal laparoscopic adrenalectomy was performed in the 1992 by Gagner et al. Some years later (1997) the first retroperitoneal video-assisted operation was theorized and completed by Mercan et al. In addition, the development and the recent spread of the robotic surgery has provided a new frontier for both the approaches described above.
Method
All the papers and the reviews published until now evaluate the surgical differences between the two techniques and the short-to-medium-term morbidity. Some analysts have therefore found that there are no studies that carry out follow-up of more than 5 years.
Results
In this regard, our comparative, observational, retrospective study has the will to analyze this aspect, often underestimated, through the direct interview and the medical examination of more than 150 patients operated in past years at our center.
Conclusion
The aim of our research is to bridge the gap of studies about the health-related quality of life and the potential long-term consequences of this kinds of procedures and to make a comparison between the two techniques.

PP023 Laparoscopic adrenalectomy in functioning versus non-functioning tumor: are there differences?

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Background
Laparoscopic adrenalectomy has become the standard of care for treating adrenal tumors. Primary hyperaldosteronism, Cushing syndrome, and pheochromocytoma are always surgical. We analyze our experience and results in laparoscopic adrenalectomy of functioning versus non-functioning tumors.
Method
This cohort study analyzes prospectively collected data from patients with adrenal tumors treated by laparoscopic surgery at a single academic medical center (April 2003–October 2021). Lateral transperitoneal approach was performed in all patients. Demographic, clinical, surgical, postoperative, and histopathologic characteristics were recorded.
Results
We included 176 patients, 112 with functioning tumors (47 Cushing adenomas, 40 pheochromocytomas, and 25 aldosteronomas), and 64 with non-functioning tumors (35 incidentalomas, and 29 malignant tumors: 2 adrenocortical carcinomas, 4 indeterminate cortical neoplasms, and 23 metastasis).
There were only statistically significant differences ($p<0.05$) when comparing the groups with respect to arterial hypertension (93.8% F group vs. 37.5% NF group, $p<0.001$), conversion to open surgery (1.8% F group vs. 9.4% NF group, $p=0.048$), and drainage placement (31.3% F group vs. 50% NF group, $p=0.014$).
There were no significant differences when comparing the groups with respect to age, sex, obesity, prior abdominal surgery, American Society of Anesthesiologist classification, right/left side, estimated blood loss, operative time, specimen size, tumor size, postoperative complications, and hospital stay. No patients died in either group.
Conclusion
Adrenal laparoscopic surgery is safe, reproducible and effective, with a low complication rate and early hospital discharge. With the laparoscopic approach there are practically no differences between functioning or non-functioning tumors.

PP024 Current limitations in laparoscopic adrenalectomy

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Background
Gagner(1992) introduced the laparoscopic adrenalectomy. In benign adrenal pathology the LA is widely accepted, but in the malignant pathology is controversial. The Spanish Endocrine Surgery Clinical Guide defines some main limitations: contraindications for laparoscopic surgery, prolonged learning curve, malignant pathology, tumor size >9cm, prior abdominal surgery, and obesity.
Method
Prospective study of patients with adrenal pathology in which laparoscopic treatment was performed in our Endocrine Surgery Unit (2003-2021). A lateral transperitoneal approach was performed in all patients. Patients' data were recorded.
Results
We have performed 176LA, 93 women/83 men (mean age of 53.5±13.2 years). The indications for surgery were: 47 Cushing adenomas, 40 pheochromocytomas, 35 incidentalomas, 25 aldosteronomas, and 29 malignant tumors (2 carcinomas, 4 indeterminate cortical neoplasms, and 23 metastasis). 97 patients (55.1%) were obesity - mean BMI of 32.4±3.0 kg/m^2 (range 30-45.7), and 93 patients (52.8%) had a story of prior abdominal surgery. The mean specimen size was 7.4±2.4 cm (range 3-16). There were 8 conversions to open surgery (4.5%), mainly due to bleeding. There were complications in 4 patients (2.3%). No patients died. The mean hospital stay was 2.4±1.3 days.
Conclusion
Laparoscopic surgery is the treatment of choice for benign adrenal tumors, but it is also a good approach for adrenal metastasis and primary adrenal neoplasms. The laparoscopic approach is accepted when it is performed by expert surgeons in minimally invasive advanced surgery, who perform a complete resection. The current limitations of laparoscopy are dependent on the surgical team and not on minimally invasive techniques.

PP025 Prospective evaluation of 100 3d laparoscopic adrenalectomies

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Background
Gagner performed the first 2D laparoscopic adrenalectomy in 1992. The main drawbacks of conventional 2D laparoscopy are limited depth perception and loss of spatial orientation. High-quality 3D laparoscopy systems might improve surgical outcomes for adrenalectomy. We aimed to evaluate the safety and efficacy of 3D laparoscopy to treat benign and malignant adrenal tumors.
Method
This observational study analyzed prospectively collected data from patients with adrenal tumors treated laparoscopically with a 3D system at a single center (2013-2020). The intraoperative outcome variables were conversion rate, blood loss, and operative time. The postoperative outcome variables were complications, length of stay, and mortality. All data were analyzed using Statistical Package for the Social Sciences.
Results
100 patients (53 women and 47 men; median age, 55.5 years) underwent adrenalectomy for Cushing's adenoma (n=28), pheochromocytoma (n=27), adrenal incidentaloma (n=16), aldosteronoma (n=14), and malignant tumor (n=15). Median operative time was 60 min, and estimated blood loss was 10 mL. Conversion was necessary in 1 (1%) patient. Morbidity rate was 2%: one patient had postoperative bleeding 24 hours after surgery that required reoperation by laparotomy and transfusion (Clavien-Dindo IIIb), and another had acute urine retention (Clavien-Dindo I). No patients died. Median length of stay was 2 days.
Conclusion
When done by experienced surgeons, 3D laparoscopic adrenalectomy is safe and effective for benign and malignant adrenal mass, resulting in low operative blood loss and operative time, with very low rates of conversion to open surgery and postoperative complications.

PP026 Value of drains in selective lateral neck dissections in thyroid cancer

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Background
Drains have largely been abandoned in thyroidectomy but are widely used in lateral neck dissections (LNDs) for metastatic disease. Their use is to prevent post-operative fluid and blood collection. Limited data is available to support their usage. The aim of this study was to evaluate the necessity of drains after LNDs.
Method
A retrospective cohort study identified all patients who underwent LNDs in a tertiary institution in UK from January 2017 to July 2021. Data on patient characteristics, drain usage and complications were collected. Patients with output of ≥100mL within the first 24h post-operative period were compared to those <100mL.
Results
A total of 73 patients underwent 80 LNDs; 36 in the left neck and 44 in the right. Drains were used in 69 (86%) of the patients. Of these, 7 had an output of ≥100mL in the first 24h period after surgery. No haematomas, chyle leaks or seromas requiring intervention occured independent of whether a drain was employed or not. The mean age was higher in the group with drain output of ≥100mL, compared to those with a drain output of <100mL (69,8±10.8 vs 49.6±17.8, p=0.005). Univariate analysis did not show any statistically difference in gender, diabetes, side of neck dissection or number of nodes resected (p>0.05).
Conclusion
Significant haematomas and seromas are uncommon after LNDs for thyroid cancer and drainage is likely to be unnecessary as in thyroid surgery. The selective use of drainage may be considered in older patients.

PP027 Diagnostic lymph node excision of the lateral neck compartment may prevent overtreatment in patients with medullary thyroid cancer

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Background
Medullary thyroid cancer (MTC) is a rare type of tumor, accounting up to 10% of all thyroid cancers. Lymph node involvement is seen in 50% of patients with MTC at the time of diagnosis. The aim of this study is to determine, whether mapping the lymphatic drainage and diagnostic excision of lymph nodes of the jugulo-carotid chain is able to detect ultrasound unknown metastases in the lateral neck compartment.
Method
39 patients from February 2012 to July 2019 with no evidence of lateral nodal involvement on imaging studies were treated with total thyroidectomy and central neck dissection. Methylene blue dye was applied into the upper part of thyroid gland, with a subsequent lymphatic drainage mapping in the lateral compartment and 2-3 lymph nodes were examinated for frozen section. In case of metastatic involvement, thus modified radical neck dissection (MRND) was performed.
Results
The sentinel lymph node (SLN) identification rate was 97,5%. 37 patients had a negative SLN on frozen section, 3 patients had a positive SLN on final pathology and in 2 patients who had positive SLN on frozen section MRND was performed. From 34 patients with negative SLNs, 1 patient presented structural persistence of disease and 2 presented biochemical persistence.
Conclusion
The method is safe and sensitive to detect unknown lymph node metastases in the lateral neck compartment, may support a decision to perform accurate surgical treatment in MTC patients.

PP028 Evaluation of BRAF V600E and TERT Mutation Analysis in Differential Thyroid Cancers in Endemic Region Population

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Background
The existence of V-Raf murine sarcoma viral oncogene homolog B (BRAF V600E) and Telomerase reverse transcriptase (TERT) mutation has been a risk factor for differentiated thyroid cancers (DTC). We aimed to evaluate the potential effects of DTC, BRAF V600E oncogene and TERT promoter mutation association on the clinical course and aggressive spread of the tumor in an endemic region.
Method
A total of 137 patients with DTC, who had surgery, were evaluated retrospectively. The patients were grouped as DTC with the aggressive course (Group 1), DTC with the standard course (Group 2) and the benign cases (Group 3/Control). BRAF V600E oncogene and TERT promoter mutation analysis and its expressions were analyzed with the supplied immunohistochemically kits and a comparison was made between the three groups.
Results
While BRAF mutation was significantly higher in Group 1 ($p=0.001$), TERT mutation and BRAF+TERT coexistence were similar in Groups 1 and 2 ($p=0.054$ and $p=0.213$; respectively). The age, gender, multifocality, tumour capsule invasion, which are local prognostic factors, metastasis status with LVI and PNI, recurrence and mortality were not associated with BRAF, TERT and TERT+BRAF mutation coexistence. Unusually, the extra thyroidal spread was found to be significantly higher in BRAF-positive cases ($p=0.029$), but was not associated with TERT and BRAF+TERT mutation coexistence.
Conclusion
It was determined that the extra thyroidal spread was higher in BRAF positivity, there was no statistically significant difference in metastasis, recurrence and survival. In an endemic region, these mutations may not fully reflect the clinical course.

PP029 Percentage of malignancy in Bethesda III and IV thyroid nodules

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Background
Evaluation os our series of thyroid nodules with Bethesda III and IV category, determine its percentage of malingnancy and correlate the results with those of the different published series.
Method
Retrospective study through review of medical records from 2009 to 2018. A total of 596 patients are included.
Results
A percentage of 3.8% and 14.3% for the categories Bethesda III and Bethesda IV repectively, with a percentage of malignancy of 39.1% and 48.2% for each category. Papillary thyroid carcinoma is the malignant tumor most frequently found in both categories.
Conclusion
The percentage of malingancy that we have found in our series is among the highest reported to date. Predictably the use of molecular tests in tissues obtained by FNAB will allow more accurate and reliabe classification of thyroid nodules in terms of malingnancy.

PP030 Risk of Recurrence among Patients with Multifocal Papillary Thyroid Carcinoma Is Not Influenced by the Presence of Thyroiditis

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Background
Multifocality is a common presentation in papillary thyroid carcinoma(PTC). The risk of recurrence among those with multifocality has recently been debated. Some suggest a possible increased risk for those with thyroiditis on histology. We sought to investigate the risk of structural disease recurrence among patients with multifocal PTC who all underwent a total thyroidectomy.
Method
Between 2000-2020, 211 patients underwent a thyroidectomy for multifocal PTC. Patient, operative, and outcome data were collected and analysed.
Results
Most patients were female(*n*=145; 69%), with an overall median age of 48 years[range:18-86]. Median size of the largest focus was 19mm[range:1-95], most patients(*n*=173;82%) thus having a multifocal macroscopic PTC. On pathological exam, extra-thyroidal extension was present in 96(45%); capsular extension in 24(11%); lymphovascular invasion in 48(23%) and thyroiditis in 57(27%). Overall, 84(40%) underwent a central, while 57(26%) underwent a central+lateral lymph node dissection, and nodal involvement was seen in 112(53%). During long-term follow-up, 26 patients(12%) developed structural recurrence; for seven(27%) this included distant metastasis. The overall, unadjusted, risk of structural recurrence was higher for males [OR=2.45;95%CI:1.08-5.72;*p*=0.03] and those aged >55years [OR=2.42;95%CI:1.06-5.57;*p*=0.02], while extra-thyroidal extension [OR=2.10;95%CI:0.91-4.87;*p*=0.08] and presence of nodal disease [OR=2.18;95%CI:0.90-5.26;*p*=0.08] bordered on being associated. None of the other histological variables seem to increase the risk of recurrence(all *p*>0.05), specifically not the presence of thyroiditis [OR=0.61;95%CI:0.22-1.70;*p*=0.34].
Conclusion
About one-in-ten patients with multifocal PTC develop structural recurrence of disease on long-term follow-up. Factors associated with increased risk include male sex and age >55years, while the presence of thyroiditis is not associated.

PP031 Risk factors for hypoparathyroidism in pediatric patients treated for thyroid cancer

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Background
Hypoparathyroidism is one of major post-operative complications of total thyroidectomy, causing severe symptoms and increasing hospitalization time. The aim of our study was to identify predictive factors for permanent hypoparathyroidism in pediatric (≤18 years) patients treated for thyroid cancer.
Method
181 pediatric patients were treated by total thyroidectomy ± lymphadenectomy at the endocrine surgery unit of Pisa University Hospital between 2006 and 2020 for thyroid cancer. Pre- and early post-operative (one day after surgery) calcium levels were collected, and difference (percentage) was calculated. Demographic characteristics of the patients and clinicopathological features of thyroid cancer were also investigated.
Results
The median age was 16 years (range: 4-18) and 137 (75.7%) patients were female. Central neck dissection (CND) was performed in 45% of cases while lateral cervical neck dissection (LND) in 30.4%. Thyroiditis (p=0.43), extracapsular invasion (p=0.58), CND (p=0.50), LND (p=0.16) was not associated with permanent hypoparathyroidism. Energy based device were used in 83/181 cases but their application was not associated with significant reduction of complications. Patients with a difference between preoperative and postoperative calcemia (Delta) > 15%, more frequently developed a permanent hypoparathyroidism (12.5% in group with Delta > 15 vs. 1.8% in group with delta < 15%)(p<0.01).
Conclusion
Several factors potentially correlated with permanent hypoparathyroidism in pediatric patients treated for thyroid cancer were evaluated. However, only a difference higher than 15% between pre- and postoperative calcium values was significantly associated with the risk of developing permanent hypoparathyroidism.

PP032 The theranostic target alpha-v-beta-3 is largely expressed in medullary thyroid carcinoma

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Background
After intended curative resection for medullary thyroid carcinoma (MTC), calcitonin levels often remain elevated. Adjuvant therapy falls short. Therefore, new imaging modalities and therapeutic options are needed. Alpha-v-beta-3, an integrin expressed in many tumors, is a promising target for nuclear imaging and treatment (theranostics) using radiolabeled arginine-glycine-aspartic acid (RGD). The aim of this study was to determine alpha-v-beta-3 expression in MTC and metastases.
Method
Ninety patients who underwent surgery for MTC in the Netherlands between 1988 and 2014 were included. Alpha-v-beta-3 expression was analyzed using a tissue micro array including three cores of primary tumors and lymph node metastases. Expression was scored from absent to strong (0-3); an average >1 was deemed positive. Expression was correlated with clinicopathological variables and survival.
Results
Mean age was 44 years (SD 16.7), 46% was male and 47% had MEN2 syndrome. Average alpha-v-beta-3 expression of the analyzed cores was 1.6. Sixty patients were scored alpha-v-beta-3 positive. Positivity was associated with sporadic MTC and lymph node metastases at time of initial surgery. Average intensity did not differ significantly between primary tumor and lymph node metastases. Survival was similar for alpha-v-beta-3 positive and negative patients. Results of 68Ga-RGD PET/CT will follow shortly.
Conclusion
The theranostic target alpha-v-beta-3 is largely expressed in MTC. Patients with sporadic MTC or lymph node metastases at time of initial surgery seem most eligible. Alpha-v-beta-3 expression appears to be stable, based on the observed similarity in expression between primary tumor and lymph node metastases.

PP033 Hemithyroidectony versus Total Thyroidectomy in the intermediate risk differentiated thyroid cancer: the Italian Societies of Endocrine Surgeons and Surgical Oncology MULTICENTRIC STUDY

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Background
The surgical treatment of the intermediate risk DTC (1-4 cm) remains still controversial. We analyzed the current practice in Italy regarding the surgical management of intermediate risk unilateral DTC in order to evaluate risk factors for recurrence and to identify a group of patients to whom propose a total thyroidectomy (TT) vs. hemitiroidectomy (HT)

Method
Among 1896 patients operated for thyroid cancer between January 2017 and December 2019, we evaluated 564 (29.7%) patients with unilateral intermediate risk DTC (1-4 cm) without contralateral nodular lesions on the preoperative exams, chronic autoimmune thyroiditis, familiarity or radiance exposure. Data were collected retrospectively from the clinical register from 14 referral centers. The patients were followed for at least 14 months (median time 29.21 months)
Results
In our cohort 499 patients (88.4%) underwent total thyroidectomy whereas 65 patients (11.6%) underwent hemithyroidectomy. 151 (26.8%) patients had a multifocal DTC of whom

57 (10.1%) were bilateral. 21/66 (32.3%) patients were reoperated within 2 months from the first intervention (completion thyroidectomy). Three patients (3/564) developed regional lymph node recurrence 2 years after surgery and required a lymph nodal neck dissection. The single factor related to the risk of reoperation was the histological diameter (HR = 1.05 (1.00-1-09), p = 0.026)

Conclusion

Risk stratification is the key to differentiating treatment options and achieving better outcomes. According to the present study tumor diameter is a strong predictive risk factor to proper choose initial surgical management for intermediate risk DTC.

PP034 Non-Recurrent laryngeal nerve during intraoperative neuromonitoring thyroidectomy: a case report and literature review

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Background
An accurate knowledge of the anatomy of the neck and its eventual abnormalities is crucial while performing a safe thyroid and parathyroid surgery.
Method
We present the case of a 58-year old female, discussing the embryological origin, surgical pitfalls of the case, diagnostic algorithm, with a literature review.
Results
Embryo-genetic malformations of the IV branchial arch can lead to a rare anatomical variation known as Non-recurrent inferior laryngeal nerve.
Its prevalence consists in the 0.7% of the population for a right non-recurrent inferior laryngeal nerve, and 0.04% for a left non-recurrent laryngeal nerve.
In these cases the inferior laryngeal nerve branches origin directly from the cervical vagus nerve, entering the larynx without hooking around the subclavian artery on the right side or around the aortic arch on the left side.
We discuss the case of a patient admitted to our department for a Bethesda IV nodule in the right thyroid lobe in which the presence of a non-recurrent laryngeal nerve was detected intraoperatively using neuromonitoring on the right vagus nerve, expected because of a vascular alteration for an aberrant right subclavian artery originating from the left aortic arch, the Lusoria Artery, subsequently confirmed by a CT scan.
Conclusion
The presence of a non-recurrent laryngeal nerve is a challenging finding during neck surgery, due to the increased risks of iatrogenic damages of the nerve, that can result in hoarseness, dysphagia, glottal obstruction, vocal cords palsy and serious airway compromission

PP035 Post-total thyroidectomy hypocalcemia: analysis of complications. A retrospective study in our center

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Background
We retrospectively analyzed patients treated by Endocrine and Metabolic Surgery in Varese Hospital in order to better define the incidence of postoperative complication in our center, paying particular attention to postoperative calcium levels.
Method
We retrospectively analyzed 288 patients who underwent a total thyroidectomy within the past 3 years.
Results
Among the 288 patients, 82.6% had a bening disease and 17.4% a malignant one. Complications were: temporary vocal cord palsy due to a RLN lesion in 11 patients (3.8%), cervicotomy for haemorrhage in 8 (2.8%), post-op hypocalcemia in 133 (46.2%). The hypocalcemia was transitory in 129 patients (44.8%) and permanent in 4 (1.4%). We divided patients into two groups: the hypocalcemic and the normocalcemic ones. The two groups differed in PTH value: its median value in pg/ml was 13.4 in hypocalcemic patients, and 42.9 pg/mL in normocalcemic patients. We analyzed serum calcium level in those patients with a transitory post-op hypocalcemia: a valure of 8.5 mg/ml was achieved by 99 patients (76.1%) one month after surgery, by 21 (16.2%) three months after surgery, and by 6 (4.6%) six months after surgery. The average post-op hospital stay was 3.8 days for normocalcemic patients (median value = 3 days), and 4.7 days for hypocalcemic patients (median value = 4 days).
Conclusion
In accordance with the literature, we observed that hypocalcemia is the most common complication in thyroid surgery and it significantly impacts the average post-op hospital stay.

PP036 Metastasis of colorectal adenocarcinoma in the thyroid gland

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Background
Metastatic lesions in the thyroid gland are rare. The primary neoplasm that metastasizes most frequently in the thyroid gland is the renal tumor, followed by other less frequent tumors such as the lung, breast and colorectal. We present a patient with a previous diagnosis of rectal cancer with liver and lung metastasis who presents symptoms of thyroiditis.
Method
A 68-year-old woman diagnosed of rectal neoplasia with synchronous liver and lung metastases. Evaluated by a multidisciplinary committee, she was considered a candidate for neoadjuvant treatment and surgery.
Months later, the patient consulted for a painful mass in the anterior cervical region. An ultrasound was performed observing a 16mm hyperechogenic nodule in the right thyroid lobe. Fine needle aspiration (FNA) of the lesion was performed, being positive for malignant cells compatible with colorectal adenocarcinoma metastases. A PET-CT scan showed a single uptake in the right thyroid region. The patient was proposed for right hemithyroidectomy.
Results
During the surgery, no new lesions or pathological lymph nodes were found. The pathological analysis of the surgical specimen showed neoplastic cells of colorectal origin with free surgical margins. Nowadays, she is controlled by general surgery and medical oncology team.
Conclusion
This case is especially rare because it is a metastatic lesion in the thyroid gland of rectal neoplasia, diagnosed by clinical signs of thyroiditis. In this case, hemithyroidectomy was performed because PET-TC showed a single location of pathologic capitation of contrast

PP037 Anaplastic lymphoma kinase gene mutation in poorly differentiated thyroid cancer

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Background
Poorly differentiated carcinomas of the thyroid gland (PDCT) are rare but highly aggressive. The diagnostic criteria for PDCT remain controversial. According to consensus in 2006, PDCT are invasive tumors with solid /trabecular/insular growth patterns plus at least one of the following: convoluted nuclei, 3 or more mitosis per 10 high-power fields or necrosis. We present a case of a 15-year-old patient with thyroid cancer with a mutation in the anaplastic lymphoma kinase ALK gene
Method
A 15-year-old male presented with a non-painful mass in the right latero-cervical region for months. Neck ultrasonography shows a nodule in the right thyroid lobe of 4x3x4 cm and right, central and latero-cervical nodes. The bigger node has a size of 2x1.6 cm and a cystic appearance. The fine-needle aspiration cytology was positive for uncertain thyroid carcinoma with negative calcitonin
Results
Our patient underwent a total thyroidectomy with central, right and left lymph node dissection. The pathological specimen diagnosed a PDCT with 45 positive metastatic nodes of 121 harvested. The immunohistochemical profile highlighted intense and diffuse positivity in the ALK gene. Our patient was treated after surgery with *Ceritinb* as a selective and potent inhibitor of anaplastic lymphoma kinase (ALK). He receives periodical follow-ups and he remains free of disease after 36 months of surgery.
Conclusion
We want to highlight two important points: ALK mutation and the age of presentation. We need better insight into the biology of PDTC. New potential targets are emerging and consequently, new adjuvant therapies will be applied.

PP038 Rationale to postpone RAI-ablation in selected patients with T1aN1aMx papillary cancer

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Background
The ETA consensus for management of papillary microcarcinoma (2006) suggest thyroidectomy followed by radioactive iodine (RAI) treatment for level VI lymph node metastases of any size and number. However, ATA 2015 guidelines advocate no RAI ablation after hemi-/total thyroidectomy for thyroid cancer less than 1 cm with 5 and less micrometastases up to 2 mm in central neck lymph nodes as this strategy has no negative impact on disease prognosis
Method
Two groups of patients (30 per group) with papillary microcarcinoma T1aN1a (5 and less level VI micrometastases up to 2 mm) were observed during 3-year follow-up. In the first group, patients received 100mCi (3.75 GBq) iodine-131 shortly after total thyroidectomy while in the second group, postponed RAI was applied when progression signs were observed (thyroglobulin, thyroglobulin antibodies level elevation and US/CT/scintigraphy) after thyroid surgery.
Results
After 3 years, no significant difference between groups was observed regarding post-RAI local recurrences (1 in group I; two in group II) and/or distant metastases (t-test p-value 0.58). All cases were treated with subsequent surgical excision with no new data for progression within the specified follow-up.
Conclusion
RAI adjuvant therapy for thyroid papillary cancer Ta1N1a may not be necessary for patients with small number of level VI micrometastases. Once revealed during the careful follow-up by thyroglobulin level elevation and visualization techniques, local and distant metastases can be effectively treated with postponed RAI therapy and/or surgery.

PP039 Hypertensive headache as a form of presentation of advanced thyroid cancer

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Background
The usual clinical presentation of thyroid cancer is that of an anterior cervical nodule. However, on many occasions, it is asymptomatic and is diagnosed incidentally in radiological studies (ultrasound or CT) performed by screening or for other medical indications. On very few occasions, thyroid cancer presents with unusual symptoms, such as dysphonia or difficulty swallowing, and even more rarely, as a headache secondary to venous hypertension due to internal jugular vein stenosis.
Method
A 21-year-old male patient consulted for an intense headache, resistant to habitual analgesia, as the first symptom. On physical examination showed submandibular adenopathic and left supraclavicular nodes. CT cervicothoracic showed a left thyroid nodule 3 cm in diameter and multiple lymphadenopathy in both jugular chains and multiple subcentimeter pulmonary nodules. Fine neddle aspiration showed a thyroid cancer. A total thyroidectomy with central and lateral lymphadenectomy was performed
Results
A total thyroidectomy was performed with bilateral central and lateral lymphadenectomy. Left lymph nodes of levels 2 and 3 caused stenosis of the internal jugular veinl with normalization of distal caliber. The right internal jugular vein had an increased caliber to compensate the contralateral stenosis. The pathological study was reported as tumor stage: pT2N1b.
Conclusion
Four different causes of occlusion of the internal jugular vein associated with thyroid neoplasia are known: venous thrombosis associated with a hypercoagulable state, tumor thrombus in the vein, compression or invasion due to thyroid disease or metastases in the lymph nodes, such as case we present, and secondary to fibrotic collapse during lateral neck dissection.

PP040 The Probability of Completion Thyroidectomy In 1-4 cm Papillary Thyroid Cancer Preoperatively Eligible for Lobectomy

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Background
To investigate the rate of completion thyroidectomy (CT) to enable adjuvant radioactive iodine (RAI) treatment in 1-4 cm papillary thyroid cancer (PTC) who were preoperatively eligible for lobectomy according to the 2015 ATA guidelines.
Method
The records of 542 PTC patients treated between January 2010 and December 2020 were evaluated retrospectively. A subgroup of 293 patients with PTC 1-4 who were preoperatively eligible for lobectomy were included. All patients underwent total thyroidectomy. Prophylactic central neck dissection (PCND) was performed in 133(43%).Presence of central lymph node metastasis (CLNM), microscopic extrathyroidal extension(ETE),vascular invasion, agressive histology were defined as indications for RAI treatment. Based on pathologic features,we evaluated the rate completion thyroidectomy that would have been indicated to enable RAI treatment in these patients if lobectomy had been performed.The rate of contralateral multifocality was determined.
Results
Vascular invasion in 62(21%), microscopic ETE in 18 (6.1%),agressive histology in 18 (6.1%) and contralateral tumor foci in 129(44%) were found in pathologic features.CLNM was found in 42 (31%) of 133 patients. CT to enable adjuvant radioactive iodine would have been indicated in 91/293 (31%) patients preoperatively eligible for lobectomy.Contralateral tumor foci would have been left in 44% in case lobectomy had been performed.
Conclusion
One third of the patients with PTC 1-4 cm who are eligible for lobectomy may require CT upon final pathologic features, and contralateral tumor foci may be left in a substantial portion if lobectomy is performed.

PP041 The Impact Of Using Intraoperative Neuromonitoring During Thyroid Surgery On Postoperative Thyroglobulin Levels And Response To Treatment In Patients With Papillary Thyroid Carcinoma

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Background
To evaluate the effect of using intraoperative neuromonitoring (IONM) on postoperative stimulated thyroglobulin(sTg) levels, response to treatment and local recurrence rate in patients who underwent total thyroidectomy(TT) for papillary thyroid carcinoma(PTC).
Method
Between January 2010 to December 2020, 795 patients who underwent TT and/or central lymph node disection(CLND) for PTC were included in the study. Patients with lateral cervical metastasis and positive Anti Tg levels were excluded. 379(47.7%) patients underwent surgery without using IONM(Group 1) and IONM was used in 416(52.3%) patients(Group 2). The demographic data, histopathologic features, postoperative Tg levels, RAI treatment, recurrence rate and response to treatment were compared between the groups. Same parameters were also compared in patients operated with continuous or intermittent IONM
Results
Demographic data and the tumor size showed no significant difference between the groups. Mean postoperative sTg levels were significantly lower(5.2±21.4 vs 12.7±69.6,p<0.001) and excellent response to treatment was significantly higher in group 2 compared to group 1(96.6% vs 93%,p=0.02). In sub-group analysis, postoperative sTg levels were significantly lower in patients who underwent CLND with IONM compared to without IONM(6.1±23.6vs19.3±103,p=0.003). Local recurrence rates were similar(3%vs2.6%,p=0.6). Postoperative sTg levels(4.9±21.8vs5.3±21.2,p=0.6) and excellent response to treatment rates(96.5%vs96.6%) were similar in intermittent and continuous IONM groups.
Conclusion
The use of IONM results in lower postoperative Tg levels and might improve response to treatment in patients with papillary thyroid carcinoma.

PP042 Diagnosis of PTC. Is it time to reconsider?

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Background
The aim of this retrospective study was to evaluate the diagnostic significance of presurgical thyroid ultrasound in comparison with FNAC of thyroid nodules and their contribution in detecting thyroid cancer.
Method
We studied the files of 118 thyroid cancer patients, 18 men (15.2%) and 100 women (84.8%), who underwent thyroidectomy from January 2013 until December 2016. All patients were diagnosed and followed up by the Section of Endocrinology and were operated upon by the same surgical team. The mean patient age was 55 years (±12.26). We evaluated the suspicious ultrasound findings according to the ATA Guidelines of 2015 (hypogenicity, microcalcifications, taller than wide shape, irregular margins, extrathyroidal extension) and the results of FNAC (in accordance to Bethesda Score), in association with the pathology report.
Results
Mean tumor size was 7.1 mm (±8.73 mm). The Bethesda score was positive for malignancy in 45% of the cases. The suspicious ultrasound findings were in accordance with the pathology report in 78.8% of the cases. Based on our statistical analysis, ultrasound as a diagnostic tool is more significant ($P<0.05$) and has a more positive predictive value in detecting thyroid cancer compared to FNAC.
Conclusion
Ultrasound characteristics and clinical suspicion are considered more valuable in the diagnosis of papillary thyroid carcinoma, especially for small lesions (<10 mm) and multinodular goiter. Therefore, an ultrasound scoring system should be adopted by the clinicians with thyroid cancer.

PP043 Thyroglossal duct/ cyst carcinoma: a case series

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Background
Thyroglossal duct (TGD)/ cyst arises from the failure of TGD to involve during embryological development. TGD carcinoma is rare, presents with symptoms indistinguishable from a benign thyroglossal duct/ cyst. We report a series of TGD cases.
Method
We present a patient with thyroglossal duct carcinoma. We also reviewed data on the preoperative surgical indications, type of operation, cytology and surgical pathology for TGD cases from two prospectively collected databases of patients undergoing thyroid surgery in two tertiary referral centers, in the USA (A) and in Greece (B) over 14 consecutive years.
Results
A 28-year-old Caucasian man was referred to our department for a painless anterior midline cervical mass, gradually increasing during the past 8 months. Past medical history was unremarkable. Physical examination revealed a well demarcated, mobile, midline cervical tumor (2.4cm) and cytology showed cells suspicious for a papillary neoplasm (Bethesda 6). Thyroglossal cyst was excised with total thyroidectomy and Sistrunk procedure. We retrospectively reviewed 5844 (A:2750, B:3094) thyroid surgery cases, included 7 TGD cases (A:5 B:2). Mean age 42.7 ± 5.3. Lobectomy (n=2) and total thyroidectomy with Sistrunk procedure (n=5) were performed. The indications for surgery were multinodular goiter (n=2) and TGD diagnosis (n=5). n=1 (14.28%) with thyroid carcinoma of the TGD (PTC with concurrent follicular adenoma). Tumor maximum diameter 0.01 cm, with lymph nodes involvement.
Conclusion
TGD carcinomas are rare entities often diagnosed postoperatively as an incidental finding during histopathological examination.

PP044 Clinical implementation of posterior carotid-jugular lymph nodes in papillary thyroid cancer

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Background
This study was designed to define and to see the incidence of posterior carotid-jugular lymph nodes, located at the level 4 neck compartment. Further analysis of central neck nodes was done to see if it can predict the pathologic status of posterior carotid-jugular lymph nodes.
Method
For the preliminary study, patients who underwent thyroidectomy for papillary thyroid cancer at OOO Hospital from January 2019 to December 2020 were analyzed. We defined what a posterior carotid-jugular lymph node is. CT scans were reviewed retrospectively to identify such lymph nodes. A further validation study was carried out by analyzing the biopsy results of posterior carotid-jugular lymph nodes of patients who underwent thyroid surgery at the same hospital from April 1st to October 25th 2021.
Results
A total of 1494 patients were eligible for the preliminary study. We have identified 282 patients (18.9%) to have posterior carotid-jugular lymph nodes on pre-operative CT scans. Further analysis revealed that patients with posterior carotid-jugular lymph nodes were younger ($p<0.01$) and had more extra-thyroidal extension ($p=0.01$).
The validation study revealed 23 patients (65.7%) had metastasis on pathologic evaluation. The pathologic status of central lymph nodes showed an AUC value of 0.899 for predicting metastasis of posterior carotid-jugular lymph nodes.
Conclusion
Posterior carotid-jugular lymph node is prevalent in the patient population. However, making decisions on the extent of surgery difficult. This study demonstrates that central lymph node frozen biopsy can help in determining the status of posterior carotid-jugular lymph nodes.

PP046 The Frozen Section of Central Neck Lymph Nodes Helps to Identify High-risk Cancer in Patients with Preoperatively Diagnosed Low-risk Differentiated Thyroid Carcinoma

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Background
Extending the indications for limited surgery for low-risk differentiated thyroid cancer (DTCs) to 4 cm (ATA guidelines 2015) requires more accurate patient selection. We reflected on the effectiveness of perioperative histology (FS) in optimisation of surgical management.
Method
In a single-centre retrospective study, we evaluated the files of 489 patients indicated for primary surgery for DTC from January 1, 2016 to December 31, 2020. 73 patients with preoperatively identified low-risk DTC (females aged 18-45 years, intraparenchymal tumour sized 11-40 mm, no lymph nodes involvement) were indicated for lobectomy.
Results
Out of 73 patients eligible for lobectomy, 34 (47%) had total thyroidectomy performed finally because high risk cancer has been confirmed later. 25 patients had FS from lymph nodes of central neck compartment (LNCC) and 41 from thyroid gland. FS accurately diagnosed high risk cancer in 15/16 patients from LNCC (sensitivity 93,7%) and 6/17 patients from thyroid gland (sensitivity 35,3%). Patients with falsely negative FS needed two-step surgery - 1/16 (6,3%) patient in LNCC group and 11/17 (64,7%) patients in thyroid gland group. From 7 patients without FS two had high risk cancer, one needed second surgery.
Conclusion
FS from LNCC is statistically significantly superior for identification of high-risk cancer and reduction of two-step surgery (OR 1.93, p = 0.026), compared to FS from thyroid gland and when no FS is performed.

PP047 Be(a)ware of leucocytosis in papillary thyroid cancer

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Background
Leukocytosis especially neutrophilia are usually caused by acute infection, inflammation, and myeloproliferative neoplasms. Leukocytosis can also occur in patients with malignancy either due to bone marrow metastases or as a paraneoplastic syndrome. Tumor cells can produce colony-stimulating factors or interleukins. In thyroid carcinoma, only a few reports exist and they refer mainly to the anaplastic variant. We report a patient with metastatic thyroid papillary carcinoma with leucocystosis and neutrophilia caused by IL-6 procuction by the tumor cells.
Method
A 42-year-old male was admitted to our surgical department due to metastatic papillary thyroid cancer detected on an outpatient investigation. Upon investigation leucocystosis and neutrophilia were detected. Further investigation was ordered preoperatively and other causes of leukocytosis were excluded.
Results
Circulating IL-6 levels were high, while tumor cells produced IL-6 as indicated by the immunostaining. The thyroid papillary cancer synthesized and secreted IL-6, which seemed to be the cause of leukocytosis.
Conclusion
Leukocytosis in a patient, having excluded infectious disease and myelodysplastic syndrome, could represent a manifestation of a paraneoplastic syndrome due to various cytokines secretion from the tumor.

PP049 Do dreadful complications still occur during thyroidectomy?

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Background
Complications can occur with any surgery. Thyroidectomy is not an exception.
Method
We reviewed prospectively maintained data base of thyroidectomy cases in tertiary care centers from January 2014 to December 2021 and came across four cases of rare complications managed successfully.
Results
The first case is of a patient with PTC who underwent total thyroidectomy. In the immediate postoperative period she developed stridor and the possibility of bilateral recurrent laryngeal nerve (RLN) palsy was considered. Evaluation with FOL showed bilateral mobile vocal cords, while the subglottis showed extensive edema and the patient had to be tracheostomized and later decannulated.The second case is of a young female who had completion thyroidectomy and central compartment lymph node dissection for PTC. She developed ptosis, myosis, and enophthalmos on postoperative day 1, without anhidrosis. A possible cause, in this case, could be trauma from retraction or injury to the communicating branch from RLN, as it was a re-operative case and cause of horners syndrome.The Third patient underwent surgery for a huge goiter had tracheomalacia and had tracheostomy.Fourth Patient has bilateral thyroid nodule which was Papillary thyroid cancer of FNAC. Underwent uneventful total thyroidectomy and six hours later had stridor.Vocal cord was in paramedian position and probably Posterior crico arytenoid dislocation .
Conclusion

Thyroidectomy is not associated with complication in the majority of cases, but the surgeon must be prepared to manage a few rare complications also.

PP050 Poorly differentiated thyroid carcinoma with superior vena cava thrombus causing life threatening acute venous ingestion and asphyxia - a presentation of 2 cases

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Background
Thyroid carcinoma with extensive tumor thrombus to the superior vena cava (SVC) has been documented in less than 50 patients up to date and no clear therapeutic algorithms are defined. We present 2 cases with superior vena cava tumor thrombus due to poorly differentiated thyroid carcinoma that could be resected successfully.
Method
First, a 46 years old female patient presented with acutely progressing upper venous congestion due to extensive thrombosis of the SVC with a large fast growing cervical goiter. Anaplastic carcinoma was ruled out and cervico-mediastinal thyroidectomy with sternotomy and thrombectomy of the SVC was carried together with cardiac surgeons using the heart-lung-machine. Patient`s congestion symptoms quickly resolved until discharge from hospital.
Second, a 70 years old female patient with known stridor suffocated and had to be intubated at home. She demonstrated with tracheal obstruction and a complete SVC thrombosis by a poorly differentiated thyroid cancer. Cervico-mediastinal resection with SVC thrombectomy and patch reconstruction was performed with cardiac surgeons using heart-lung-machine. Further on she underwent temporary tracheostomy for weaning-failure but could be decannulated during follow-up.
Results
-
Conclusion
When patients with differentiated or poorly differentiated thyroid cancer present with extensive superior vena cava thrombosis an interdisciplinary cooperation with cardiac surgeons is advocated, since prognosis largely depends on complete tumor resection.

PP051 Thyroid malignancy rate in bethesda iii and iv category nodules

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Background
Fine-needle aspiration cytology (FNAC) has become a well-established diagnostic technique to assess cellular morphologic features and malignancy risk of thyroid nodules using the Bethesda System for Reporting Thyroid Cytopathology (BSRTC) thereby facilitating appropriate clinical management. BSRTC categories III and IV constitute a problematic entity with variable malignancy risks, leading to different approaches for choosing the best therapies.
Method
Over a 6-year period, 1560 thyroid operations were performed. FNAC was done in 1021 (65%) cases. BSRTC I was found in 67 (6.6%), BSRTC II – 458 (44.9%), BSRTC III - 120 (11.7%), BSRTC IV - 63 (6.2%) BSRTC V - 121 (11.8%), BSRTC VI - 192 (18.8%). Patient data were reviewed to establish a correlation between the FNAC results and the final morphology.
Results
In BSRTC III nodules malignancy rate in final morphology was 42 (35.0%), BSRTC IV - 31 (49.2%), no significant difference regarding malignancy risk was found ($p>0.05$). However, if compared with BSRTC II - 50 (10.9%) malignancy rate in BSRTC III and IV was statistically significantly higher ($p<0.05$).
Conclusion
BSRTC III malignancy risk does not significantly differ from the BSRTC IV category. According to our data in patients with BSRTC III nodules surgery rather than active surveillance is advocated.

PP052 Papillary thyroid microcarcinoma – analysis of endocrine unit data

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Background
Papillary microcarcinomas (PTMC) - carcinoma measuring 1cm or less, have increased at the greatest rate in recent years worldwide. There is considerable debate regarding the optimal therapeutic approach of PTMC. Decision-making is mainly based on risk assessment. However, high-risk characteristics can only be revealed post-surgically.
Method
Over a 6-year period, 1566 thyroid operations were performed. Papillary thyroid cancer (PTC) was noticed in 419 (26.7%) cases, from those 225 (53.7%) were PTMC. Retrospective data of PTMC clinical, histopathological, and management features were analyzed.
Results
Main indications for surgery were: excluding malignancy – 80 (35.6%) and malignancy - 83 (36.9%). PTMC was found in 7 (3.1%) cases of completion thyroidectomies. In 55 (24.4%) cases PTMC was found in thyroids operated due to compression or thyrotoxicosis. Bilateral thyroidectomy was performed in 171 (76%) cases. In 27 (12%) cases PTMC were multifocal. Altogether morphology revealed lymph nodes in 82 (36.4%) cases. Central lymph node dissection was done in 33 (14.7%). Lymph node metastases were found in 24 (10.7%) of all PTMC cases, from those in 7 (3.1%) it was an incidental finding.
Conclusion
At least half of PTC are PTMC. From those 1/10 will develop lymph node metastases. Despite that, the majority of patients with PTMC have an excellent prognosis

PP053 Thyroid papillary cancer, hyperthyroidism and parathyroid adenoma in a patient with Wilson's disease; hints for a possible association

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Background
Wilson disease is a rare genetic disorder of copper metabolism, predominantly affecting the liver and psychomotor brain areas. The aim of the present study is to report a case of a patient with Wilson's disease diagnosed and surgically treated for thyroid papillary cancer, hyperthyroidism and parathyroid adenoma.
Method
The present case is about a 50 year old female with past medical history of Wilson's disease diagnosed at the age of 25 , liver cirrhosis, gait imbalance and aphasia. During the past two years she was diagnosed with a multinodular goiter of the thyroid gland by thyroid ultrasonography (u/s). The last thyroid u/s elastography demonstrated a right lobe nodule measuring 6.1 x 5.9x 4.8 mm with high elastographic score of 4.4 indicating malignancy and a single paratrachial lymph node with adverse sonographic features. Biochemical testing revealed THS 0.01 μIU /mL, FT3 5.09 pg/mL, FT4 2.51 ng/mL, PTH 1080 pg/mL and Ca 12.1 mg/dL which also implied the presence of a concurrent primary hyperparathyroidism. Fine need aspiration was positive for papillary cancer, while the sestamibi parathyroid scan confirmed the adenoma of upper right parathyroid.
Results
The patient underwent total thyroidectomy with central lymph node dissection and upper right parathyroidectomy. Histopathology confirmed the papillary cancer of the thyroid and 1 infiltrated lymph node out of the 13 that were totally dissected additionally to the parathyroid adenoma.
Conclusion
A possible causal relationship between copper metabolism derangement (such as in the case of Wilson's disease) and thyroid cancer, hyperthyroidism and primary hyperparathyroidism is implied.

PP054 Synchronous and metastatic papillary and medullary thyroid carcinomas presenting one year post gastrectomy for giant hypertrophic gastropathy in a woman

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Background
Depending on definition, overall reported incidence of multiple primary thyroid cancers varies between 2.4 and 17%. The aim of the present study is to report a case of a patient with synchronous primary thyroid carcinomas of different histologic types arising in a rare genetic background.
Method
The present case is about a 61 year old female with past medical history significant for MDS, falx cerebri meningioma, small bowel resection in childhood due to bowel obstruction and total gastrectomy due to Menetrier's disease.
Results
Biochemical testing revealed increased CEA (580.4 ng/ml), CA 19.9 (99.8 U/ml) and Calcitonin (2456 pg/ml) one year post gastrectomy thus the patient underwent thoracic CT and abdominal MRI scanning without significant findings and thyroid U/S scanning which revealed two bilateral lower lobe nodules evaluated as TIRADS 5 and one left upper lobe nodule evaluated as TIRADS 3 in the setting of goiter, as well as enlarged lymph nodes in the right cervical compartment III. Subsequent FNAC revealed bilateral lower lobe Bethesda VI medullary type foci as well as lymph node metastasis. The patient underwent total thyroidectomy plus bilateral and central neck dissection. Histopathology revealed right lobe papillary carcinoma with 4 lymph node metastases and left lobe medullary carcinoma with 1 lymph node metastasis. Genetic testing revealed a germline mutation of the SMAD4 gene.
Conclusion
Multiple primary endocrine cancers are rare entities, frequently associated with MEN. In this patient, mutation of the SMAD4 gene was associated with concurrent medullary and papillary thyroid carcinoma.

PP055 Evaluation of lobectomy for well differentiated thyroid cancer

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Background
According to revised criteria of ATA 2015, lobectomy is recommended in well-differentiated papillary carcinomas of the thyroid, < 4 cm without extrathyroidal invasion, lymph node metastasis, family history of malignant thyroid neoplasm or neck radiation in childhood. The purpose of this retrospective study is to evaluate these criteria in case of bilateral malignant involvement.
Method
Two hundred and thirteen (213) consecutive total thyroidectomies were included. One hundred and one (101) benign pathologies were excluded, while from the remaining malignant cases were evaluated only those that meet the above criteria (95 cases). Two groups were defined. Group A:bilateral disease (43 cases) and Group B:unilateral disease (52 cases).
Results
Fourty-two (42) cases of group A (97%) were neoplasms <4cm. Thirty of thoses cases (72.4%) did not present extrathyroidal infiltration or lymph node involvement. Moreover, fourty-nine of Group B (94.2%) were neoplasms < 4cm, 37 of them (75.5%) were carcinomas without extrathyroidal infiltration or lymph node involvement.Evidently, only thirty seven (37) (38.9%) out of 95 cases were eligible for lobectomy and were histologically confirmed that meet the revised criteria of ATA 2015.
Conclusion
Incidental findings of bilateral malignancy additionally to the fact that more than 60% of the cases did not fulfill the lobectomy only criteria, renders the necessity of reevaluation of the ATA 2015 criteria.
Implementing these criteria without additional information can lead to undertreatment of well-differentiated thyroid carcinoma.

PP056 Bilaterality, not multifocality, is an independent risk factor for recurrence in low-risk papillary thyroid cancer

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Background
The impact of multifocality and bilaterality on recurrence in patients with low-risk papillary thyroid carcinoma remains unclear. However, against the background of de-escalating treatment (hemithyroidectomy (HT) instead of total thyroidectomy followed by radioactive iodine (TT+/-RAI)), this may be important when selecting patients for such approach.
Method
All patients with 0-4cm PTC treated with TT+/- RAI in the Netherlands between 2005 and 2015 were identified from the Netherlands Comprehensive Cancer Organisation (IKNL), and linked with the nationwide network and registry of histo-and cytopathology in the Netherlands (PALGA). For all patients, multifocality and bilaterality were recorded and analysed with univariate and multivariate analyses, to assess them as possible predictors for recurrence.
Results
Of 2.445 included patients, 1.053 (43.1%) had multifocal disease (MFD), of whom, 661 (62.8%) patients had bilateral disease. For all patients, recurrence was higher in MFD when compared to unifocal disease (UFD)($P<0.001$), and when bilaterality was compared with unilaterality ($P<0.001$). In our patient cohort, 205 (24.4%) of patients showed contralateral disease after pre-op diagnosed UFD, having a recurrence rate of 10.2%. Also, 148 (57.8%) of patients showed no contralateral disease after pre-op diagnosed MFD, with a recurrence rate of 3.4%.

Conclusion
Bilateral disease seems to be an independent risk factor for recurrence. Multifocality could possibly and mistakenly be considered as risk factor because of the confounding effect which bilaterality has on multifocality. Bilaterality should be taken into account when considering patients for de-escalated treatment strategy for low-risk PTC.

PP057 Three-dimensional surgical planng in recurrence papillary thyroid cancer surgery

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Background
Papillary thyroid carcinoma (PTC) is usually a potentially curable illness, however, some patients recur in a local sites. The neck reoperation for recurrent PTC is still a challenge for the endocrine surgeon. Three-Dimensional (3-D) technology in medicine has rapidly increased, and is an useful tool for optimizing pre-surgical planning in complicated procedures, but its use in endocrine surgery is limited today.
Method
We present two cases with recurrence of PTC. One of them had the recurrence on the left vein jugular in III level. The other had it in upper right jugular vein in the IIa level. Both of the patients underwent thyroidectomy, central neck dissection and bilateral modified radical neck dissection. The initial tumors were high risk on recurrence according to ATA guidelines. The surgery was performed with a 3-D reconstruction and roll localizer.
Results
Both patient operated successfully. Complete resection of the metastasis was achieved, without injury to neighboring structures. Thanks to 3-D planning, we could choose the best incision site, we were able to know the approximate real size of the metastasis, and oriented ourselves in anatomical structures altered by previous surgeries. In addition, we knew where to carry out the dissection because it was far from the structures to be preserved.
Conclusion
The neck´s reoperation is a challenge for endocrine surgeons. Sometimes we need markers to help us locate the recurrence, but it is not enough. 3-D technology may be a useful help for increase the whole resection, improve the metastasis approach site and minimize morbidity.

PP058 Endocrine surgery unit acreditation using redcap as model-based data collection

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Background
The Spanish Society of Surgeons objective is to promote and maintenance high standards in clinical practice. In order to achieve this goal, the SSS proposes an accreditation system for specialized Endocrine Surgery Units.
Method
Research Electronic Data Capture (REDCap) is a secure, browser-based web application for building and managing online surveys and databases. This platform was established in our Surgery Department as a tool to registry all procedures performed. A retrospective analysis was conducted on thyroid, parathyroid and adrenal interventions performed in our department between January 1st 2019 and December 31st 2019. All preoperative, intraoperative and postoperative variables were collected.
Results
275 patients were included. There were 165 total thyroidectomies performed, 12 with central lymphadenectomy associated and 11 with lateral lymphadenectomy. 54 unilateral thyroidectomies, 9 completion thyroidectomies, 35 parathyroidectomies, 1 laparoscopic adrenalectomy and 7 procedures classified as “others”. Definitive histological diagnostic were benign in 186 cases, 85 papillary carcinoma, 4 medullary carcinoma, 4 follicular carcinoma and “other” histologic features in 4 cases. Transient hypoparathyroidism rate was 13.5% (n=37) and in 1.8% (n=5) was definitive. Permanent unilateral recurrent palsy was identified in 3 patients (1.09%). Four patients required emergent surgery for postoperative neck hematoma (1.5%).
Conclusion
Quality indicators and a specific structure, equipment, and multidisciplinary collaboration are required. The implementation of an accreditation system for endocrine surgery will permit to identify high-quality endocrine surgery centers, ensuring a minimum quality standard based on scientific guidance and clinical experience.

PP059 Extension of lymph node dissection in medullary thyroid cancer, is preoperative basal calcitonin the most predicting criteria?: a case report

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Background
Medullary thyroid carcinoma (MTC) originates from the calcitonin-producing parafollicular C-cells and represents <5% of all thyroid malignancies. Calcitonin is a sensitive tumor marker for MTC and correlates with burden of disease. Surgical treatment of MTC involves total thyroidectomy and bilateral central neck lymph node dissection (LND). Controversy remains in the approach to management of potentially uninvolved lateral neck lymph node, particularly in patients with markedly elevated calcitonin serum levels.
Method
A 60-year-old woman presented a palpable left thyroid nodule. MTC was suspected from fine needle aspiration citology. Preoperative basal calcitonin was 409 pg/ml and carcinoembryonic antigen (CEA) 26.20 µg/L. Positron-emission tomography-computed tomography (PET-TC) confirmed a left thyroid nodule without cervical lymph node or systemic disease. The genetic testing for RET mutation was negative.
Results
The patient underwent a total thyroidectomy, bilateral central LND and left lateral LND. Pathological features revealed a left 2.2cm MTC with capsular and vascular invasion. All lymph node dissected were negative for malignancy (8 lymph nodes in central compartment and 47 in left lateral compartment).
Conclusion
Different studies provide additional guidance in LND based on tumor size, tumor characteristics and preoperative calcitonin levels in the absence of structural lateral neck disease. The ATA 2015 guidelines recommend contralateral lateral neck dissection for patients with basal serum calcitonin > 200pg/ml. However, no consensus was reached and important questions remain regarding the optimal extent of LND.

PP060 How can a single preoperative blood analysis be associated with clinicopathological features and prognosis in patients with papillary thyroid carcinoma?: a meta-analysis

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Background
The association between Inflammation and cancer prognosis is reported in the literature. Neutrophil to lymphocyte ratio (NLR) and platelet to lymphocyte ratio (PLR) can be considered as predictive factors for several solid tumors. However, little is known regarding their significance in papillary thyroid cancer. This meta-analysis aims to investigate the correlation between preoperatively measured NLR and PLR with tumor characteristics and prognosis.
Method
Three searching engines were stratified (Pubmed, EMBASE, and Cochrane Library). The search string that we used is the following: (((NLR) OR (PLR)) AND ((papillary thyroid carcinoma) OR (PTC))).
Results
Eight studies consisting of 5.314 patients were finally enrolled. Results of meta-analysis showed that elevated NLR was significantly associated with metastatic disease in patients with PTC ([HR] = 0.67, 95% CI = 0.38-0.97). In subgroup analysis, no statistically significant association was found between NLR and Tumor Stage (Z=1.74, p = 0.08).
Conclusion
Preoperative measurement of NLR and PLR appear as good biomarkers for papillary thyroid cancer prognosis. Analysis of all the existing articles may enhance the statistical power and come to a more solid conclusion on this issue.

PP061 Predictive factors for skip metastasis to the lateral lymph node compartment in papillary thyroid carcinoma and possible consequences in decision making

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Background
Papillary thyroid carcinoma (PTC) is frequently accompanied by neck lymph node metastasis. Current guidelines state, on a weak level of evidence, that level VI dissection is mandatory in the presence of lateral lymph node involvement. However, the morbidity of CND is not negligible. Aim of our retrospective study is to evaluate predictive factors of the absence of level VI involvement despite the presence of metastases to the lateral cervical stations in PTC.
Method
Eighty-eight patients operated on for PTC with level II–V metastases, and in whom level VI dissection had always been performed at the same time, were retrospectively enrolled. Demographics, thyroid function, nodule size and site, cancer variant, multifocality, number of positive lymph nodes and outcome were recorded.
Results
At univariate analysis, PTC location and number of positive lateral lymph nodes were risk criteria for failure to cure. ROC curves demonstrated the association of the number of positive lateral lymph nodes and failure to cure. On multivariate analysis, the protective factors were PTC located in lobe center and number of positive lateral lymph nodes < 4. Kaplan–Meier curves confirmed the absence of central lymph nodes as a positive prognostic factor
Conclusion
In extremely selected cases Central Neck Compartment could not be involved in the presence of sporadic lateral metastases in PTC. Therefore, our proposal is to reevaluate the risks and benefits of CND in these cases.

PP062 Treatment and Follow-up of patients with struma ovarii : A single center experience

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Background
Struma ovarii (SO) is a mature ovarian teratoma in which greater than 50% of the total tumor volume is composed of thyroid tissue. However, protocols of gynecologic surgical treatment, post-treatment follow-up and additional thyroid management are not well established. The objective of this study was to analyze the clinical characteristics, and outcomes in patients with SO and malignant SO.
Method
Medical records of patients with struma ovarii between January 2000 and June 2021 at Seoul National University Hospital in Korea were reviewed. Cliniopathologic characteristics and postoperative follow-up results of women diagnosed with SO after undergoing gynecological surgery.
Results
Benign SO was observed in 70 patients, malignant SO in 13, and strumal carcinoid in 10. Five out of 13 malignant SO patients had total thyroidectomy followed by radioactive iodine treatment(RAI) whereas 8 patients had follow-up without further treatment. There were 2 case of recurrence in malignant SO during postoperative follow-up. 1 case of recurrence observed in a patient with malignant SO manifested peritoneal carcinomatosis despite adjuvant RAI. The other case of recurrence did not have adjuvant RAI. There was no case of recurrence in strumal carcinoid, but in benign SO, there was 1 case of recurrence during postoperative follow-up. Among 4 patients with follicular thyroid carcinoma arising in SO pathology, distant metastasis was identified in two patient.
Conclusion

It is necessary to do total thyroidectomy and following adjuvant treatment after surgical resection of malignant SO. Further evaluation with longer follow-up data of benign and malignant SO will be necessary to establish delicate strategy of postoperative management.

PP063 Time for self-initiated follow-up for patients with unmeasurable stimulated thyroglobulin before radioactive iodine ablation?

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Background
Guidelines for the management of differentiated thyroid cancer (DTC) lack details for follow-up strategies according to recurrence risk. This study assessed the long-term outcomes of patients with DTC who had excellent response to therapy predicted by achieving unmeasurable stimulated thyroglobulin (sTG) levels after surgery, before radioactive iodine ablation (RIA).
Method
Retrospective cohort study of consecutive patients treated for DTC in a tertiary referral centre between 2000-2020. RIA was done after hormone withdrawal (prior to 2015) or Thyrogen stimulation. After September 2012, the biochemical assay for TG changed from a lower limit of detectability of 5 ng/dl to 0.2 ng/dl.
Results
187 patients with pre-RIA sTG less than 5 ng/dl were analysed (F=140; M=54). Patients were divided into 3 groups: group A – undetectable sTG defined as < 0.2 ng/dl (n= 32, median follow-up 41 months); group B – sTG 0.2-4.9 ng/dl (n=98, median follow-up 35 months); and group C – historical patients with sTG considered unmeasurable if < 5 ng/dl (n=57, median follow-up 116 months). At the most recent assessment, 100% of patients in group A, 94% in group B, and 93% in group C were deemed disease-free. Six patients in group B and four in group C had either biochemical or radiological evidence of residual or reccurent disease.
Conclusion
Patients with sTG less than 5 ng/dl and dynamic risk stratification assessed as excellent response to initial therapy could be discharged from routine yearly appointments to patient-initiated follow-up.

PP064 High-risk papillary thyroid microcarcinoma in patients operated for benign thyroid disease

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Background
The aim of this study was to identify independent risk factors for high-risk papillary thyroid microcarcinoma (PTMC) in patients operated for benign thyroid disease.
Method
A retrospective study of 301 patients with PTMC operated for benign thyroid diseases at a high-volume endocrine surgery unit in a 5-year period. In statistical analysis, we used standard descriptive statistics and univariate and multivariate logistic regression analysis.
Results
In our study, there were 85.4% females and 14.6% males with a median age of 54 years. Most patients (68.4%) had a PTMC that was 5 mm or smaller. The most frequent histological variants of PTMC were: follicular (52.8%), papillary (22.6%) and mixed follicular-papillary variant (18.6%). A multifocal PTMC was present in 26.6% of cases. Independent risk factors for multifocality of PTMC were size of PTMC greater than 5 mm (OR 3.26, 95% CI 1.85–5.75, p=0.000) and the mixed follicular-papillary variant of PTMC (OR 2.42, 95% CI 1.09–5.36, p=0.030). An independent protective factor for multifocality of PTMC was a large thyroid gland (OR 0.55, 95% CI 0.31–0.97, p=0.039).
Conclusion
Independent risk factors for multifocality of PTMC are size of PTMC greater than 5 mm and the mixed follicular-papillary variant of PTMC, while a large thyroid gland represents an independent protective factor. More than a quarter of PTMCs in our study were multifocal PTMCs, which are considered high-risk PTMCs, and as such require adequate post-operative treatment that significantly differs from low-risk PTMCs.

PP065 Outcomes of Shave versus Transection of Involved Recurrent Laryngeal Nerve in Papillary Thyroid Cancer

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Background
Recurrent laryngeal nerve palsy (RLNP) is not uncommon after thyroid surgery and can be debilitating. This is a retrospective cohort analysis of outcomes in patients with RLN involvement necessitating amputation versus shave in papillary thyroid carcinoma.
Method
Over a period of 20 years (2000-2020), 540 thyroidectomies were performed for papillary thyroid cancer at a tertiary referral centre in Singapore. Clinicopathological details as well as outcomes of interventions performed for nerve palsy were collected. The patients were stratified into two groups based on whether the recurrent laryngeal nerve (RLN) was amputated or preserved.
Results
Of the 1077 nerves in 540 patients at risk during thyroidectomy, a total of 59 (11%) (18M:41F) patients, with a median age of 55 (range: 19 – 83) suffered RLNP, which was temporary in 3 (0.5%), unilateral in 55 (10%) and bilateral in 4 (0.7%) patients.
The RLN was amputated in 28 of 59 patients (48%). In 26 patients the nerve was intentionally sacrificed due to gross disease infiltration while the RLN was inadvertently severed during dissection in 2 patients. In the remaining 31 (52%) patients, shaving of the tumour from the RLN was performed.
The only factor associated with amputation of the RLN was a larger tumour size (38.9 vs 25.9mm, p = 0.013). Voice preservation was higher in the shave group in comparison to the amputation group ((93.5% vs 67.8%, p = 0.022).
Conclusion
Shave excision of the RLN should be considered in patients with locally invasive PTC, rather than amputation where possible.

PP066 Predictive value of calcium loading test for preoperative diagnosis of medullary thyroid carcinoma in patients with moderately elevated basal calcitonin

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Background
Medullary thyroid carcinoma (MTC) can be very aggressive, and the early diagnosis is based on the routine measurement of serum calcitonin (CT) and on the RET genetic testing for hereditary forms. Basal serum CT concentrations (bCT) are helpful in the early detection of MTC, while it is still unclear whether they can be used also for the differential diagnosis between MTC and C cell hyperplasia (CCH). Since false-positive results can be gained with the basal measurement of calcitonin, a provocative test to evaluate stimulated calcitonin (sCT) is often needed. The objective of this study was to investigate the utility of calcium gluconate test for CT in distinguishing MTC from CCH, a precancerous condition in hereditary forms of MTCs, but with unclear significance in sporadic MTCs.
Method
A total of 74 patients underwent the calcium loading test before thyroidectomy, and basal and stimulated calcitonin levels were compared with histological results by receiver operating characteristic (ROC) plot analyses.
Results
A peak of calcitonin after stimulation with calcium gluconate of 388.4 pg/ml was able to significantly distinguish patients with MTC from patients with CCH and patients without C cell pathology, with 81.8% sensitivity and 36.5% specificity. Basal calcitonin of 16.1 pg/ml was able to distinguish these two group of patients with 90% sensitivity.
Conclusion
High dose calcium test is potent procedure that can be applied for differential diagnosis of MTC and CCH. Reference ranges for calcium sCT levels and CT thresholds in different group of patients have been identified.

PP067 Single-center experience for thyroid cartilage needle electrode use in intraoperative neuromonitoring during thyroid surgery

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Background
In neural monitored thyroid surgery, the most common recording-side method is endotracheal tube electrodes. Also, needle electrodes can be used by inserting these on both sides of the thyroid cartilage lamina. This is an alternative and cheaper recording-side electrode system that provides recurrent laryngeal nerve (RLN) and vagus nerve monitoring and eliminates problems related to tube electrodes.
Method
Data were retrospectively analyzed from those who underwent thyroid surgery with intermittent intraoperative nerve monitoring with thyroid cartilage needle (TCN) electrodes. Patients' demographic data, diagnosis, surgery type, pre-resection vagus nerve (V1) and RLN amplitudes (R1), and post-resection vagus nerve (V2) and RLN (R2) amplitudes were evaluated.
Results
We evaluated 1002 (1929 nerves at risk) patients who underwent thyroid surgery. Our patients comprised 220 (21,9%) male and 782 (78,1%) female patients. The mean age of the patients was 49 (±13.87) years. Considering the indication for surgery, 655 (65.5%) had malignant disease and 345 (34.5%) had benign diseases. Seventy-five (7.5%) hemithyroidectomies and 925 (92.5%) total thyroidectomies were performed. Mean initial amplitude was 1980 µV (±1517) at V1 and 1490(±991) µV at R1. Loss of signal occurred in 16 patients (1.6%) in our patients. Unilateral permanent vocal cord paralysis developed in 7 patients (0,69%). Needle-related problems and complications didn't occur.
Conclusion
The use of TCN electrodes are an inexpensive, efficient and safe recording-side technique in monitored thyroid and parathyroid surgery. Therefore, we believe this technique will be included in guidelines soon and used even more commonly.

PP068 The need of completion thyroidectomy in cases undergoing hemithyroidectomy

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Background
We aimed to evaluate the clinical outcomes of patients undergoing hemithyroidectomy in our center.
Method
A retrospective evaluation of all patients receiving a hemithyroidectomy was conducted. Patients with bilateral nodular disease and those who underwent staged thyroidectomy due to loss of signal were excluded. Clinical and histopathological parameters and outcomes were analyzed.
Results
A total of 104 patients (79 female, 25 male), with a mean age of 39.3 (18-74) years, were included. According to preoperative fine-needle aspiration biopsy (FNAB) results, there were 13 Bethesda-6, 46 Bethesda-5, 27 Bethesda-3, and nine Bethesda-1 patients. Conventional hemithyroidectomy was performed in 90 (86.5%) of patients, while endoscopic thyroidectomy was performed in 14 (13.5%). A total of 41 (39.4%) was reported to have a benign pathology, and 63 (60.6%) had malignancy. Eighteen patients (28.6%) had papillary thyroid cancer (PTC), 40 had (63.5%) papillary thyroid microcarcinoma (PTMC), and five had (7.9%) follicular thyroid cancer (FTC). Twelve (11.5%) of these patients underwent completion thyroidectomy within the first two weeks. The mean follow-up period was 44 months, and there was no recurrence or lymph node metastasis in both patient groups who were performed the completion thyroidectomy and not.
Conclusion
Hemithyroidectomy is a treatment modality that can be applied in patients with differentiated thyroid cancer smaller than 4 cm, especially PTMC. The rate of completion thyroidectomy is approximately 10%

PP069 Staged thyroidectomy due to loss of signal during monitored thyroidectomy

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Background
Staged thyroidectomy, due to the loss of signal (LOS) that may develop during intraoperative nerve monitoring (IONM), has taken its place in the guidelines. In this study, we have compiled the results of our patients who underwent staged thyroidectomy.
Method
Data of 1162 patients (2229 nerves at risk) who underwent thyroidectomy/hemithyroidectomy with IONM were retrospectively analyzed. Patients with LOS who were decided for staged surgery were evaluated.
Results
Eighteen (1.5%) patients had LOS during thyroidectomy. A staged thyroidectomy was planned for nine patients. Type-2 LOS was observed in seven patients, and Type-1 in two patients. The follow-up decision was made for four patients with three Type-2 LOS and a Type-1 LOS (two nodular goiters, a unifocal papillary microcancer, and a pT1 papillary cancer). Of the five patients who underwent contralateral staged thyroidectomy, four were reported as papillary cancer (pT2 and above) and one as multifocal papillary microcancer. Two patients had contralateral Type-2 LOS during staged thyroidectomy, and one of them (Type-1 LOS at first surgery) had bilateral vocal cord paralysis with a 4 mm rima glottis wideness . No patient received a tracheostomy, and all Type-2 LOS's were healed without having permanent paralysis at 12-months follow-up.
Conclusion
Staged thyroidectomy may effectively reduce the rate of bilateral permanent vocal cord paralysis and requirement for emergency tracheotomy.

PP070 The Impact of Age on Long-Term Outcomes of Papillary Thyroid Cancer: a Nationwide Study

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Background
Previous studies suggest an age-related effect in disease characteristics and outcomes of papillary thyroid carcinoma (PTC), but none provided a detailed and national overview. The aim of this study is to describe and compare the age-specific differences in disease characteristics, treatment modalities and long-term outcomes of patients with PTC aged 15 – 60 years.
Method
We conducted a nationwide, retrospective cohort study. Patients aged 15 to 60 years, diagnosed with PTC between 2010 and 2016, were included. Patients were subdivided into four age-groups: 15 – 19 years of age (adolescents), 20 – 29 (very young adults), 30 – 39 (young adults), and 40 – 60 (adults). pT-stage, pN-stage and recurrence rate were compared using binary logistic regression.
Results
2362 patients were included: 63 adolescents, 286 very young adults, 562 young adults, and 1451 adults. Adolescents most often presented with pT3 tumors, very young adults and young adults with pT2 tumors and adults with pT1a tumors. pN1 was present in 54.0% of the adolescents, in 43.7% of the very young adults, in 30.7% of the young adults and in 25.8% of the adults. Younger patients more often received a total thyroidectomy as primary treatment, more frequent lymph node dissection and more often radioiodine-remnant ablation. The recurrence rate was 17.5% for adolescents, 9.4% for very young adults, 8.2% for young adults and 7.4% for adults. All-cause mortality was 0%, <1%, 1.4% and 5.9%, respectively.
Conclusion Age has a distinct impact on the disease characteristics and long-term outcomes of patients with PTC.

PP071 The Long-Term Oncological Outcomes of Pediatric Differentiated Thyroid Cancer

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Background
Pediatric thyroid carcinoma is rare and data on long-term oncological outcomes in the Netherlands are sparse. Therefore, the aim of this study is to describe the long-term oncological outcomes of pediatric differentiated thyroid carcinoma in a national cohort, and to evaluate risk factors for recurrence
Method
We conducted a nationwide, retrospective cohort study, in which we combined two national databases. Patients aged <18 years, diagnosed with differentiated thyroid carcinoma, in the period of 2000 to 2016, were included. To identify risk factors for recurrence, pT-stage, pN-stage, multifocality and angioinvasion were included in a Cox-regression analysis.
Results
133 patients were included: 110 with papillary thyroid carcinoma (PTC) and 23 with follicular thyroid carcinoma (FTC). Patients with PTC most often presented with pT2 tumors (24%) and pN1b (45%). During a median follow-up of 11.3 years, 21 patients with PTC developed a recurrence (19%). Nineteen recurrences were regional (91%) and 2 were pulmonary (9%). All patients developed their recurrence within 5 years after initial surgery. One patient that developed pulmonary recurrence died 2.5 years later. No risk factors for recurrence were found. Patients with FTC most often presented with pT2 tumors (57%). One patient presented with pN1b (4%). In 70%, no lymph nodes were collected. None of the patients with FTC developed a recurrence or died.
Conclusion
Survival of pediatric DTC is very good. However, recurrence in pediatric PTC is common and seems to occur within five years after initial treatment. No risk factors for recurrence could be determined.

PP072 Can preoperative ultrasound mapping become routine in clinical practice? Preliminary study

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Background
Our objective is calculating accuracy, false negative rate, predictive values and diagnostic ORs of pre-operative ultrasound (US) mapping of the lateral and central lymph node compartments, surgical indication of total thyroidectomy or lobectomy and comparing the US prediction of malignity to histological examination.
Method
We retrospectively reviewed 30 malignant cases who underwent thyroid surgery between 2018 and 2021. Our study centred on patients with US exams performed in Rome's Policlinico Umberto I - Thyroid Cancer Unit, where US staging diagnosis was formulated only after consensus of at the least two to reduce interobserver variability. Histological diagnosis was compared with previous US predicted staging.
Results
Of the 30 patients, in only 1 the preoperative mapping was inaccurate. In this case a suspicious lymph node was identified on postoperative computed tomography (CT) in the retropharyngeal site. Of the remaining 29 cases, 3 cases showed suspicious lymph nodes on ultrasound review in our department, which were then confirmed by histological examination, not detectable by ultrasound performed elsewhere. In 2 cases, infiltration of the capsule evidenced by ultrasound, previously not detected, changed operative indication from lobectomy to total thyroidectomy.
Conclusion
US mapping is an accurate procedure to stage the preoperative local state. However, our single-institution study indicated that preoperative ultrasound mapping could not always detect lymphatic involvement when positive lymph nodes had a particular localization. In many cases preoperative mapping has proved to be a valid tool to divide patients to undergo lobectomy or total thyroidectomy.

PP073 Somatic Mutational Profile of Papillary Thyroid Carcinoma in Bulgarian population

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Background
Fine needle aspiration biopsy, ultrasound and The Bethesda System allow for accurate diagnosis in 60–80% of all thyroid nodules. In the last few years, two major questions have arisen in the minds of clinicians - how to proceed with the remaining 20% of patients with indeterminate cytology and which of the diagnosed papillary carcinomas we can observe and which we operate immediately.
The aim of this study was to investigate the presence of specific somatic mutations occurring in fresh tissue samples taken from patients with papillary thyroid carcinoma(PTC), by using a NGS panel.
Method
The study included 27 patients operated in USBALE Hospital Sofia. The NGS sequencing was conducted on *Ion PGM Sequencer* employing *Ion AmpliSeq Cancer Hotspot Panel v2*. The obtained data from genomic experiments were subjected for analysis using dedicated software and compared with clinical data.
Results
We analyzed 24 females and 3 males with PTC. When we compared the sequencing with the ClinVar database we found 46 pathogenic variants and 26 probably pathogenic variants in 15 different genes. The BRAF V600E and PIK3CA mutation were more common, than KRAS and NRAS mutations
Conclusion
The results of our study demonstrate that PTC has a distinguishable Somatic Mutational Profile. Finding of new genes participating in the development of PTC may enable searching for novel targeted therapeutic methods.

PP074 Double trouble: multiple papillary carcinomas in cervical and mediastinal thyroids

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Background
Ectopic thyroid tissue can be found anywhere along the obliterated thyroglossal duct. Mediastinal ectopic thyroid gland is rare, accounting for approximately 1% of all mediastinal tumours. Ectopic thyroid cancers are uncommon, particularly mediastinal thyroid cancer, with only five reported cases.
Method
We report a rare case of multiple papillary carcinomas of both orthotopic thyroid and ectopic mediastinal thyroid. Retrospective analysis of patient's clinical records was performed, as well as literature review using MEDLINE/PUBMED. This is the sixth' worldwide case of carcinoma in mediastinal ectopic thyroid, the first removed by video assisted thoracic surgery (VATS).
Results
72yo male diagnosed with multinodular goiter with two FLUS cytology of the larger nodule. Uneventful total thyroidectomy was performed. Pathology revealed 8 synchronous papillary carcinomas in both thyroid lobes. Follow-up ultrasound identified unspecific cervical nodules and a neck and chest CT was performed, identifying a mediastinal mass with 6x3cm. Excisional biopsy was performed by VATS. Pathology identified an ectopic thyroid with papillary microcarcinoma. Recovery was uneventful and patient is currently asymptomatic.
Conclusion
Mediastinal ectopic thyroid is usually asymptomatic, but obstructive or compressive symptoms can appear, as well as complications or malignant transformation. Although there is no consensus on the best treatment strategy surgical removal is advised by most authors. VATS is a minimally invasive technique with shorter recovery period, less morbidity, minor blood loss, shorter hospital stay and better cosmesis than classical open approaches. It is safe and feasible, although limited to masses smaller than 10cm.

PP075 The significance of prophylactic central neck dissection in the treatment of well differentiated thyroid cancer: a single center results of complications and micrometastasis occurence

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Background

Prophylactic central neck dissection (PCND) in patients with well differentiated thyroid cancer (DTC) remains a controversial issue in the literature and endocrine surgeons are divided between proponents and opponents of its use. CND has been associated with an increase in transient post-operative complications. Although up to 90% of cases micrometastasis are reported, the impact on long term survival is subject to intensive research.

Method

94 patients with DTC that underwent total thyroidectomy and CND (group A) or total thyroidectomy (group B) were included in this study. The parameters studied were postoperative calcium and parathoromone levels, vocal cord dysfunctions and micrometastasis occurrence

Results

In group A (n=61) postoperative calcium levels were 8,64mg/dl(±0,718) while in group B (n=33) 8,81mg/dl (± 1.11). Pth levels were 12,535pg/ml(±6,19) and 19,303pg/ml(±9,48) accordingly. There were 5 cases of transient unilateral vocal cord dysfunction in total, one case in group A and two in group B. From the statistical analysis only transient hypoparathyroidism had a significant statistical difference ($p<0.001$). As far as micrometastasis is concerned, it was observed in 36 out of 61 cases.

Conclusion

The results of this study are in accordance with the international literature. Except for transient hypoparathyroidism no other major complication seems to be associated with PCND. While there was a relative large percentage of micrometastasis observed (59%) it still remains controversial whether it would affect recurrence rates and overall survival of the patients.

PP076 Primary squamous cell carcinoma of the thyroid: case report

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Background
Primary squamous cell carcinoma of the thyroid gland is an extremely rare thyroid tumour.
Method
We present a case of very aggressive kind of tumour with bad prognosis. A fifty six-year-old female was admitted to our hospital for surgical treatment of a sudden onset tumour of the thyroid gland with cervical lymphadenopathy.
Results
Complete surgival resection was performed on two times. Radiotherapy and chemotherapy treatment were not initiated postoperatively.
Conclusion
Multimodal treatment are the only hope to improve the prognosis of these patients.

PP082 Analysis of malignancy predictors for follicular thyroid tumors

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Background
It is difficult to establish a preoperative diagnosis for thyroid follicular tumours due to the fact that the cell morphology of these adenomas and carcinomas are similar and that capsular and vascular invasion cannot be determined by cytology findings.
Method
We analyzed medical records of all patients with follicular thyroid tumors operated at the Centre for endocrine surgery in a five year period (2008-2012). A total of 263 patients were included and divided into follicular adenomas (97) and carcinomas (166) on the basis of definite histopathological diagnosis.
Results
Follicular carcinoma was present in 63% of the patients, 80.4% were females, there was no significant difference regarding gender and age, the mean age was 49 years (range 15-79). The results of univariate analysis showed that thyroglobulin concentrations ≥500 ng/ml, tumour diameter <30 mm, presence of more than one nodule and an afunctional/hypofunctional nodule on scintigraphy were significantly more frequent in patients with follicular carcinoma compared to patients with adenoma. All variables with a p value <0.05 were included in multivariate logistic regression model. Independent predictive factors were elevated preoperative thyroglobulin concentration ≥500ng/ml (OR=4.18, 95%CI 1.14-15.33, p=0.031) and presence of more than one nodule (OR=2.71, 95%CI 1.36-5.38, p=0.004). Based on our results we formed a nomogram, a two-dimensional diagram designed to enable calculation of preoperative probability of malignancy.
Conclusion
Elevated preoperative thyroglobulin concentration ≥500ng/ml and the presence of more than one nodule are indepedent predictors of malignancy for follicular thyroid carcinomas.

PP083 PANDORA-2 protocol: Intervention study to improve quality of life in patients with small (≤2 cm) non-functional pancreatic neuroendocrine tumors

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Background
Current guidelines changed the treatment strategy for small (≤2cm) non-functioning pancreatic neuroendocrine tumors (NF-pNET) from tumor resection to an active surveillance strategy. The previous PANDORA-1 (2021) study showed excellent clinical outcomes after a median follow-up of 17 months, where 89% of patients had pNETs without any tumor growth and only 3% of patients had tumor growth leading to a resection. Despite these results, the quality of life (QoL) was decreased at baseline and during follow-up. Furthermore, there was suboptimal adherence to the advised surveillance protocol. The current PANDORA-2 study strives to improve the QoL for these patients by reducing the burden of the previous protocol and by introducing a supportive care intervention.
Method
A nation-wide multicenter intervention study. Patients follow a reduced intensity protocol with 6 moments of radiological imaging instead of 13, spread out over 10 years. The diagnosis will be made using both a ^{68}Ga-DOTATATE-scan and a CT- or MRI-scan. At 3 months patients undergo endoscopic ultrasonography with fine-needle biopsy, to confirm the size and diagnosis, as well as to determine tumor grade. In the second half of this study, patients will also follow an additional supportive care intervention. Finally, a cost-benefit analysis will be performed.
Results
This study introduces a new follow-up protocol designed to improve patients' QoL and their adherence to protocol while maintaining tumor control. Additionally, a supportive care intervention will be added to study its augmenting effect.
Conclusion
The life expectancy of patients with small NF-pNET is almost unchanged and should therefore be with the best QoL.

PP084 A systematic review of clinical prediction models for recurrence in patients with resectable grade 1 and 2 non-functional pancreatic neuroendocrine tumors: a systematic review and meta-analysis

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Background
The survival of patients with non-functional pancreatic neuroendocrine tumours (NF-pNET) is significantly impacted by recurrence. Accurate risk-stratification to identify patients at risk can help tailor follow-up, but also reduce follow-up in patients with a low recurrence risk. A systematic review of prediction models for grade 1 and 2 NF-pNET is lacking.
Method
PubMed, Embase and the Cochrane Library were searched up to June 2021. Studies that developed, updated or validated prediction models for recurrence or overall survival in resected grade 1 or 2 NF-pNET were included. Exclusion criteria were reviews and abstracts, or if more than 15 per cent of pNET were functional, genetic or metastatic. Studies were critically appraised.
Results
A total of 1313 studies were screened and 7 studies were included (3856 patients). All studies developed an original prediction model, Two models were developed for the preoperative setting, 4 models for the postoperative setting, and 1 model for both. Four were presented as scoring systems and three as nomograms. Most frequently included parameters were Ki-67 index/tumour grade, tumour size, and lymph node positivity. After critical appraisal, 4 studies were deemed as high risk of bias. The C-statistic/area under the curve values of the prediction models ranged from 0.67 to 0.91. Three models were identified as promising.
Conclusion
Several models are available for resected pNET, yet most are at risk of bias and without external validation. The 3 most promising existing risk stratification models should be evaluated in a large international cohort to compare outcomes and decide on future implementation.

PP085 Quality of life in 101 patients with men 1 syndrome. How is pancreatic pathology influenced?

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Background
MEN1 syndrome is characterized by having a chronic clinical course with varying degrees of tumor aggression, which can affect the quality of life. It is important to determine in which patients psychological support would be necessary. Objectives: Determine the quality of life level in MEN 1 patients and the differences with population-based healthy sex- and age-matched controls.
Method
A cross-sectional study was performed from March 2018 until March 2020 on MEN 1 patients during follow-up at a tertiary hospital. Quality of life was evaluated using the SF-36 questionnaire and two specific questionnaires (EORTC-QLQ-C30 and GINET21). Control group: a sample of healthy people was obtained and paired by age and sex. Statistical analysis:t-Student/ANOVA or Mann-Whitney/Kruskal-Wallis tests.
Results
101 patients with MEN 1 were analysed. The MEN 1 patients reported lower levels of general health (47,03 vs 69,8), vitality (57,15 vs 64,31) and mental health (62,36 vs 67,29). There were differences depending of pancreatic pathology (pNETS) (8/8), functioning pNETS (3/8) and pancreatic surgery (3/8). Pancreatic surgery was associated with a lower mental component ($p<0,05$). In EORTC QLQ-C30 scale, pancreatic surgery (1/3) and tumor stage (2/3) were associated with worse quality of life ($p<0,05$). In GINET 21 scale, functioning pancreatic tumors (3/9) and pancreatic surgery (4/9).
Conclusion
Patients with MEN1 have an impaired health-related quality of life. Functioning pNETS and pancreatic surgery are the most influential factors, aspects that should also be taken into account in the clinical assessment of these patients and even in the surgical decision of non-functioning tumors.

PP086 Our experience in neuroendocrine pancreatic tumors

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Background
The aim of this study is to describe the characteristics of pancreatic neuroendocrine tumors (PNT) in our centre. They represent 1%-5% of all pancreatic tumors. We can differentiate from functional tumors and non-functional tumors. In the functional tumors, the most frequent are insulinomas(70%) following on gastrinomas(25%).
Method
The aim of this study is to describe the characteristics of pancreatic neuroendocrine tumors (PNT) in our centre. They are infrequent, and represent 1%-5% of all pancreatic tumors.
We can differentiate from functional tumors and non-functional tumors. In the group of functional tumors, the most frequent are insulinomas (70%) following on gastrinomas (25%). There are less frequent VIPomas, glucagonomas and somatostatinomas.
Results
Our series of patients is composed of 15 patients. The mean age was 59 years, ant there were 7 men and 7 women. The 64,3% of patients suffered from non-functional tumors and 35,7% were functional. In the group of functional tumors, we found 4 insulinoma, 1PPoma, and 1 glucagonoma. The average size was 29,54 mm, and the most frequent localization was pancreas head. 4 patients underwent to distal pancreatectomy, 5 enucleations, 1 resection of uncinate process and 1 Whipple procedure. 3 patients received palliative treatment and only 1 conservative treatment and monitoring.
Conclusion
As it can be seen in our series, at present, its more frequent the incidental diagnosis of this type of tumors.
PNT are infrequent, and the most frequent is insulinoma. Perhaps the only potentially curative treatment is the surgical resection, in selected patients, non-surgical management is an option to consider, with follow-up with imaging techniques.

PP087 Indocyanine green fluorescence guided resection of neuroendocrine liver metastases: a proof-of-concept study

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Background
Even though the relative indolent character of neuroendocrine neoplasms, untreated NELM have a detrimental impact on survival outcomes. Therefore, complete resection should be considered if technically possible. The aim of this study was to assess the value of indocyanine green (ICG) guided fluorescence guided surgery of neuroendocrine liver metastases.
Method
This is a proof-of-concepts study including patients who underwent resection of NELM of any grade, and patients who underwent liver resection for other tumour types to compare ICG uptake. Patients received an intravenous bolus of 10 mg ICG approximately 24 hours prior to surgery. Resection of liver metastases were performed using guidance of fluorescence cameras and intra-operative ultrasonography. All resected lesions underwent histopathological assessment by an expert pathologist.
Results
Six patients with liver metastases were included in the study, three with NELM and three with colorectal liver metastases (CRLM). All liver metastases showed uptake of ICG. The fluorescence pattern of NELM and CRLM was comparable. There wer
Conclusion
This is to our knowledge the first proof-of-concept study describing ICG fluorescence guided resection of NELM. Fluorescence guided resection of NELM using ICG is feasible, and uptake of ICG by NELM is comparable to CRLM.

PP088 Tumour-specific fluorescence-guided surgery for gastroenteropancreatic neuroendocrine neoplasms using PHT001: a phase 0, open-label, single-arm, microdosing study – PHOTON-trial

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Background
Currently, preoperative imaging of well-differentiated gastroenteropancreatic neuroendocrine neoplasms (GEP-NENs) is conducted using [68Ga]Ga-DOTATATE, which makes use of the overexpression of somatostatin type 2 receptors (SSTR2) on cell surfaces of GEP-NENs. An intraoperative counterpart that could provide visual guidance during surgery would be highly valuable. The aim of this study is to produce and implement an SSTR2-targeted fluorescent tracer and assess its safety to accurately identify GEP-NEN during surgical resection.
Method
This is a phase 0, open-label, single-arm, microdosing study investigating safety of the newly developed fluorescent tracer PHT001. Non-clinical safety studies will be performed according to ICH M3(R2). Patients undergoing surgical resection of GEP-NEN will be included. PHT001 will be administered with a dose of 100 µg in three patients to assess the safety profile.
Results
Conjugation of the near-infrared dye IRDye800 to the SSTR2-targeting peptide TOC was performed using a novel linker known as the multimodality chelator (MMC). The resulting agent MMC(IRDye800CW)-TOC is able to localize SSTR2-expressing tumours in animal models with high selectivity and clearly delineate tumour boundaries in vivo. Similar results are shown with ex vivo staining of human biospecimens of NENs and indicate strong translational potential. PHT001 is a successor of MMC(IRDye800CW)-TOC with better fluorescence performance.
Conclusion
The phase 0 PHOTON trial will assess the safety profile of PHT001, a SSTR2-targeted fluorescent tracer for clinical use in patients with GEP-NEN. We expect that results of the phase 0 trial will aid future phase I/II clinical trials at higher doses.

PP089 The first case report of a de-novo purely prostatic large cell neuroendocrine carcinoma with thyroid and adrenal metastases

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Background
Large Cell Neuroendocrine Carcinoma (LCNEC) is the rarest neuroendocrine prostatic malignancy. It usually arises after androgen-deprivation therapy (ADT), while de novo cases are even more infrequent with only 6 cases described.
Method
A 78-year-old man with no history of ADT presented with cervical lymphadenopathy. Diagnostic approach included PET/CT, MRI, and CT scans, U/S, biopsies, cytological and immunohistochemical evaluations. Thyroid surgery revealed a LCNEC metastasis to the gland. Additional metastases were identified in both adrenal glands. Despite appropriate treatment, the patient succumbed to his disease.
Results
We report the first patient with a de novo purely prostatic LCNEC, metastasizing to the thyroid and the adrenal glands.
Conclusion
De novo LCNECs of the prostate are very rare, highly aggressive tumors with poor prognosis. They are resistant to most therapeutic agents, have high metastatic potential and are usually diagnosed at an advanced stage. Further studies are needed to characterize these tumors.

PP090 Pancreatic neuroendocrine tumors: results of the last decade

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Background
Our objective was to analyze pancreatic neuroendocrine tumor (pNET) cases operated during the last decade.
Method
Data of all patients operated due to pNETs are prospectively collected.
Results
Thirty patients were enrolled (female:60%,age:58±6.5years). Diagnosis was: single non-functioning tumor (63.3%), insulinoma (26.7%), multiple non-functioning tumors (6.7%, MEN1 syndrome) and gastrinoma (3.3%). Computed tomography depicted the lesion in 93.3%, MRI 96.3% and EUS in 100%. The tumor was located in the pancreatic head in 33.3%, body 30%, tail 30% and throughout the pancreas 6.7%. Distal pancreatectomy with splenectomy was performed in 40%, Whipple 33.3%, distal pancreatectomy without splenectomy 13.3%, enucleation 10% and total pancreatectomy 3.3%. Twelve patients (40%) suffered from postoperative complications: pancreatic fistula (20%), intrabdominal collection (6.7%), postoperative hemorrhage (6.7%, necessitating reoperation), splenic infarct (3.3%), and delayed gastric emptying (3.3%). Mean tumor diameter was 3.3±1.2cm. Tumors were G1 stage in 50%, G2 % 26.7% and G3 23.3%. Capsule infiltration was identified in 33.3%, perineural invasion 16.7%, perivascular invasion 13.3%, and lymph vessel infarct in 6.7%. Lymph node dissection was performed in 73.3% and involvement was identified in 31.8% of the dissection cases (23.3% of the total population). Regarding immunohistochemistry, chromogranin-A was positive in 96%, synaptophysin 95.6%, NSE 94.1%, CD56 87.5% and CK8/18 100%. During the short follow-up period of 64.8±8.3 months no recurrence has occurred so far.
Conclusion
Pancreatic NETs are rare tumors that need a multidisciplinary approach. Their surgical management is challenging and demanding. An important proportion of such neoplasms may show aggressive characteristics.

PP091 Neuroendocrine tumors of the gastrointestinal system during the last 10 years

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Background
Our aim was to analyze gastrointestinal (GI) tract neuroendocrine tumor (NET) cases operated during the last decade.
Method
Data of all patients operated due to GI NETs are prospectively collected.
Results
Twenty-five cases were included (men:60%,age:60±5.4years). Diagnosis was non-functioning tumor (88%), functioning tumor causing carcinoid syndrome (8%) and gastrinoma (4%). Tumor was located in the small bowel in 28%, stomach 24%, appendix 20%, duodenum 12%, esophagus 8% and rectum 8%. Two appendiceal NET cases had coexistent right colon adenocarcinoma and three recurrent acute appendicitis episodes due to appendix obstruction from the tumor. Two small bowel NETs presented with liver metastases and carcinoid syndrome and one with concurrent right colon adenocarcinoma. Wedge resection was performed in 24%, partial small bowel resection 24%, right hemicolectomy 12%, appendicectomy 12%, total gastrectomy 12%, esophagectomy 8%, partial gastrectomy 4% and low anterior resection 4%. Mean tumor diameter was 3.4±0.7cm. Tumors were G1 stage in 48%, G2 % 32% and G3 20%. Perineural invasion was identified in 24%, perivascular invasion 20% and lymph vessel infarct 28%. Lymph node dissection was performed in 64% and involvement was identified in 56.2% of the dissection cases (36% of the total population). Chromogranin-A immunohistochemistry was positive in 93.3%, synaptophysin 92.8%, NSE 100% and CK8/18 100%. During the short follow-up period of 60.8±5.3months two patients (8%) were reoperated due to recurrence.
Conclusion
Gastrointestinal tract NETs are rare tumors that need a multidisciplinary approach. A significant share of them may show aggressive characteristics.

PP092 Surgery for Pancreatic Neuroendocrine Neoplasms with Size ≥ 4 cm

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Background
Pancreatic neuroendocrine neoplasms (pNENs) often are asymptomatic, detected as large primary lesions, even with distant metastases: features not clearly related to a worse prognosis.
Method
Among 333 pNENs diagnosed in our Pancreatic Unit (1979-2017), 64 patients (19%) had a lesion ≥ 4 cm. We retrieved data on clinical presentation, surgery, histology and prognosis (follow-up to December 2019).
Results
Among 64 patients enrolled, 36 M / 28 F (median age 61 years, range 26-79). Fifty (78%) non-functioning (NF) pNENs, 40 of them diagnosed after 1998. Median tumor size 6.0 (range 4.0-15.0) cm. Seven patients with MEN1 syndrome had multiple pancreatic lesions. Localization of the primary pNEN: 29 in the head/uncinated process, 31 in the body/tail, four pNENs were diffused. Thirty-five (55%) had distant metastases at diagnosis (liver, peritoneal, bone or pulmonary). Thirty-six patients operated (10 pancreaticoduodenectomies, 21 distal pancreatectomies, two total pancreatectomies), 13 with associated hepatic resection/ablation. Histology: 26% were T2 (72% T3, one T4), 67% were N1, 14% were G3 (16% G1, 34% G2). After a median follow-up of 48 months (up to 33 years), 42 patients died of disease. Median survival of operated patients 79 months. Twenty-one (58%) operated patients were R0, six of them experienced recurrence. Median DFS 94 (range 16-395) months.
Conclusion
About 20% of pNENs had a size ≥ 4 cm, 78% NF, 55% diagnosed with distant metastases. Nevertheless, these patients may undergo surgery and a long-term survival (more than 5 years) is achieved.

PP093 Goblet Cell Carcinoid Tumor of the Appendix – case report

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Background
Goblet Cell Carcinoid tumor (GCC) is a rare type of tumor with origin in the intestinal crypt stem cells, which develop both neuroendocrine and glandular differentiation. It is more frequent in the 5th and 6th decades of life and may present as acute appendicitis, abdominal pain or mass. Due to its rarity and intermediate behavior between neuroendocrine and adenocarcinoma tumors, the staging and therapeutic approach aren't consensual.
Method
Case report
Results
We report the case of a 61 year-old female submitted to a laparoscopic appendectomy for acute appendicitis. The histologic analysis described a 2cm GCC in the base of the appendix, with positive margins of resection. The Ga-PET DOTANOC raised doubts regarding the brain and the left adrenal gland, which were not confirmed by PET-FDG and brain MRI. She was then submitted to a laparoscopic right colectomy. The pathology examination had no evidence of neoplasia.
With a final staging pT4apN0M0R0, the patient was kept in our follow-up programme.
Conclusion
GCC treatment is based on surgical resection. In this clinical case, the 2 cm tumor dimension and the surgical margin involvement justified a right colectomy. Due to its malignant nature and worse prognosis than pure neuroendocrine tumors, they are generally approached in the same way as colon adenocarcinomas. For this reason, it was considered PET-FDG to be more sensitive and reliable than Ga-PET DOTANOC and the left adrenal gland was kept under surveillance, as well as the brain lesion.

PP094 A rare case of wireless endoscopy capsule retention causing intestinal obstruction in a patient with small bowel neuroendocrine tumor

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Background
Capsule endoscopy has played a significant role in small bowel investigation, providing the opportunity of detecting neoplastic lesions to a greater degree and at an earlier stage. Failure to excrete the capsule with the feces within 48 hours can lead to capsule retention with increased risk of bowel obstruction and perforation. Acute small bowel obstruction as late as many months following capsule endoscopy investigation is very rare, with only a few cases reported in the published literature.
Method
We herein report a rare case of prolonged capsule retention which remained undiagnosed, resulting in small bowel obstruction 6 months after the initial investigation. An 82-year-old woman presented with abdominal pain and symptoms suggestive of intestinal obstruction. The patient's history included capsule endoscopy investigation because of episodes of abdominal pain 6 months prior to admission. Both the outcome of the investigation and the excretion of the capsule remained undetermined due to her history of dementia and follow-up failure. Radiologic investigations identified the capsule causing small bowel obstruction. Upon surgery, the capsule was found to be impacted in a stenotic small bowel lesion, and segmental small bowel resection was performed.
Results
Histologic examination revealed the presence of a stenotic small bowel neuroendocrine tumor.
Conclusion
Appropriate follow-up is necessary to diagnose the complication of capsule retention which, if it remains unrecognized, can cause life-threatening complications as late as many months after capsule endoscopy.

PP095 Preoperative prophylactic active Vitamin D to streamline Total thyroidectomy

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Background
Hypocalcaemia is a common complication after total thyroidectomy. Treatment consists of calcium and active vitamin D supplementation. Low levels of vitamin D preoperatively has been shown to be a risk factor for postoperative hypocalcaemia, yet studies examination routine preoperative vitamin D have shown conflicting results. This retrospective cohort study aims to investigate the potential benefit of preoperative active vitamin D supplementation on hypocalcaemia following thyroidectomy.
Method
This study included patients undergoing total thyroidectomy at Uppsala University Hospital from January 2013 to December 2020, resulting in a total of 401 patients after exclusion. Routine preoperative alfacalcidol treatment was initiated in January 2017 and divided by this date two groups were formed and compared, one group that was prescribed preoperative alfacalcidol and one that did not. Propensity score matching was used to reduced bias.
Results
After propensity score matching 108 patients in each group remained. There were two cases with postoperative day one S-Calcium <2.10 in the treated group and 10 cases in the non-treated group ($p<0.001$). Nil in the treated group had a S-Calcium below 2.00 mmol/L. Preoperative alfacalcidol was associated with higher mean serum calcium level day one (2.33 vs 2.27, $p=0.022$), and reduced lenght of stay ($p<0.001$). There was also a trend towards less symptoms of hypocalcaemia (18.9 per cent vs 30.5 per cent, $p=0.099$).
Conclusion
Prophylactic preoperative alfacalcidol was associated with reduced hypocalcaemia and lenght of stay following total thyroidectomy. Also, routine day one postoperative calcium measurement seems void using this protocol.

PP096 Malignancy rate and complications in intrathoracic goiter- a nationwide cohort study

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Background
The aim was to investigate the incidence of malignancy and morbidity after surgery for intrathoracic goiter (ITG).
Method
This retrospective cohort study includes all patients undergoing surgery for ITG, with or without sternotomy/thoracotomy 2005-2015 in Sweden. Patients were identified through the Scandinavian Endocrine Quality Register (SQRTPA); combined with data from the National Patient Register and the Swedish prescribed drug register.
Results
Some 1662 patients who underwent surgery for ITG. 1602 patients were operated on with a cervical incision and 60 (3.6%) with sternotomy (n=58) or thoracotomy (n=2). Most patients underwent a hemithyroidectomy (55.8%). The following primary indication were noted; compression symptoms (82.6%), excluding malignancy (7.9%), confirmed malignancy (2.9%) or thyrotoxicosis (5.2%). Of those operated on with no suspicion of malignancy on medical history, examination, cytology, ultrasound or other radiology, 2.5% (36 out of 1471 patients), nevertheless had a malignancy >1cm in size on final pathology.
Recurrent laryngeal nerve (RLN) damage (5.0% vs 2.7%, $p<0.05$) was more common in the thoracic approach. However, surgical site infection (6.7% vs 4.2%, $p=0.335$), rebleeding (4.9% vs 1.8%, $p=0.226$) and permanent hypoparathyroidism* (PHPP) was not significantly associated with operative approach. (22.2% vs 23.6%, $p=0.62$ *only calculated for total thyroidectomies).
Conclusion
The risk of PHPP after surgery for ITG was high. In comparison to a cervial incision, it is safe to perform transthoracic surgery with a slight increased risk of permanent damage to the RLN. The risk of malignancy is small in those with no preoperative suspicion of malignancy.

PP097 First toetva-results of the caek study group for endoscopic thyroid surgery

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Background
The aim of this study was to present the first results of transoral thyroid surgery in the German-speaking area.
Method
In total 203 patients (180 female, 90.5%;19 male, 9.5%) who underwent endoscopic thyroid or parathyroid surgery via vestibular approach from June 2017 to November 2021 in Austria and Germany, were included. Data was analysed regarding complications, surgery time, specimen retrieval and hospital stay.
Results
Overall, 197(96.1%) TOETVA and 8(3.9%) transoral endoscopic parathyroidectomy vestibular approach (TOEPVA) with an average surgery time of 168.4 (±67.8) and 282 nerves at risk were performed. In 59 (28.9%) patients the specimen was retrieved via retroauricular and in 7 (3.5%) via transaxillary approach. 149(83.7%) patients had benign histology including Grave´s disease, 21 (11.8%) showed malignancy and in 8 (4.5%) adenoma of the parathyroid gland was present. In 2(1%) patients conversion to open surgery was necessary and in one (0.5%) revision was performed. Transient recurrent laryngeal nerve (RLN) paralysis was present in 15 (7.5%) and permanent RLN paralysis in 2(1%) patients. 8 (11%) patients were affected of hypoparathyroidism after thyroidectomy during hospital stay. At discharge date 45 (22.5%) individuals presented skin discoloration, 35(17.5%) presented sensibility disorder (chin, lips) and 8(5%) had minor motor function disorder associated with the mental nerve. One patient (0.5%) presented postoperative infection.
Conclusion
Our results show that TOETVA is a safe scarless surgical method and a good alternative to conventional minimally invasive thyroid surgery with further potential of development.

PP098 Large goiters and hypoparathyroidism, always hand in hand?

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Background
Traditionally, large goitre surgery has been considered technically complex, assuming a slightly higher complication rate specific to thyroid surgery. There are no studies confirming this trend with respect to post-surgical hypoparathyroidism. The main objective of our study is to analyse the association between thyroid volume and post-surgical hypoparathyroidism.
Method
A retrospective prospective study of the endocrinology unit of a tertiary hospital between 2017 to 2020 was performed. Patients with any type of cervical lymphadenectomy were excluded. Permanent hypoparathyroidism was defined as the need for oral calcium therapy one-year post-surgery. Pre-surgical thyroid volume (ml) was studied by cervical ultrasound performed by an experienced radiologist.
Results
A total of 133 patients were analysed. The incidence of permanent hypoparathyroidism was 4.5%. Median thyroid volume in the patients with permanent hypoparathyroidism was 27.5 (20-41) ml versus 28.4 (19-45) ml in normal calcium patients (p=0.828). Also, in patients with accidentally removed parathyroid glands the thyroid volume was smaller [21.8 (15-40) ml versus 33 (20-50) ml; p=0,08]. Binary logistic regression only showed postoperative values at 24 hours of calcium (p=0.003) and PTH (p=0.029) as predictors of permanent hypoparathyroidism.
Conclusion
According to our results, larger thyroid gland size is not a risk factor in the rate of permanent postoperative hypoparathyroidism. Although no statistically significant differences could be demonstrated, the presence of accidentally removed parathyroid glands is higher in smaller thyroids.

PP099 Faster Levothyroxine Dosage Adjustment with Pharmacokinetic/Pharmacodynamic Modeling

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Background
We have developed a decision aid tool (DAT) that models levothyroxine pharmacometrics and enables patient-tailored dosage. The aim of this study was to speed up dosage adjustments for patients after total thyroidectomy.
Method
The DAT was applied in a prospective randomized multicenter trial in 145 unselected patients admitted for total thyroidectomy. The levothyroxine dosage was adjusted after <s></s>two weeks, with or without application of the DAT, which suggested dosage adjustments based on four repeated measurements of fT4 and TSH levels. Subsequent levothyroxine adjustments were carried out every six weeks until target TSH was achieved.
Results
Successful dosage was defined by TSH targets of either <0.1, 0.1–0.5, or 0.5–2.0 mIU/L, depending on the diagnosis. When clinicians were guided by the DAT, 40% of patients with goiter and 59% of patients with cancer had reached the TSH targets after eight weeks, as compared with only 0% and 19% of the controls. The TSH was within the normal range in 80% of DAT/goiter patients as compared with 19% of controls. The DAT shortened the average dosage adjustment period by 58 days in the goiter group and 40 days in the cancer group. For thyrotoxic patients, application of a simplified DAT did not improve dosage adjustment.
Conclusion
Application of the DAT with repeated early postoperative TSH and fT4 monitoring offers a fast approach to LT4 dosage after total thyroidectomy for patients with goiter or differentiated thyroid cancer. Estimation of individual TSH-fT4 dynamics was crucial for the model.

PP100 Time of determination of perioperative paratohormone in patients undertaken for total thyroidectomy for benign pathology

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Background
Postsurgical hypoparathyroidism is one of the most relevant surgical consequences after total thyroidectomy. Postoperative intact parathyroid hormone (iPTH), calcium(Ca)and ionic calcium(iCa) levels, as well as their drop regarding their preincisional levels,are used to predict resultant postsurgical hypocalcemia
Method
iPTH, Ca and iCa levels were studied 6 and 20 hours after total thyroidectomy among 117 patients operated between the 1st of May 2018 and the 31st of December 2020
Results
In the studied series,23 patients presented biochemical hypocalcemia, and 13 of them suffered from clinical hypocalcemia. In these cases, iPTH levels 6 and 20 hours after total thyroidectomy were 14.39 pg/mL(1.53 pmol/L) and 7.38 pg/mL(0.78 pmol/L)respectively. Ca and iCa levels at 6 hours were 8.68 mg/dL(2.17 mmol/L)and 1.04 mg/ dL(0.26 mmol/L);at 20 hours,8.16 mg/dL(2.04 mmol/L) and 0.97mg/dL(0.24 mmol/L) respectively.The average stay of patients suffering from clinical hypocalcemia was 2,23 days;the average stay of those who did not suffer from hypocalcemia was 1,7 days. Statistical analysis has been performed using the R version 4.0.5 program(R Core Team (2021)
Conclusion
Since early clinical hypocalcemia seems to entail the necessity of Ca and D vitamin supplementation, it is highly important to set a cut point above which there is statistical certainty that patients will not present postsurgical hypocalcemia. In the studied series, the stablished iPTH cut point 20 hours after the procedure is >19 pg/mL (2.01 pmol/L)

PP101 iPTH level and postoperatory hypocalcemia after total thyroidectomy

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Background
The importance of determining PTH levels at 15 minutes and 20 hours, as well as postoperative changes in calcium after total thyroidectomy are key for biochemical predictors and to foresee the postoperative hypocalcemia. The objective of the study was to determine the value of the Paratohormone (iPTH) above which there is a statistically significant probability of not suffering postoperative hypoparathyroidism
Method
The study was conducted retrospectively evaluating 48 cases which underwent total or complete thyroidectomy for benign pathology in a secondary referral center between January 1, 2017 and April 30, 2018.
Results
In the series studied, 9 patients suffered hypocalcemia requiring oral calcium and vitamin D at discharge. In these cases, the PTH level at 15 minutes and at 20 hours after total thyroidectomy was <5 ng / ml. Calcium and ionic calcium values at 6 hours were 8.6 mg / dl and 1.08 mg / dl respectively. These values decreased 20 hours after the intervention, being 8,166 mg / dl and 0.981 mg / dl respectively. The average stay of patients who suffered hypocalcemia was 3.7 days, higher than the stay of those who did not suffer from hypocalcemia (2,05 days). In our series, there has not been any case of permanent hypocalcemia
Conclusion
A PTH level> 10 pg / ml is established (in our case at 15 minutes and at 20 hours) after total thyroidectomy to have statistical certainty that the patient will not suffer postoperative hypocalcemia

PP102 Neuromonitoring for the localization of the superior laryngeal nerve

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Background
The external branch of the superior laryngeal nerve (EBSNL) is located in the dissection area of the superior thyroid pole. It innervates the cricothyroid muscle. The contraction of this muscle mobilizes the thyroid cartilage inducing tension in the vocal folds, which allows to produce high-pitched sounds during phonation. The injury of this nerve causes a dysphonia which is hardly perceptible in normal speech. As a result, the frequency of this injury during thyroid surgery (15-59%) is often underestimated.
The aim of this work is to evaluate the contribution of intraoperative neuromonitoring to the localization of the EBSLN. A prospective study has been carried out for this purpose.
Method
The study includes the 340 patients who underwent thyroidectomy in 2017, 2018, 2019, and 2020 in the thyroid surgery unit of our hospital, with a total of 467 EBSLNs at risk of injury. The neuromonitoring system used is the INOMED's C2 with a 4-channel adhesive electrode for the endothracheal tube and a bipolar probe. A discontinued 1mA stimulation was applied. The appearance of a detectable electromyographic wave on the monitor (detection threshold of 0.01mV and 0.01 mS) was considered as a positive response.
Results
EBSLNs at risk: 467
EBSLNs located: 443 (94.86%).
Conclusion
Intermittent intraoperative monitorization is highly beneficial for the localization of the EBSLN course during thyroid surgery. You can help us to decrease the incidence of EBSLN injuries.

PP103 Role of ultrasonography in predicting follicular thyroid neoplasm with papillary-like nuclear features

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Background
Less is known about the ultrasound features of non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFT-P) and particularly of the differences with the follicular variant of papillary thyroid carcinoma (FV-PTC).
Method
We reviewed pre-operative ultrasound features of 252 thyroid nodules evaluated at the Endocrine Unit of the University Hospital of Pisa. Histologic examination revealed NIFT-P (n=112) and FV-PTC (n=140). For each nodule we evaluated US features. Moreover, each nodule was further classified using the 3 main radiological risk-stratification systems: TIRADS, AACE/AME and ATA.
Results
NIFT-P shows like a single nodule in 31.2% of cases. Fine needle aspiration cytology was TIR3A in 46.4% of NIFTP group vs. 50.7% of FV-PTC group, TIR3B in 17.9% vs. 26.4%, TIR2 in 14.3% vs. 5% and TIR4 in 1.8% vs. 3.6%. Groups were comparable for size, structure and echogenicity. NIFT-P and FV-PTC were significantly different ($p<0.05$) for presence of calcification (5.4% vs. 30%), margins (irregular in 3.6% vs. 16.4%) and shape (taller than wider in 0.9% vs. 7.9%). The combination of regular margins, absence of calcification and wider than tall shape were present in 87.7% of NIFT and in 52.9% of FV-PTC ($p<0.05$). Groups were also significantly different in main risk-stratification system.
Conclusion
In spite of similar preoperative cytological reports NIFT-P and FV-PTC presented relevant different radiological features. NIFT-P showed ultrasonographic features suggestive for benign nodules. Main radiological risk-stratification system can help to distinguish NIFT-P from FV-PTC.

PP104 Impact of energy-based devices in pediatric thyroid surgery

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Background
Energy-based devices are surgical devices being increasingly utilized for thyroid surgery, due to reduction of operative time and surgical related complications. The aim of the study is to evaluate if the use of energy-based devices could improve the complications rate in in pediatric thyroid surgery.
Method
This is a retrospective observational study. We identified 177 consecutive pediatric patients (Group A) with thyroid diseases, surgically treated by energy-based devices and 237 patients (Group B) treated by conventional clamp and tie technique and matched for sex, age and indication for surgery. Transient and permanent complications rate, operative time and length of hospital stay were compared between the two groups.
Results
Patients of group A experienced less complication rate compared to group B. Particularly, transient (11.3 vs. 19% $p<0.05$) and permanent post-operative hypoparathyroidism (1.7 vs. 5.5%, $p<0.05$) were lower in Group A. Moreover, also operative time was shorter in Group A compared to Group B and this difference was statistically significant in patients who performed total thyroidectomy alone and total thyroidectomy associated with central compartment neck dissection ($p<0.05$). Length of hospital stay was lower in Group A than in Group B, but this difference was statistically significant only for microfollicular lesion ($p<0.05$).
Conclusion
The use of energy-based devices has a key role in reducing surgical related complications, particularly transient and permanent hypoparathyroidism, operative time and length of hospital stay in pediatric patients treated with thyroid surgery.

PP105 Pediatric endocrine surgery: a 15-years experience in pisa

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Background
Surgical thyroid and parathyroid diseases are rare in children and their management can be complicated. Herein we report our data about 15 years of experience in surgery of pediatric patients performed in a high-volume endocrine centre.
Method
We retrospectively reviewed data of 550 patients surgically treated at the endocrine surgery unit of Pisa between 2006 and 2020. Data collection focused on pathologic diagnosis, surgical technique, and surgical complications.
Results
Surgical treatment consists of 414 total thyroidectomy, 95 lobectomy, 14 lymphadenectomy, 14 parathyroidectomy and 13 Sistrunk procedures. The indications for thyroid surgery were symptomatic multinodular goiter (10.9%), toxic adenoma (3%), indeterminate nodules (26.8%), Graves' disease (18.7%), papillary thyroid cancer (36.2%) and proto-oncogene RET mutation carriers' patients (4.4%). Mean age was 14.9 years, 45/550 (8.2%) surgical treatments were performed with a minimal invasive video-assisted technique and 7/550 (1.3%) with robot-assisted procedure. Regarding postoperative complications, 65/414 (15.7%) patients had transient postoperative hypoparathyroidism and only 16/414 (3.8%) developed a permanent one. Three\550 (0.5%) patients were re-operated for postoperative surgical bleeding. Direct fiber optic laryngoscopy was performed only in symptomatic patients and showed in 4 cases a transient vocal cordal palsy, conversely no cases of permanent vocal cord palsy were experienced.
Conclusion

Pediatric thyroid and parathyroid diseases are quite rare, however, they need to be treated in a tertiary referral centre by high volume surgeons both to increase the surgical completeness and to decrease the complication rate, particularly if permanent, in patients with long life expectancy

PP106 Non-recurrent Laryngeal Nerve In The Era Of Intraoperative Nerve Monitorization

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Background
Non-recurrent Laryngeal nerve (NRLN) is a very rare anatomical variation. We retrospectively analyzed the rate of the patients with NRLN's at our Tertiary Referral Endocrine Surgery Clinic.
Method
The operative notes and clinical data of 3200 patients, who underwent surgery for either thyroid or parathyroid diseases between January 2010 and December 2020 were analyzed.
Results
Of 3200 patients, NRLN was found in 13 (0.4%). The indications for surgery were multinodular goiter in 7 (54%) papillary thyroid cancer in 2 (15,3%), Graves Disease in 2 (15,3%), toxic adenoma in 1 (7,6%) and primary hyperparathyroidism in 1 (7,6%).The age of the patients ranged betweed 40-69 years with median of 52 years. Intraoperative nerve monitoring (IONM) technique were used in 10 (77%) of the 13 patients. In these cases, we could not detect electromyographical vagal signal at the level of inferior thyroidal artery. We further dissected towards the carotid artery bifurcation level where EMG activity was picked up from the NRLN. NRLN was located at the right side in 12 (92,5%) patients, and at the left side in 1(8%). Thoracal cross sectional imaging showed concomitant aberrant right subclavian artery in all patients with right nerve anomaly. The left sided NRLN patient showed no vascular anomaly.
Conclusion
NRLN is a very rare anatomical anomaly which is most frequently located at the right side. IONM is very helpful to provide for early intraoperative awareness of this anomaly.

PP107 Impact of endocrine surgery training on professional growth and satisfaction: A reflection from the endocrine surgeons of India

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Background
Endocrine surgery (ESx) is a distinct sub-specialty, however, it does not enjoy such recognition in low&middle-income countries like India. There is scanty data on training opportunities&career development. We aimed to map the professional growth&satisfaction amongst practicing endocrine surgeons (ESn) of India post specialty training.
Method
A questionnaire-based survey was circulated amongst ESn with with minimum 1 year work experience. Demographics, post-training experience&satisfaction with professional recognition were recorded & analysed using SPSS v16.
Results
Of 95 ESn, 72(75%) responded. Mean age was 45.6years. 42(58%) were faculty at academic centers & 30(42%) at private establishments. 58% work in an independent ESx unit, 28% within general surgery &14% within surgical oncology units. Only 25% reported an average of >25 thyroid procedures/month. Mean number of adrenal & parathyroid cases were 3&5. Those at academic centers performed more surgeries annually, had more publications & expressed satisfication with professional development ($p<0.01$). 60% felt ESx has not been universally accepted as a distinct sub-specialty, however 52% felt its demand has increased in recent years. 53% stated not receiving due credit from other specialty colleagues. Only 20% were satisfied with their working conditions &opportunities but 65% reported due recognition from patients. 80% felt the need for a formal patient navigation & referral system.
Conclusion Most ESn felt, specialty training helped hone their skills&professional growth. Hurdles encountered in practice are lack of specialty recognition of ESx, support from other colleagues &a well laid out patient referral pathway. Overcoming these should result in improved ESx career prospects, specialist care widely accessible &therefore improved patient care.

PP108 The effectiveness of preoperative calcium and vitamin D supplementation in prevention of postoperative hypocalcaemia in patients undergoing total thyroidectomy.

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Background
Hypocalcaemia is a common complication after thyroidectomy. The purpose of the randomised clinical trial was to evaluate the effectiveness of preoperative oral calcium and alfacalcidol supplementation in the prevention of posttyroidectomy hypocalcaemia.
Method
One hundred fifty-three consecutive patients with nontoxic multinodular goitre were randomly assigned to routinely receive (group A) or not to receive (group B) calcium carbonate (4 g) and alfacalcidol (2 µg) in divided doses before surgery.
Their preoperative 25-hydroxyvitamin D (25-OHD), serum calcium and parathyroid hormone (iPTH) levels were measured. Hypocalcemic symptoms, serum calcium and iPTH levels were determined 6 and 24 hour after surgery and 6 weeks after procedure.
Results
Symptomatic hypocalcaemia was observed in 41/153(26.79%) patients. The incidence of symptomatic hypocalcaemia was significantly lower in group A: 10(12.99%) versus 31(40.79%) participants (p=0.0001)).
The rates of mild and severe hypocalcaemia (corrected calcium 2.0 to 2.29 mmol/l and <2.0 mmol/l, respectively) were 39(50.65%) and 7(9.09%) in group A and 51(67.11%) and 22(28.95%) in group B, respectively (p=0.0387, p=0.0017). There were no significant differences in corrected calcium levels after surgery (p=0.2554) and postoperative decreases in corrected calcium levels (ΔCacor) between groups (p=0.0611). 112(73.20%) participants were vitamin D deficient (25(OH)D level<20 ng/ml). ΔCacor were independent of preoperative vitamin D levels (p=0.9801).
Conclusion
Oral supplementation of calcium and alfacalcidol may help in the prevention of postthyroidectomy hypocalcaemia. Vitamin D deficiency was widespread among operated patients.

PP109 Rapidly growing cervical cyst presenting wih acute obstructive symptoms, who needs a hero?

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Background
The identification and evolution of rapidly growing neck masses, presented with various clinical manifestations, are often misdiagnosed, leading to inappropriate management. Histopathologically, the majority of such tumors is related to brachial cysts, other benign lesions and malignancy.
Method
We present a case of a 58 year old male patient with a rapidly growing mass during the past three months with an excessive increase in size in the last few days (approximately 10cm in diameter) on the left side of his neck, causing dyspnea with stridor and esophageal disorders. The patient was evaluated using FNAC, ultrasound and magnetic resonance imaging scans. Based on the images and the patient's symptoms, an urgent surgical intervention was decided due to threatened airway, in order to relieve his symptoms.
Results
The patient underwent complete excision of the mass with a left lateral cervical approach. Histopathological findings were consisted of branchial cleft cyst. The patient had an uneventful postoperative course with immediate remission of symptoms .
Conclusion
The management of neck masses with airway obstruction is quite challenging, mainly due to their anatomical location. Early diagnosis followed by surgery is the optimal treatment. Proper preoperative evaluation, followed by surgical excision in specialized centers is essential, especially when life threatening symptoms occur. Surgical excision is considered to be of increased difficulty due to the complications that may arise from neighboring structures such as bleeding and nerve damage.

PP110 Patients operated for presumed benign, large or growing thyroid nodules, have a high likelihood of significant synchronous thyroid cancers

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Background
Large or growing nodules in the setting of multinodular goiter remain a surgical indication despite evidence suggesting otherwise. This study investigates whether surgical treatment is justified.
Method
We reviewed data from two prospectively collected databases of patients undergoing thyroid surgery in two tertiary-care referral centers [USA (A), Greece (B)] over 14 consecutive years. We collected data on preoperative surgical indications, FNA cytology and surgical pathology We included subjects with multinodular goiters, operated solely for large or growing thyroid nodules, without any known or presumed thyroid cancer, or lesions at high risk for malignancy (FNA class ≥ III according to Bethesda classification), family history of thyroid cancer or familial cancer syndromes, prior neck radiation or lesions suspicious sonographically.
Results
We reviewed 5805 consecutive cases of thyroid surgery (A:2711, B:3094). We included n=3170 subjects with n= 692 thyroid cancers (21.8%); 426 (61.6%) were microcarcinomas (<1cm), 233 (33.7%) were macrocarcinomas (≥1cm) and 33 (4.8%) of undetermined size. The histology was consistent with PTC n=643, FTC n=16, HCC n=8, MTC n=8, thyroid lymphoma n=1 and mixed histology cancers n=10. In n=93 (2.93%) of all cases, a large or growing thyroid nodule harbored a thyroid cancer. The cancer was multifocal in n=237 subjects, extrathyroidal extension in n=106, lymph node involvement in n=79 and bone metastasis in n=2 subjects.
Conclusion
More precise screening strategies are needed to identify patients, who would benefit from thyroid surgery.

PP111 Riedel's thyroiditis: pitfalls in diangosis and subsequent complications - a case report

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Background
Riedel's thyroditis is a rare disease of chronic inflammation with fibrotic infiltration of the thyroid gland and its surrounding vital structures. Due to its low incidence, there are often delays in diagnosis as it is commonly mistaken for other thyroid diseases.
Method
We report the case of a 34-year-old female patient who presented with a firm, enlarged mass in the neck, compression symptoms and hypothyroidism. Lab tests showed elevated A-TG (thyroglobulin antibodies) and A-TPO (thyroid peroxidase antibodies) levels. Based on the disease presentation and supporting lab findings, the patient was misdiagnosed with Hashimoto's thyroiditis and treated accordingly.
Results
Yet the patient's symptoms grew progressively worse. She was discovered to have severe tracheal compression and bilateral RLN (recurrent laryngeal nerve) palsy. Tracheotomy became a necessary surgical intervention after the development of respiratory failure, but this procedure was complicated by the development of intraoperative pneumothorax. After an open biopsy, histology revealed Riedel's thyroiditis. A new treatment was drawn up:
Methylprednisolone (24 mg) Tamoxifen (2 x 10 mg) Mycophenolate Mofetil (which was later discontinued).
With these medications, the patient's condition improved. However, she continued to suffer from the open tracheocutaneous fistula left by the tracheotomy, which adversely affected her everyday life. A follow-up operation was performed to close the fistula.
Conclusion
In this case report, we discuss the consequences of misdiagnosing the patient and delaying the appropriate treatment for her disease.

PP112 Role of Intraoperative Cricothyroid Muscle Electromyography during Dissection of Superior Pole in Thyroidectomy for Preservation of External Branch of Superior Laryngeal Nerve

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Background
Preservation of External Branch of Superior Laryngeal Nerve(EBSLN) is one of the most important components for good vocal cord function after thyroidectomy. To achieve better outcome Cricothyroid Muscle Electromyography(CME) may be applied. In this study, correct timing of CME during thyroidectomy was evaluated.
Method
Patients underwent thyroidectomy and CME between April 2017 and June 2021 included to this retrospective study. Patients underwent secondary operations, TOETVA and patients have extrathyroidal invasion to the cricothyroid muscle were excluded from study. In group 1, cricothyroid muscle activity were assessed by stimulation of EBSLN and seeing muscle twitch and neuromonitoring via endotracheal tube with surface electrodes, also CME was applied to confirm EBSLN function at the end of the operation between April 2017 and December 2018. In group 2, CME was routinely done during thyroid superior pole dissection between January 2019 and June 2021.
Results
Total 626 patients and 1037 nerves were evaluated(477 Female,149 Male). Mean age was 49.26±13.35(range 14-89). Indications for operation were benign thyroid disease in 273 patients(43.6%), malignant disease in 220 patients(35.1%) and hyperthyroidism in 133 patients(21.2%). EBSLN injury were observed in 13 nerves(1.25%). 11 of these injuries(84.6%) were observed in group 1 and 2 of these injuries(15.4%) were observed in group 2 ($p=0.002$). Detection rate of EBSLN before dissection of superior pole were higher in group 2($p<0.0001$).
Conclusion
CME during superior pole dissection of thyroidectomy significantly reduces the number of EBSLN dysfunction when compared to visual preservation of the EBSLN. Also, this technique helps early identification of EBSLN during thyroidectomy.

PP114 Vitamin D deficiency in patients scheduled for endocrine surgery

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Background
The objective of this study was to identify and analyze preoperative vitamin D deficiency in patients planned for endocrine surgery.
Method
All cases submitted to thyroidectomy, parathyroidectomy or adrenalectomy in our department from 1/9/2016 until 31/8/2019 were included in this prospective study.
Results
During the 3-year study period, 1100 patients were included (mean age: 52.4±5.6 years, female: 74%). The majority of cases underwent thyroidectomy (92.5%), whereas 6% underwent parathyroid surgery and 1.5% of the study population had an adrenalectomy. Mean preoperative vitamin D was 23.8±4.7 ng/ml (range: 4-70 ng/ml, normal values: 30-50 ng/ml). Vitamin D deficiency (< 30 ng/ml) was identified in a significant proportion of the study population (70%). Moreover, severe vitamin D deficiency (< 10 ng/ml) was encountered in 15% of all cases. No statistically significant difference was identified between the three groups of patients receiving either thyroid, parathyroid or adrenal surgery regarding vitamin D deficiency in general (72%, 63.6% and 64.7% respectively, p>0.05) as well as regarding severe vitamin D deficiency (17%, 13.6% and 17.6% respectively, p>0.05).
Conclusion
Vitamin D deficiency in patients scheduled for endocrine surgery in our country is very often and requires further study and analysis, particularly regarding perioperative treatment of these cases.

PP115 Evaluation of the Safety of Continuous Intra-Operative Vagus Nerve Neuromonitoring during Thyroid Surgery

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Background
Continuous Intra-Operative Neuro Monitoring (CIONM) has been successfully demonstrated to predict damage to the recurrent laryngeal nerve (RLN) by detecting electromyographic (EMG) changes, which inform the surgeon of impending nerve damage. Despite the apparent benefits its use is not widespread, mainly because of the ongoing debate about its safety**.**
Method
In this prospective study, for each dissected and monitored nerve, we measured the amplitude of the EMG wave of the vagus nerve (VN)-RLN axis, both proximal and distal to the stimulation electrode placed upon the VN. EMG signal amplitudes were collected at three distinct events during the operation: during the dissection of the VN, before application of the continuous stimulation electrode upon the VN and after its removal.
Results
169 vagus nerves, among 108 included patients who underwent CIONM-enhanced neck endocrine surgeries, were analyzed. Electrode application resulted in a significant overall decrease in measured proximo-distal amplitudes of -10.94µV CI95%(-17.06;-4.82) $p<0.005$, corresponding to a mean decrease of -1.44%(SD±5.38%). Prior to removal of the electrode, the measured proximo-distal difference in amplitudes was -18.58µV CI95%(-28.31;-8.86) $p<0.05$ corresponding to a mean decrease of -2.50% (SD±9.59).
Conclusion
In addition to supporting claims that CIONM exposes the VN to injury, this study shows a very mild, yet statistically significant electrophysiological impact of CIONM electrode placement on the VN-RLN axis. However, the small observed differences are negligible and seem unlikely to be associated with a clinically relevant outcome, making CIONM a safe adjunct in selected thyroid surgeries.

PP116 "Colloid leak"-A lightening effect during Thyroidectomy

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Background
Thyroidectomy is the common most common endocrine surgical procedure varies from Scalpel to Robotic transoral thyroidectomy. Colloid nodules are common and easily operable without any difficulty. We report a phenomenon where in the surgery becomes difficult and lead to complications if not thought with this phenomenon – colloid leak.
Method
The endocrine surgeon (Associate Professor) has been involved in training of over 25 superspeciality endocrine trainers over a period of nine years in a tertiary referral high volume center. He has participated in 700 Thyroidectomies of which 250 thyroidectomies for colloid goiter. We have observed this phenomenon in 5 patients over 5 years in a tertiary referral centre in north India
Results
5 male patients (46.7±12.1 years) had this colloid leak. Mean BMI was (22.4±2.9). FNAC was colloid in all patients. 3 had colloid leak in all planes.2 had only per thyroidal leak. All patients had Recurrent Laryngeal nerve identified. In 1 patient only 1 parathyroid gland could be identified. Mean duration of surgery was 120± 12 minutes. Mean blood less was 10 ml ± 2.5ml.Mean duration of stay after surgery was 48.± 12 hours. No permanent complication was observed. All patients operated within 2 weeks of FNAC. All HPT was colloid.Immunohistochemistry revealed IgG4 stained plasma cell aggregates in the line of colloid leak.
Conclusion
Astute Endocrine Surgeon should be aware of this colloid leak phenomenon and when found the dissection should be very careful to present complications during thyroidectomy.

PP117 Hemithyroidectomy for Benign Multi Nodular Goitres- is it feasible in iodine deficient belt?

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Background
In iodine deficient areas, benign goitres are the most common disorder and multinodular goiter is most common thyroid disease after solitary thyroid nodule (STN). Various societies and guidelines recommend Total thyroidectomy for multinodular goitre. Total thyroidectomy when performed by a trained surgeon, has less complications. Substantial risk of total thyroidectomy include hyperparathyroidism in the elderly and also morbidity with recurrent laryngeal nerve (RLN).
Method
We have performed hemi thyroidectomy in carefully selected group of patients presenting with MNG with opposite lobe clinically and ultrasonographically normal. Total patients included in the cohort were 25. (Male 4= Female 21). Mean age 60.08+/- 6.25. All patients had benign FNAC.
Results
After USG imaging and CECT concordance, these patients underwent HT (removal of diseased side + isthmus + pyramidal lobe + cuff of opposite lobe) with harmonic scalpel as vessel sealing device. A single romovac 14 F drain was inserted and removed when drain <30ml .FT4, TSH levels checked 6 weeks after surgery. Mean follow up 18±2 months. 3 patients required thyroxine supplementation. The Mean Duration of drain was less than 3 days and mean duration of admission was 2± .51 days
Co morbidities

U/L Vocal cord palsy pre op	4 Patients
DM+ HTN	10 Patients
RSE	8 Patients

Conclusion
In our study hemi thyroidectomy was effective treatment for compressive symptoms in carefully selected MNG.

PP118 Substernal goiter case series report and review of published literature

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Background

Substernal goiter refers to an enlarged thyroid gland that extends into the mediastrinum. Although cervical approach is most commonly used, in 2-11% of the cases an extracervical approach is mandatory, increasing complications and mortality rate. The aim of this case series report is to present our department's experience during the last one and a half year and review the relevant literature.

Method

From January 2020 to September 2021, three patients with enlarged multinodulaire goiter underwent surgery at our department. Radiological imaging examination revealed varying degrees of dimension increase of the gland and compression of the trachea.

Results

All patients underwent total thyroidectomy with Kocher cervical incision, without the need of thoracotomy or sternotomy. In all cases, recurrent laryngeal nerves were optically identified. Normal postoperative course followed and patients were discharged the second postoperative day.

Conclusion

As in our cases, cervical approach is usually adequate for the surgical excision of substernal goiter. Diligent preoperative evaluation with CT scan of cervix and thorax in hyperextended neck position being the gold standard, can help the surgeon plan a safe thyroidectomy and also foresee the need of extracervical approach based on the CT classification of goiter.

PP119 Enhancing total thyroidectomy in amiodarone-induced thyrotoxicosis. Results from a national survey

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Background
Amiodarone-induced thyroiditis (TIA) is a potential life-threatening disorder. Its usual initial management is pharmacological since clasical series showed high morbidity/mortality for total thyroidectomy(TT). Recent guidelines have increased TT indications, but its role could be implemented.
Objetive: Analyze national experience in surgical management of TIA in order to better determine its current position.
Method
A National survey colleted 27 patients who underwent TT for TIA between 2010 and 2020. Data regarding clinical presentation, cardiological status, therapeutic management, indications, TT time priorization and morbidity/mortality were retrospectively analyzed.
Results
Most frequent type of diagnosed TIA was type 2 in 55.5% (15 patients), followed by type 1 in 29.6% (8 patients) and mixed TIA in 14.9% (4 patients). Cardiological impairment (left ventricular ejection fraction <55%) was observed in 63%. Although medical treatment was started in all of them, only 55.6% achieved euthyroidism. 63% underwent preferent/urgent TT, with a high overall percentage of TIA type 2 operated (55%). There was no mortality and only 7 patients had complications, all mild and self-limited. None preoperative factor showed any association with postoperative complications, neither preoperative euthyroidism, nor degree of urgency or cardiac impairment.
Conclusion
Based on our data, in higly specialized units, TT in TIA can be enhaced as definitive treatment, particularly in type 2. It´s a good choice to control hyperthyroidism fast, avoiding long treatment´s side effects and being able to keep amiodarone therapy. Cardiological impairmet or absence preoperative euthyroidism are not major contraindications since morbidity/mortality rates observed are low.

PP120 Morphological types of anemia and autoimmunity in patients with graves disease

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Background
To identify anemic syndrome in patients with Graves disease (GD) and to determine its relationship with the severity of autoimmune reactions.
Method
42 patients with GD were examined. Two groups of patients were identified: group I - GD with anemia (n = 27) and group II - GD without anemia (n = 15). In the clinical analysis of blood Hb, the number of erythrocytes, Ht, erythrocyte indices - MCV, MCH, MCHC were determined. The following indicators of autoimmune reactions were determined: circulating immune complexes (CIC), autoimmunization coefficient (AC) and erythrophagocytosis (EPh).
Results
The CIC level in persons with GD with anemia was 90.0± 2.0 conventional units, which was 1,4 times ($p < 0,05$) higher than the control and 1,2 times ($p < 0,05$) is higher than in GD patients without anemia. High CIC and AC indices significantly differed between the groups of patients ($p < 0,05$). The EPh index was 2,1 times ($p < 0,05$) increased in I group compared with group II. In 62,9% microcytic - hipochromic anemia was noted. Normocytic - normochromic anemia (anemia of chronic diseases) was verified in 33,3% of patients.
Conclusion
Elevated levels of CIC, AC and EPh indicate the presence of more pronounced autoimmune disorders in patients with GD with anemia.

PP121 Anesthesia based on propofol in thyroid surgery by using the laryngeal mask airway

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Background
Introduction: The use of the laryngeal mask airway (LMA) opens up new possibilities for ensuring airway patency.
Goal: To determine the safety and adequacy of anesthesia based on propofol by using the LMA with preserved spontaneous breathing in thyroid surgery.
Method
Prospective, randomized clinical trials were conducted in 82 patients operated on for nodal euthyroid goiter. Induction was carried out by bolus intravenous administration of fentanil (0.1-0.2 mg), diazepam (5-10 mg) and propofol (2.0-2.5 mg / kg). LMA was established after induction in spontaneous breathing. Administration of propofol continued as an intravenous infusion at a dose of 5-7 mg / kg / hour until the end of the surgery. The stady was approved by the Research Ethics Committee at Scientific Center of Surgery, Republic of Azerbaijan under the protocol number 0106AZ00884
Results
The surgical stage of anesthesia was achieved quickly, with a smooth course and hemodynamic stability without respiratory depression. The depth of anesthesia was easily controlled by a change in the dose of propofol drip. LMA was removed after the completion of the surgical intervention with adequate spontaneous breathing and patients were transferred to the general ward bypassing the ICU
Conclusion
Propofol-based anesthesia with the use of LMA with preserved spontaneous breathing is a safe and adequate method of anesthesia in thyroid surgery.

PP122 Thyroid Paraganglioma - an extremely rare finding

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Background
Paragangliomas are rare neuroendocrine tumors. They arise from the extra-adrenal autonomic paraganglia and have the ability to secrete catecholamines.
Although they can occur in various locations, primary thyroid paraganglioma is extremely rare - less than 0.1% of all thyroid neoplasms.
The authors present a case of a thyroid paraganglioma, emphasizing its diagnosis, treatment and follow-up.
Method
The patient is a 60-year-old female reporting cervical compression, medical history of autoimmune thyroiditis and thyroid nodules - the largest one on the left lobe with 33 mm, hypervascular.
Fine-needle aspiration cytology diagnosed a benign nodule.
Results
The patient was proposed for total thyroidectomy which revealed a left lobe solid nodule, poorly defined and extremely adherent to trachea and left recurrent laryngeal nerve. Only a left hemithyroidectomy was performed.
Histopathology examination revealed a paraganglioma, with positive margins, and a functional study was performed, with no alterations.
Follow-up study excluded other locations and the patient underwent completion thyroidectomy, with an excellent recovery.
Conclusion
Primary thyroid paraganglioma is extremely rare and can mimic follicular neoplasm, medullary thyroid carcinoma and metastatic tumors.
Increasing awareness for its features and diagnosis is essential to avoid complications, poorer prognosis and unnecessary aggressive therapies.
When diagnosed, all patients should be tested for hypersecretion of catecholamines.
Surgical excision is the treatment of choice and follow-up is indicated with cervical ultrasonography, catecholamine levels measurements and whole body tomography.
Studies have been increasing to provide insights into its biologic characteristics and new therapeutic targets.

PP123 Neuromonitoring and signal loss during thyroidectomy:surgical plan options

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Background
Intraoperative neuromonitoring has endorsed the need to develop surgical alternatives in cases of signal loss in order to avoid bilateral nerve injury. We tried to analyze the impact of recorded loss of RLN signal on our decision to remove the other lobe.
Method
One hundred eleven (111) thyroidectomies were studied prospectively over a period of 18 months. Intraoperative neuromonitoring,either intermittent or continuous, preoperative and postoperative laryngoscopy were performed in all patients.
Results
Signal loss in the vagous nerve was recorded in 12 cases (10.8%) after the excision of the first lobe. In 6 cases, group A (50%), lobectomy was performed and in the rest, group B (50%), a total thyroidectomy was performed, despite signal loss. In postoperative laryngoscopy in 4 (33%) patients, 2 of group A and 2 of group B, no paralysis of the vocal cord was observed. One patient from group B developed bilateral paralysis treated conservatively.
Conclusion
Loss of signal after the resection of the first lobe gives the option of two stage thyroidectomy .The goal is to avoid RLN injury on both sides, and to complete the thyroidectomy if the mobility of the vocal cord is restored and if the histopathology impose the need of total thyroidectomy. Total thyroidectomy despite the loss of signal is employed in advanced malignancy, ASA (3-4) in combination with the experience of the surgeon, aiming to better control of the disease postoperatively.

PP124 Supplementation of calcium and/or calcitriol is cost-effective strategy for post-thyroidectomy hypocalcaemia

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Background
No specific guidelines exist to decrease rates of hypocalcemia after total thyroidectomy which occurs in 40-60% of patients. Amongst the three strategies in terms of efficacy and cost to manage transient hypocalcemia- routine/preventive, selective and no supplementation- authors hypothesize that routine/preventive supplementation is costeffective
Method
Center A followed the prophylactic method in which 36 patients were analyzed who underwent total thyroidectomy. The preventive strategy included supplementing with 1-gram calcium carbonate and active Vitamin D(0.25mcg) before surgery and then 8 hrs. after surgery and continued for average of 15 days for calcium and 6 days of calcitriol.Center B followed selective and included 76 patients of total thyroidectomy. Patients were started on supplementation if they developed severe biochemical or symptomatic hypocalcemia but continued for minimum 3months
Results
11% in A and 18% in B had auto-transplantation of single parathyroid. Postoperative mean calcium was 8.4mg/dl (POD1) and 8.9mg/dl (POD2), while in B mean ionized calcium was 1.12 mmol/l (1.15-1.33) and 1.14.Cost of supplementation per patient was 7.69$,1/3rd of what is required if patient develops clinical hypocalcemia and requires infusion. On comparison,there was no significant difference in rates of biochemical hypocalcemia. However, the rate of clinical hypocalcemia was 3 times higher in the center B (42.1%) than A (13.5%). Similarly, the need for starting calcium infusion was 3 times more in center B (29%) than A (8.1%) which was significant.
Conclusion
This confirmed that preventive supplementation is useful and cost-effective compared to selective supplementation for hypocalcemia

PP125 Introducing routine intraoperative nerve monitoring in a high-volume endocrine surgery centre: a health technology assessment

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Background
Intraoperative nerve monitoring (IONM) helps identifcation of RLN, and predicts the postoperative function of vocal cords. The analysis of cost-effectiveness of IONM in thyroidectomy can be very difcult considering all factors infuencing the procedure and its outcomes, and it has been addressed by a few studies only. We sought to analyse the effect of the introduction of IONM in our routine surgical practice and to provide a circumstantial analysis of direct costs of IONM in total thyroidectomy and of indirect costs associated with vocal fold palsy, as centred in the health care system of Italy
Method
We retrospectively compared outcomes of 232 total thyroidectomies performed between November 2017 and October 2019, respectively, before(109 TT-Group A) and after(123 TT-Group B) adopting IONM technology in November 2018. We analysed the costs of IONM per procedure and rate and costs of vocal fold palsy events(temporary and permanent).
Results
Overall, there were 61 thyroid cancers(32 in Group B) and 171 multinodular goitres (91 in Group B). We recorded 5 cases of vocal fold palsy(4.6%-4 transient, 1 permanent) in Group A and none in Group B ($p = 0.016$). IONM consumables cost 219 eur per case. Healthcare and social cost of Vocal fold palsy ranged between 3200 eur(function recovery < 1 month postoperatively) and over 32,000 eur(permanent event).
Conclusion
When only direct costs are considered, IONM can hardly be cost effective. In this study, cost of IONM implementation was offset by the absence of complications attributable to recurrent laryngeal nerve dysfunction.

PP126 A critical analysis of unconventional complications of transaxillary robot-assisted thyroidectomy (RATT)

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Background
In the last 10 years, robotic assisted transaxillary thyroidectomy(RATT) has proved to be a safe and effective procedure. Anyway, new complications have been reported that have led to criticism regarding this new technique. The aim of the study was to analyse the rate of complications in a large series of European patients who underwent RATT and to evaluate the impact of new unconventional complications on the safety of the procedure.
Method
From February 2012 to December 2020, 541 RATT were performed at the University Hospital of Pisa. Complications were divided into two groups: Group A(conventional) and Group B(unconventional). Conventional complications included: bleeding; recurrent laryngeal nerve(RLN) transient and definitive palsy; transient and definitive hypoparathyroidism. All the other complications were considered unconventional.
Results
The overall rate of post-operative complications was 4.6%. Group A included a total of 22 complications (4.1%): bleeding occurred in 6 patients (1.1%); RLN transient palsy occurred in 7 cases (1.3%), whereas RLN definitive palsy occurred in one case (0.2%); transient hypoparathyroidism occurred in 8 cases (1.5%). Concerning Group B, 3 unconventional complications were registered (0.6%): one case of ulnar nerve traction injury (0.2%), one tracheal injury (0.2%) and one case of benign thyroid tissue reimplantation along the surgical track (0.2%).
Conclusion
The overall incidence of post-operative complications in our experience is at the lower limits compared to data reported in literature. Furthermore, the rate of unconventional complications is very low. Experienced surgeons who are aware of these new potential complications and how to prevent them can perform RATT safely.

PP127 Thyroidectomy via unilateral axillo-breast approach (uaba) with gas insufflation: a prospective multicenter european study

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Background
The purpose of this prospective cohort study was to evaluate the surgical outcomes of UABA with gas insufflation from three different European Institutions.
Method
From July 2015 to December 2019, 170 UABA procedures were performed at three separate European institutions. Restrictive selection criteria were established. Follow-up was performed at 2 weeks, 2 months and at 1 year. Surgical and esthetical outcomes were analyzed from this prospective cohort study.
Results
There were 143 (84.2%) women and 27 (15.8%) men with a mean age of 46.6±10.2. Mean BMI was 22.57±3.2. No case required conversion from the endoscopic approach to an open procedure. Mean operative time was 72.9±12.8 minutes for the total procedure. There were 10 (5.9%) patients who developed transient recurrent laryngeal nerve (RLN) injury, and 1 (0.6%) persistent. Minor complications were present in noted 55.9% of the patients all solved at 2 moths from the surgery. The final pathology report revealed 82 (48.2%) benign nodules, 67 (39.4%) nodules with underlying papillary thyroid carcinoma, and 21 (12.4%) case follicular carcinoma. Hospital discharge at 1 post-operative day (POD) was achieved in 117 (68.8%) of the patients. Esthetical satisfaction was present in 99% of the patients and all patient would be operated on again with the same approach.
Conclusion
In selected patients and with experienced minimally-invasive endocrine surgical teams, UABA with gas insufflation for thyroidectomy is safe and effective for the treatment of benong thyroid pathologies with an excellent esthetic profile.

PP128 Recurrent laryngeal nerve (RLN) injury: nerve recovery assessed by simultaneous use of electromyography and vocal cord accelerometry

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Background
A wide variety of positive predictive values have been demonstrated when using intraoperative neural monitoring (IONM) during thyroid surgery. Our goal was to experimentally assess the correlation between recovery of electromyography (EMG) readings and real time movement of the vocal cords (VC), using an accelerometer-probe implanted directly on the VC using a porcine model.
Method
Sixteen animals were studied. To ensure free movement of the VC, an endotracheal tube was placed via tracheostomy. We then identified the vagus nerve, and needle electrodes were placed trans-ligamentary into the VC muscles. EMG was obtained by use of continuous IONM, and movement by the accelerometer-probe. After registering baseline EMG, a 1.0 N traction stress was applied to the RLN and continued until the EMG amplitude decreased to 70 per cent below baseline or went on to LOS. After stress-release, nerve recovery was followed for 40 min during ongoing recording of EMG amplitude and VC contraction
Results
The accelerometer values essentially mirrored the EMG values. Mean normalized LOS values at end of traction and 40 minutes shows EMG: 0,1262 (±0,045) and 0,3353 (±0,18) vs Accelerometer readings: 0,4054 (±0,17) ($P>0.05$) and 0,646 (±0,23) ($P>0.05$). 70% means show EMG: 0,339 (±0,04) and 0,519 (±0,24), Acc: 0,601 (±0,16) ($P<0.05$) and 0,714 (±0,18) ($P>0.05$).
Conclusion
The EMG measured with needle electrodes is an accurate surrogate for real time movement during recovery of the vocal cords.

PP129 Incidence and prognosis of contralateral vocal fold palsy after hemithyroidectomy in previously unoperated patients

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Background
Vocal fold paralysis (VFP) due to damage (physical, thermal or by traction) of recurrent laryngeal nerve is a well-studied complication in thyroid surgery. However, in the course of unilateral hemithyroidectomy VFP of the contralateral, not operated side, despite normal preoperative laryngoscopic findings, is a very rare and unexpected event. To ascertain its incidence and prognosis, we conducted a retrospective analysis of prospectively collected data from patients operated in our institution.
Method
The study population comprised all patients undergoing thyroid resections between January 2012 and November 2021. As standard of care, all patients underwent a pre- and postoperative video-laryngoscopy by an independent ENT phoniatrician. In a planned hemithyroidectomy, the contralateral side was never explored or its RLN dissected. Postoperative VFP was defined as newly discovered movement reduction of vocal folds at postoperative day two; a permanent VFP as a persistent functional impairment six months after hemithyroidectomy.
Results
2475 thyroid resections were reviewed. 1349 hemithyroidectomies in previously non-operated patients were performed with 1343 undergoing postoperative laryngoscopy (99.5%). 34 patients (2.5%) showed ipsilateral VFP, whereas 8 unexpected VFP of the contralateral, non-operated side were observed (0.6%). Patients were symptomatic to a varying degree and received speech therapy. Clinical symptomatology and VFP resolved completely in all 8 documented cases within six months.
Conclusion
Contralateral VFP is an exceptionally rare event after hemithyroidectomy. Its occurrence may be underestimated due to missing or incompetently performed postoperative laryngoscopy as standard of care. Fortunately, contralateral VFP seems to have a good prognosis since all observed cases resolved completely.

PP130 Necrotizing Fasciitis after Thyroid Resection – a case report

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Background
In thyroid surgery, surgical site infections are rare complications (0.5%). If occurring, patients usually recover swiftly after surgical wound revision and drainage. Contrariwise, wound infections due to Streptococcus pyogenes causing necrotizing fasciitis (NF) are exceedingly rare and life-threatening.
Method
A 69-year-old female was diagnosed with ectopic, benign, thyroid goiter nodule inferior the isthmus. Medical history was unremarkable without impaired immune defense system. Due to increasing local symptoms, the ectopic goiter-nodule was removed in an uneventful, short operation.
Results
Ten hours after surgery CT-scan was performed due to massive pain, without detected pathology. Another 12 hours later, the patient was transferred to intensive care unit (ICU) in septic shock. Antibiotic therapy was started (Imipenem/Clindamycin). Although the wound being unsuspicious, bedside wound re-opening was performed without evidence of infection. 50 hours after primary surgery a subtle, increasing neck exanthema emerged and immediate surgical wound revision was performed. All fascias were succulent and necrotic without pus, compatible with NF. Performing extensive repetitive debridements and vacuum therapy the wound was definitively closed two weeks later. Antibiotic regime was adapted after identifying Streptococcus pyogenes causing the infection. After 20 days, the patient was discharged from ICU and recovered completely without clinical permanent deficits.
Conclusion
After thyroid resections, NF is an unexpected, severe complication. Nevertheless, keeping this complication in mind is of utmost importance in order performing early wound revision before appearance of obvious wound infection signs. In addition to ICU treatment and antibiotics, repetitive surgical debridements and negative pressure wound therapy are important pillars of treatment in NF.

PP131 The impact of Covid-19 on the training of endocrine surgical residents in Greece: a survey one year after the emerge of the pandemic

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Background
The pandemic of coronavirus disease (COVID-19) unfortunately remains at the frontline, which brought about dramatic changes pertaining to daily routine workflow in hospitals. Following the lapse of almost one year since the outbreak of COVID-19 in Greece, we attempted to estimate to which extent COVID-19 pandemic affected training and education of endocrine surgical residents.
Method
We developed an anonymous online brief questionnaire, consisting of 15 multiple choice questions, addressed and dispatched via email to residents who are employed and educated in surgical and ENT departments that take a keen interest in endocrine surgery. The survey took place between January and February of 2021 throughout Greece's hospitals. A total of 124 residents completed the questionnaire.
Results
The majority of the residents (51.6%) reported a significant decline in the number of operations performed per week before and during the pandemic. Both surgical skills and theoretical knowledge have deteriorated to a significant extend. With regard to how confident residents feel, pertaining to their surgical career, the majority of them submitted that they feel pessimistic to a very great extent and they would consider prolongation of the clinical training.
Conclusion
The aims and scopes of a surgical department, are inter alia, the provision of excellent training to young surgeons. The impact of the pandemic to surgical day-to-day life is tremendous, notably affecting young surgeons' surgical training.

PP132 Reflection of the covid-19 pandemic to remote access thyroid and parathyroid surgery

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Background
The outbreak resulted in a decrease in elective surgical procedures, including endocrine surgery. Remote access surgery decreased more than all other surgical procedures. In this study, we aimed to define the impact of the pandemic on remote access practice.
Method
Patients operated for thyroid cancer, multinodular goiter, thyrotoxicosis, and parathyroid pathologies between January 2017-October 2021 were evaluated retrospectively. Patients' demographics, indications for surgery were compared before and after the pandemic. A two-way ANOVA test was used for statistical analysis.
Results
While our overall number of cases per year from 2017 to 2019 was 395, 478, and 532, respectively, this number decreased to 260 in 2020 (p=0.068). However, considering the indication, there was a significant decrease in the number of benign and remote access surgeries (p=0.036 and p=0.048, respectively)
Conclusion
The steepest decline in neck endocrine surgical procedures during the pandemic was remote access surgery. This may be due to patient and/or surgeon preference and concerns related to gas insufflation.

PP133 Effectiveness of a single port technique on transoral endoscopic thyroidectomy vestibular approach (toetva): a preclinical study in two human cadavers

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Background
This study aimed to evaluate the safety and feasibility of a single port system for transoral endoscopic thyroidectomy vestibular approach (TOETVA).
Method
Two fixed human cadavers without any neck surgery were used for the study. After positioning, a median vestibular incision was performed. Fatty-fibrous tissue was dissected with a Kelly clamp through the mentum to reach the subplatysmal plane. Next, Keyport Single Port System (Richard Wolf®) was inserted. Trocar's measurements were 21 mm in the passage, 30 mm in WL, and 9 mm in length and had a plastic spiral-shaped ring with 6 mm for stabilizing. After the port placement, curvable endoscopic dissectors and a 5mm endoscope were moved forward.
Results
On the first cadaver, skin tension was observed during dissection and the trocar application. While inserting the trocar, the skin was perforated at the submental area. While operating on the second cadaver, although skin tension, the single port trocar was inserted successfully but did not allow surgical maneuvers for the following steps. Distal branches of the mental nerve were related to the trocar's passage.
Conclusion
Single port-TOETVA with current surgical technology seems not be safe and feasible. Improvements are warranted to perform this technique without injury to distal branches of the mental nerve, skin perforation, and other complications.

PP134 Primary thyroid tuberculosis: a case report

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Background
Thyroid involvement by disseminated tuberculosis is scarce, and primary involvement of this organ is much more unusual, even in countries with a high incidence of the disease. Approximately five cases have been reported in Europe in the last ten years.
Method
We present a 50-year-old woman with no medical history of interest, that had performed several Mantoux tests as part of her job. She was evaluated for presenting a 3 cm lesion in the left thyroid lobe, heterogeneous and with infiltrative appearance in the ultrasound, classified as TI-RADS. The fine needle aspiration cytology (FNAC) resulted in a follicular lesion of undetermined significance, Bethesda III. A left hemithyroidectomy was performed.
Results
The pathological analysis showed a granulomatous thyroiditis with non-necrotizing epithelial granulomas with the presence of multinucleated giant cells. The stains performed using the Ziehl-Nielsen technique evidenced acid fast bacilli. The tests performed to the patient at the Infectious Diseases Department excluded other organ damage.
Conclusion
Thyroid tuberculosis is a rare entity with a highly variable presentation and a complex diagnosis when it is not suspected. It usually occurs in patients with disseminated tuberculosis. However, it may present as a solitary nodule in a patient with no history of tuberculosis and no previous contact with areas of high prevalence. In most cases, the FNAC is non-specific, and the definitive diagnosis is revealed after the pathological analysis of the surgical specimen. Medical treatment according to local resistances is the main treatment and prevents surgery if there is a prior diagnosis.

PP135 The usefulness of the parathormone levels at the end of thyroid surgery in predicting the need of calcium supplementation

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Background
The parathormone value (PTH) in the postoperative period and the clinical symptoms of hypocalcemia are our main criteria for the calcium supplementation (CaS) after thyroid surgery.
The purpose of this study is to evaluate if the PTH at the End Of the Surgery, before the extubation (EOS- PTH), has the same prognostic importance and can be used for predicting the need of CaS, as the PTH on the first postoperative day (POD1-PTH).
Method
Retrospective data analysis of 1254 consecutive patients, who underwent thyroid surgery (lobectomies were not included). 77 patients with missing data were excluded. From the remaining 1177 patients, 451 underwent total thyroidectomy (TT), 622 TT with central neck dissection (TT+CND) and 104 patients TT with CLND and lateral neck dissection (TT+CND+LND). PTH, Calcium, Phosphorus and Albumin levels were measured in all patients pre- and postoperatively. Additionally, all patients had measurement of PTH before the extubation.
Our criterion for CaS was POD1-PTH below 18,8 pg/ml or symptoms of hypocalcemia.
Results
The decision for CaS with criterion the EOS-PTH remained unchanged in 85%(383/451), 84%(523/622) and 90%(94/104) of patients who underwent TT, TT+CND, TT+CND+LND respectively. The shift from no CaS to CaS which is the most critical change, was required in 4,2%, 2,7% and 0,9% of patients in the above groups respectively.
Conclusion The EOS-PTH could be used for the selection of the patients who will receive CaS postoperatively.

PP136 Feasibility and safety of ambulatory transoral endoscopic thyroidectomy via vestibular approach (toetva)

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Background
In search of an ideal cosmesis, transoral endoscopic thyroidectomy via vestibular approach (TOETVA) has recently been introduced to avoid a visible scar. Ambulatory thyroid surgery is considered safe in carefully selected patients. This study aims to analyze the feasibility and safety of ambulatory TOETVA.
Method
All consecutive adult patients who underwent TOETVA or traditional thyroid surgery in ambulatory setting at a French university hospital were prospectively enrolled from 12/2020 until 11/2021. The primary outcome was postoperative morbidity (recurrent laryngeal nerve (RLN) palsy, re-intervention for bleeding, wound morbidity, or hospital readmission). The secondary outcome was quality of life, measured by a validated questionnaire (SF-12) and a thyroid surgery questionnaire six weeks after surgery.
Results
In the study period, 374 patients underwent a unilateral lobectomy or isthmectomy in ambulatory setting, of which 33 (8.8%) as TOETVA (including 19 (57.6%) for a possible malignancy). In the TOETVA group, younger age (median 40 (IQR 35-50) years vs 50 (40-59), p=0.001), but comparable sex ratio and BMI were noted. No cases were converted to traditional cervicotomy. TOETVA was at least as good as traditional cervicotomy with zero versus four (1.2%) re-interventions for bleeding, two temporary (6.1%) versus 13 (3.8%) (temporary) RLN palsies, and one (0.3%) wound infection (traditional cervicotomy group). No hospital readmissions occurred in all ambulatory surgery patients. No differences were found in physical (p=0.242) and mental (p=0.484) QoL between TOETVA and traditional surgery.
Conclusion
In carefully selected patients, performing TOETVA in ambulatory setting is safe and feasible with morbidity and quality of life comparable to open surgery.

PP137 Relevance of preoperative Parathyroid hormone value for transient, protracted and permanent hypoparathyroidism after total thyroidectomy

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Background
This study aimed to evaluate the potential influence of preoperative PTH levels on transient, protracted and permanent hypoparathyroidism after total thyroidectomy.
Method
A prospective, observational study that includes 100 consecutive patients who underwent total thyroidectomy was performed.
Results
Transient, protracted and permanent hypoparathyroidism was present in 42%,11% and 5% of patients respectively.The median preoperative PTH between patients who did not suffer from hypoparathyroidism and those who did suffer from it was similar (65.4 pg/mL [IQR 49.3-89.6] vs. 62.6 pg/mL [IQR 49.8- 86.1], p=0.815). In patients with protracted hypoparathyroidism, the median preoperative PTH was higher (85 pg/mL [IQR 68.5-94] vs. 63 pg/mL [IQR 49.3-76.6]; p=0.054). The median PTH was similar in patients with permanent hypoparathyroidism and those without it (73 pg/mL [IQR 54.6-89.5] vs. 63.5 pg/mL [IQR 49.4- 87.1]; p=0.491).We formed 3 groups based on the preoperative PTH value, defined as: less than 40 pg/mL, between 40 and 70 pg/mL and PTH greater than 70 pg/mL. The median preoperative Vitamin D was higher in patients with transient hypoparathyroidism (24 ng/mL [RIQ 13-31] vs. 17 ng/mL [RIQ 10-24]; p=0,024), patients with Vitamin D over 20 ng/mL suffered higher rates of hypoparathyroidism (53,1% vs. 31,4%; p=0,028), no differences were found in protracted nor permanent hypoparathyroidism.
Conclusion
No statistically significant differences were found between preoperative mean PTH in patients with transient, protracted or permanent hypoparathyroidism. We found that groups with higher preoperative PTH had significantly higher rates of protracted and permanent hypoparathyroidism.

PP138 Perioperative factors implicated in the need of hormonal replacement after thyroid lobectomy.

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Background
Hypothyroidism after thyroid lobectomy (TL) is quite common but its real incidence and risk factors that influence its development remain poorly defined. The main aim of this retrospective, unicentric study was to analyse these factors in our setting.
Method
We have included all patients undergoing TL in our hospital between 2015 and 2020, collected in Eurocrine® Registry. Exclusion criteria: missing data, malignancy in the pathologic report, or a later reoperation to complete a total thyroidectomy.
Analyzed variables: age, sex, indication for surgery, cytology results, histopathological main diagnosis and specimen weight. Statistical analysis included uni and multivariate analysis (SPSS program version 20.0); a p value <0.05 was considered significant.
Results
Among 918 thyroidectomies performed, 185 were TL. After applying the exclusion criteria, 143 patients were evaluated. Median age was 53 years, and 29 patients were men (20.2%). Globally, 58 (40. 6%) needed postoperative thyroxin therapy. In univariate analysis, female gender (p=0.015), history of compressive symptoms (p=0.02), higher specimen weights (p=0.028) and presence of lymphocytic thyroiditis in pathologic report (p=0.004) were predictors of thyroxin replacement. The presence of lymphocytic thyroiditis emerged as the only independent predictive factor in multivariate analysis (Odds Ratio 3.261, 95% Confidence Interval 1.322-8.043).
Conclusion
A clinical context suggestive of lymphocytic thyroiditis should be kept in mind when facing patients proposed for TL, as its presence triples the chance of requiring postoperative replacement therapy. This may influence on the preoperative counselling regarding the proposed surgery.

PP139 Recurrent laryngeal nerve anatomy variations as a risk factor of injury: a multicenter study

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Background
The risk factors of RLN injury during thyroid operations have been thoroughly investigated in various studies. It has been shown that one main cause is the RLN's anatomical variability. This study aims to point out the specific anatomies that lead to injury.
Method
220 patients that underwent thyroid operations were enrolled between 1/10/2017 and 31/5/2019 leading to 432 nerves studied. The variables were: side (left-right), RLN trajectory in regards with the tracheoesophageal groove (TOG), relationship to the Berry Ligament, trajectory in regards with inferior thyroid artery (ITA) and RLN branching prior to entering the larynx
Results
9% vocal cord injury in the first post-op day was recorded. 52,4% were on the left side, 73% had a normal TOG trajectory, 75,6% were superficial to the Berry ligament, 57,3% were posterior to the ITA and 51,7% presented branching. In each side every variable was studied independently using chi-square analysis and only the relationship to the Berry ligament was statistically important (left: p=0.001 and right p=0.04). We decided to create a scoring system that ranks 0 for normal and 1 as abnormal each variable studied (min=0, max=4). Logistic regression analysis yielded for the right side an OR of 7,909 (p=0,00035) and for the left side an OR of 2.9 (p=0,004)
Conclusion
RLN anatomy variability remains a major factor leading to injury. This study portrays the significance of each factor independently and attempts to create a scoring system to predict injury risk

PP141 How long does it take to regain normocalcaemia in post-thyroidectomy hypoparathyroidism - a detailed analysis of time course and risk-factors

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Background
Post-surgical hypoparathyroidism (PH) is a common after total thyroidectomy. A detailed time-course-analysis of the dynamics and time needed for recovery has not yet been reported, neither have factors associated with early vs. late recovery.
Method
Retrospective analysis of 1100 unselected consecutive thyroid procedures (12 months) of a single center registry. Patients with PH were followed by structured interviews q4w for at least 12 months, allowing for time course analysis. Uni- and multivariate models addressed covariates of early and late recovery from PH.
Results
There were 578 bilateral, 517 unilateral and 5 central thyroid procedures. 154 patients (26,5%) had PH and 143 (93%) had a full dataset. 57,3 % were symptomatic and 76.9% had a PTH of < 15 (15-65 pg/ml) on POPd1. Median time-to-recovery was 8w; 2/3 recovered within 18w (mean 13, IQR 4-18). Three patients (2,1% of the TT-cohort, 0.27% of all thyroid surgeries) had calcium for >12 months. Only lymphadenectomy (LAD) and low PTH on POPd1 were associated with delayed recovery. In the event of long PH, visualization of all parathyroid glands increased the likelihood for recovery (OR 2.69; 95%CI 1.08-6.69, p=0.003).
Conclusion
Although almost every patient with PH apparently eventually recoveres, this detailed analysis revealed a rather large cohort to require many weeks of medical surveillance. These needs, however, can be anticipated by distinct biochemical (PTH) and operative (LAD, vizualisation of PT-glands) characteristics.

PP142 Emergency endocrine surgery: Cervical hemorrhage due to parathyroid adenoma

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Background
Cervical hemorrhage as a presentation of a parathyroid adenoma is a rare and potentially fatal complication. We present a clinical case to review the management.
Method
A 78-year-old patient with multiple comorbidity, consultation in the emergency department for odynophagia, dyspnea and dysphonia due to increased soft tissues in the anterior cervical region. An urgent cervical ultrasound showed a multinodular goiter and a peritracheal hematoma that produced a decrease in the caliber of the airway. On CT, a heterogeneous 2 x 5 cm lesion is observed posterior to the left thyroid lobe, which could correspond to a hemorrhagic complication of the thyroid nodule.
Symptoms progressively increase, surgical treatment is decided. Hematoma is observed at the expense of the destructuring of both thyroid lobes with extension to the mediastinum and with tracheal involvement due to compression on the posterolateral aspect. Total thyroidectomy and temporary tracheostomy were performed.
Results
The patient had no surgical complications. The pathological diagnosis reports as parathyroid tissue (70-80% of the total consigned as "left thyroid lobe") with histological characteristics compatible with parathyroid adenoma.
Conclusion
Bleeding as a complication of a parathyroid adenoma, although rare, can be fatal. In the absence of airway involvement or hemodynamic instability, cases have been successfully managed conservatively. The optimal time for surgery has not been determined. Many of these patients are previously unaware of the diagnosis, so it is necessary to have a high index of suspicion to identify it and give it the appropriate treatment.

PP143 Feasibility of autofluorescence using elevision™ for the detection of parathyroid glands: standards and clinical applicability

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Background
This prospective study was conducted to define standards for the usage of Elevision™(Medtronic, Minneapolis, MN, USA) which represents a development of near infrared autofluorescence (NIRAF) imaging differing to previous NIRAF-products in an additional adjustment of the intensity of excitation light and a near-infrared overlay.
Method
In total 113 patients (female=78(69%)), in whom Elevision™ was used from January to November 2021 at least for the intraoperative visualization of one parathyroid gland, were included in this study. Whether parathyroid glands were first localized by the surgeon or by Elevision™ was noted. Distance and infrared-intensity (IR%) were documented during the measurement. In thyroidectomies the specimen was subsequently scanned for further parathyroid glands.
Results
Overall, 311 parathyroid glands were analyzed with 191 nerves at risk. In 65 (57.5%) patients same parathyroid glands could be localized by the surgeon and by using Elevision™. In 33 (29.2%) patients the surgeon detected more parathyroid glands and in 15 (13.3%) patients more parathyroid glands could be visualized by using Elevision™. The ideal distance for the measurement covers a range from 8 to 11 cm with mean IR% of 42.5% (±17).
Conclusion
In contrast to previous NIRAF imaging Elevision™ allows intraoperative real time imaging. Considering its limitations such as different autofluorescence patterns, influence of location and surrounding tissue of parathyroid glands, it can be used as an adjunct tool for the localization of parathyroid glands.

PP144 Efficiency of surgeon performed endoscopic ultrasonography in cases with non-localized parathyroid adenoma; initial reports

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Background
To determine the accuracy of endoscopic ultrasonography (EUS) for non-localizing parathyroid adenoma compared with conventional cross sectional imaging (CT and MRI)) methods and 4-dimensional computed tomography (4D-CT).
Method
Between 2014 and 2021, the data of 139 patients with primary hyperparathyroidism who had surgery indication but whose pathological gland could not be localized by ultrasonography and/or 99mTc-MIBI were analyzed retrospectively. Different second-line imaging methods were applied to the patients with non-localized parathyroid adenoma. These patients were divided into 3 groups as those who underwent conventional cross-sectional imaging (Group 1), 4D-CT (Group 2) and EUS (Group 3), and the effectiveness of these methods were examined.
Results
There were 73 patients in Group 1, 34 patients in Group 2, and 20 patients in Group 3. The accurate localization of the pathological gland was found to be 55% in Group 1, 83% in Group 2, and 60% in Group 3. The rate of correct detection of lateralization of the pathological gland by EUS was 80%. In addition, after the initial 10 cases in which the learning curve was completed, correct localization of the pathological gland increased up to 70% and correct lateralization increased to 90% in the following 10 cases.
Conclusion
Preoperative localization studies are important in order to perform focused parathyroid surgery. Considering the high radiation exposure of 4D CT, EUS can be used as an effective method in cases with non-localized parathyroid adenoma.

PP145 Parathyroid adenoma in pregnant women

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Background
We present the case of a 38-year-old patient, 14 weeks pregnant, with a giant parathyroid adenoma; carried out in our service and bibliographic review
Method
We relize a retrospective data collection was performed and a literature review.
Results
38-year-old woman, 14 weeks pregnant, who came to the emergency room due to vomiting and abdominal pain in the epigastrium. Analytically, severe hypercalcemia stands out (calcium 16.7 mg / dl).
In the hormonal study, intact PTH levels of 303 pg/ml and 25-OH-VitD3 of 11.2 ng/ml were found. Given the suspicion of HPTP, it was decided to perform a cervical ultrasound where a mass compatible with a 35mm right parathyroid adenoma was observed.
Subsequently, an early intervention was decided by means of a selective lower right parathyroidectomy, with postoperative iPTH as of 28 pg/ml.
The pathological result of the specimen confirms the suspicion of a 45 x 25 x 22 mm parathyroid adenoma.
Conclusion
The pathophysiological alteration produced by HPTP is a lack of inhibition of PTH secretion in response to abnormally high levels of calcium in the blood.
HPTP during pregnancy is rare, but moderate-severe hypercalcemia can carry significant maternal and fetal risks.
The maternal presentation usually includes hyperemesis, or nephrolithiasis,
Neonatal complications include hypocalcemia and tetany secondary to suppression of fetal PTH.
Surgery during the second trimester is the preferred treatment for symptomatic patients, such as the patient in our case.
However, observation may be appropriate in asymptomatic patients with mild hypocalcemia.

PP146 Near Infrared Imaging of Parathyroids - Effect on Autotransplantationrate and Postoperative Hypoparathyreoidism

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Background
Postoperative hypoparathyroidism is a common complication of thyroidectomy. Near infrared imaging (fluoroscopy) was shown to distinguish parathyroid tissue from surrounding tissue. As fluoroscopy is not dependent on tissue perfusion, this technique can also be used to identify accidently removed parathyroid tissue ex vivo. In this study, we evaluated the influence of fluoroscopy (Fluobeam) on the number of performed autotransplantations and the occurrence of postoperative hypoparathyreoidism
Method
We evaluated the influence of fluoroscopy in a retrospective board approved two center-study. Over a period of 24 month, 250 patients underwent thyroid surgery using fluoroscopy. Data from 700 patients, who were operated before fluoroscopy technology was available, served as control.
The number of performed autotransplantations of parathyroids was compared between the groups, regardless of the extend of resection. To investigate the effect on postoperative hypoparathyroidism, matched pair analysis of thyroidectomies cases was performed
Results
No significant difference in indication, sex or age between the groups was observed. The usage of fluoroscopy was demonstrated to result in an significant increase of performed autotransplantations. However, matched pair analysis revealed no significant difference in the rate of early postoperative hypoparathyroidisms defined by PTH levels < 15pg/ml
Conclusion
Fluoroscopy is a suitable technique to identify parathyroid tissue. We could not determine a significant effect on the incidence of early postoperative hypoparathyroidism. However, autofluorescence is clearly suitable to identify accidently removed parathyroids as indicated by an increase in performed autotransplantations. This might help to reduce the rate of permanent hypoparathyroidism

PP147 Urgent parathyroidectomy due to severe hyercalcemia in pregnant woman

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Background
Physiological events during pregnancy, such as emesis, muscle weakness can easily mask symptoms of primary hyperparathyroidism. Localizing parathyroid gland in pregnancy is limited as computer tomography and 99mTc Sestamibi are contraindicated because of radiation risk for fetus. Prolonged and untreated hypercalcemia can lead not only to growth retardation of fetus but also to intrauterine or neonatal death, and can cause life threatening pre-eclampsia, preterm delivery or pancreatitis in pregnant women.
Method
32-years old primigravida was admitted at obstetric clinic due to prolonged vomiting, dehydration, epigastric pain and pain in the ribs. She was in 14-th gestational week. Laboratory results showed increased level of calcium and parathyroid hormone (PTH) 4.19 mmol/mL, 783 ng/L, respectively. Serum lipase level was 205 U/L and alpha amylase was 272 U/L. Ultrasound of neck revealed enlarged upper right parathyroid gland. Urgent parathyroidectomy was performed by experienced endocrine surgeons.
Results
After parathyroidectomy was performed calcium level started to fall, 24 hours after it was 3.3 mmol/mL and serum PTH level was 9 ng/L. At second postoperative day calcium was 3.23 mmol/mL and PTH was 7ng/L. Finally seven days after surgery patient was normocalcemic (2.2 mmol/mL) and PTH level started to rise (45 ng/L). Serum lipase and amylase levels were in normal range.
Conclusion
Review of literature revealed thatour case was one of the rare cases with the highest hypercalcemia (Ca >4mmol/mL) reported so far. Surgically treated patients have lower rates of pre-eclampsia and preterm delivery compared to patients who were treated with medicaments.

PP148 Inadvertent parathyroidectomy rate during thyroid surgery

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Background
Thyroidectomy is a common surgical procedure worldwide. Inadvertent parathyroidectomy (IP) is a well recognised complication. Parathyroid glands can be inadvertently removed or devascularised insitu causing failure. A recognised consequence of IP is hypocalcaemia which has been shown to increase risks of cancer, renal disease and increased cardiovascular events. Primary aims were to ascertain the local IP rate during thyroid surgery. Secondary aims were to assess presence of lymphadenopathy and rate of post-operative and chronic hypocalcaemia.
Method
A retrospective review of thyroid surgeries by a single surgeon between 2018 to 2020 (n=50) was undertaken to ascertain the rate of inadvertent parathyroidectomy. A list of pathology reports were obtained from the pathology department. Patient records were assessed to record demographics, pre-operative clinical presentation and post-operative outcomes.
Results
The majority of the patients were female (n=41;82%). Procedures included right hemi-thyroidectomy (n=22;44%), left hemi-thryoidectomy (n=18;36%) and total thyroidectomy (n=10;20%). 40 (80%) were for benign pathology and 10 (20%) for malignancy. The IP rate was 12% (n=6), of these 50% were in malignant cases. Cervical lymphadenopathy at presentation seen in 8%. Post-operative hypocalcaemia was seen in 42.9% and chronic hypocalcaemia in 14% of cases although these reflect only total and completion thyroidectomy (n=14).
Conclusion
The local IP rate of 12% is consistent with the global literature. There was no difference in IP in malignant or benign cases. Given that there is significant documented morbidity in patients with corrected hypocalcaemia, it is more vital than ever to ensure care is taken intra-operatively to locate and protect the parathyroid glands.

PP149 Sporadic primary hyperparathyroidsm with normal parathormone levels. a diagnostic and therapeutical challenge

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Background
Sporadic primary hyperparathyroidism (sPHPT) with normal parathormone (PTH) levels is an uncommon disorder of not well-stablished mecanism. Laboratory test missmatching of 1-64 PTH or abnormal protein configuration are suggested causes leading to diagnostic and therapeutic difficulties.
Method
We performed a retrospective review of 68 consecutive parathyroidectomy performed at our centre in the last 5 years. Selected patients were those who presented laboratory criteria of sPHPT but PTH levels within the laboratory's normal range.
Results
Two patients (2.9%) with hypercalcemia, normal vitamin D levels and all determinations of serum PTH values in normal range were selected. First case was a woman with hypercalcemia and previous history of renal lithiasis, with all imaging studies negative, who underwent bilateral neck exploration and identification of a single adenoma. The second case was a man with hypercalcemia and positive 99mTc-Sestamibi scan for parathyroid adenoma. Intraoperatively, adenoma identification was done with a real-time 99mTC sestamibi scintigraphy with a miniature hand-held gamma camera. In both cases, definitive pathological report confirmed the presence of a single adenoma and calcium levels normalized during follow-up.
Conclusion
There are very few studies in the literature, with limited number of cases and ill-defined criteria for sPHPT with normal PTH level term. After excluding other causes, it is important to take in consideration a sPHPT in patients with hypercalcemia and normal PTH. Diagnosis and localization use to be more challenging and bilateral neck exploration is sometimes needed. Histopathology may reveal single gland disease, but up to 35% could present multi-gland disease

PP150 Mission impossible: finding an ectopic parathyroid

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Background
This case report is about a difficult to find parathyroid that required multiple cervical surgeries and the complications that followed.
Method
A 47 year old woman presented with a cervical mass detected on multiple imaging investigations, seric PTH levels of 164 pg/mL, total serum calcium 11.5 mg/dL, diagnosed by the endocrinologist with primary hyperparathyroidism due to left inferior parathyroid hypertrophy.
The patient had multiple cervical surgical interventions when she presented in our hospital (total thyroidectomy - for polynodular goiter, cervical surgical exploration for parathyroid adenoma, right superior parathyroidectomy).
Results
A cervical surgical exploration was performed in our service, with a prior parathyroid scintigraphy with Tc-99m-mibi, revealing a left paraoesophageal mass. Intraoperative histopatological examination and detection of the lesion with Gamma-Probe were performed, without being able to detect the parathyroid.
In June 2021 another attempt was made, using preoperative Tc-99m-mibi scintigraphy and intraoperative detection with Gamma-probe. No parathyroid tissue was found. During the surgery, the thoracic duct was accidentally injured and sutured.
On the 2nd postoperative day the patient accused dyspnea and intense thoracic pain. A thoracic Computed tomography detected massive pleurisy. An emergency left pleurostomy was performed. A biochemical analysis of the pleural liquid revealed high triglycerides (176.14 mg/dl) and cholesterol (111 mg/dl), leading to the diagnosis of iatrogenic chylothorax.
The patient was discharged on the 6th postoperative day.
Conclusion Nevertheless the advances made in imaging and in perioperative methods for locating ectopic parathyroid tissue, some cases still raise challenges and difficulties, leading to unpleasant postoperative complications.

PP151 Parathyroid carcinoma: the optimistic story of 9 years repeated surgery

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Background
Parathyroid carcinoma (PC) is rare but challenging issue in endocrine surgery. Extent of surgery, pathology confirmation, adjuvant treatment remain not clear.
Method
Female patient (1955 y.b.) was closely followed up 2013-2021 during the course of five consequent operations and radiation therapy.
Results
First effective operation on primary hyperparathyroidism due to left inferior parathyroid adenoma was performed in 2013. In 2018 recurrent hypercalcemia was observed and recurrent parathyroid tumors removed (defined mass close to left thyroid lobe together with subcutaneous "spilled" fragment of parathyroid tissue – both visualized on 99mTc-MIBI scan). Laboratory cure achieved and eucalcemia lasts for 1.5 year. In 2019 – 3rd operation on local recurrence was performed (intrathyroid parathyroid tissue discovered, probably remnant of 1st adenoma). Hyperparathyroidism was cured by hemithyroidectomy. In one year (08.10.2020) next recurrence occurred – intramuscular metastasis revealed by sonography and removed from left sternothyroid muscle. Hypercalcaemia (Ca++ - 1.54 mmol/l) persisted and parathormone raised (174 pg/ml) with no response to cinacalcet. After conclusive data from 99mTc-MIBI-SPECT the fifth operation performed in November 2020 – parathyroid carcinoma metastasis was removed from right carotis-subclavian angle and carcinoma eventually confirmed pathologically. Despite curative surgery prophylactic radiation therapy was proposed. Patient received 65 Gy of multifractioned beam irradiation on the neck. In one year patient feels good with stable normal calcium and parathormone.
Conclusion
Meticulous performing of first operation, avoiding "seeding" of tumor cells is crucial for elimination of PC. Local recurrence should not discourages repeat surgery. Radiation therapy seems useful tool for disease control.

PP152 PHPT With Pancreatitis:Atypical Presentation Of PHPT

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Background
Primary hyperparathyroidism (PHPT) is rarely associated with the occurrence of acute or chronic pancreatitis, requiring complex perioperative management.The aim of this study was to assess the prevalence and disease characteristics of pancreatitis in PHPT.
Method
This study is a retrospective analysis of the medical records of patients who were diagnosed with PHPT with pancreatitis between 1989 and 2021 in Endocrine Surgery department, SGPGI, Lucknow.
Results
Out of 494 PHPT cases,42(8.5%)were found to be associated with pancreatitis.Mean age was 33.9 years(15-65years);4 were below 20 years while 21 were =/< 30 years of age.There were 24 males & 18 females.20 cases were of acute(10acute,9recurrent acute,1acute on chronic)while 22 were of chronic pancreatitis(5 chronic calcific pancreatitis).Mean number of attacks per patient in recurrent acute pancreatitis were 2.Mean PTH levels were 66.49 pmol/l.Mean tumor size was 2.76x1.83x1.14cm while mean tumor weight was 5.04g.Nephrolithiasis was associated with 21 cases.An association with MEN-1 syndrome was seen in 1 case.Final histopathological diagnosis was parathyroid carcinoma in 2 and parathyroid adenoma in 40 cases.Normocalcemia was seen in 12,hypercalcemic crisis in 7 and 11 cases were taken up for semi-emergency parathyroidectomy.The outcome was favorable in all as none had any further attacks of pancreatitis.
Conclusion
In our study,the prevalence of pancreatitis in PHPT cases was 8.5%.Majority of patients were young.Normocalcemia was seen in 12 patients so even if calcium levels are normal,PHPT should be suspected in young patients with pancreatitis. Parathyroidectomy resulted in complete resolution of symptoms of pancreatitis in all 42 patients.

PP153 Parathyroid carcinoma and MEN1

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Background
Parathyroid carcinoma (PC) is a rare neoplasm, and its occurrence in the context of multiple endocrine neoplasia type 1 (MEN1) has been little investigated. We report a case of PC in a patient with MEN1.
Method
Primary hyperparathyroidism (PHPT) caused by a 9 cm PC was diagnosed in a 62-year-old man. His preoperative corrected calcium and intact PTH serum levels were 2,92 mmol/L and 391,7 pg/mL, respectively. The neoplastic gland was removed en bloc with thyroid and central compartment lymph nodes. Pathology confirmed PC. Post-operative calcium and PTH levels were normal. A diagnosis of MEN1 was established post-operatively.
Results
Seventeen cases of PC in patients with MEN1 have been reported in literature. 59% of patients were men, and the median age at diagnosis was 50 years, with median serum PTH of 379 pg/mL and median serum calcium level of 3,2 mmol/L.
Conclusion
The occurrence of PC in the context of MEN1 is extremely rare. Diagnosis and treatment may represent a challange, so opportune identification or suspicion of malignancy and adoption of correct surgical approach may offer affected patients the best outcome.

PP154 Differences in quality of life and neurocognitive symptoms between sporadic and familial hyperparathyroidism

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Background
The negative impact on the quality of life of patients with primary hyperparathyroidism (PHPT) has been previously investigated. However, quality of life may also be affected by other neurocognitive disorders, and differences may exist according to the sporadic or familial nature of the disease. The objective was to analyze the differences between the quality of life, mood, and sleep quality of patients with sporadic or familial PHPT and with population-based healthy sex-, age-matched controls.
Method
We included patients diagnosed with sporadic and familial PHPT. Control group: a group of healthy people paired by age and sex. Quality of life was analyzed using the SF-36 questionnaire and the PHPQoL assessment. Beck-II and Pittsburg questionnaires were also used. Socio-personal and clinical variables were analyzed. Statistical analysis: SPSS v.28, Chi square test, Student's t-test and the Mann-Whitney test.
Results
Sixty-five patients with PHPT were analyzed. A greater negative effect on the quality of life was observed in patients with sporadic PHPT compared to the familial type (44.39 vs. 68.08; $p<0.001$). Greater mood impairment (in the range of mild depression) was also evident (16.69 vs. 6.93; $p<0.001$). The Pittsburgh index also showed greater sleep impairment in patients with sporadic PHTP (9.57 vs. 6.21; $p=0.015$).
Conclusion
Patients with sporadic PHPT present with a poorer quality of life, mood and sleep quality compared to cases with familial PHPT. Socio-personal and clinical differences could influence these results.

PP155 Do we need to determinate intraoperative PTH routinely?

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Background
Primary hyperparathyroidism is caused by a benign parathyroid adenoma in 80% of cases, by a multigland disorder in 15%-20%, or a parathyroid carcinoma (1%).
At this moment, the combination of two imaging techniques, cervical sonography and Sestamibi imaging, has a high sensitivity (around 95%), to predict the affected gland. For that, the routinely use of intraoperative PTH is been disputed.
Method
A retrospective review and descriptive analysis were carried out using data collected from patients who were diagnosed with primary hyperparathyroidism from January 2006 to May 2021.
All the patients had preoperative imaging techniques (Sestamibi imaging and cervical sonography) and PTH intraoperative levels before parathyroidectomy according to Miami criteria.
Results
Our series is composed of 322 patients, 92 of them were men (28,6%) and 230 women (71,4%), the medium age was 58,2 years. In 273 cases (84,8%), patients were diagnosed with only one affected gland and they underwent to selective parathyroidectomy. In all the cases, intraoperative PTH was determinate, finding a correct decrease in 94,5% of the cases, according Miami criteria.
In the 7 cases (5,5%) that the PTH didn't descend, 7 patients were diagnosed with persistent hyperparathyroidism. In 3 cases, the persistence or the reappearance was due to multigland affectation, in 3 cases due to an ectopic location and 1 case the pathologic gland wasn't detected and the patient received medical treatment. The other 9,45% patients were considered cured.
Conclusion
Due to our good results, we think that patients diagnosed with an only adenoma don't need the routinely intraoperative PTH determination.

PP156 Our experience about primary hyperparathyroidism

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Background
Primary hyperparathyroidism is an increase in parathyroid hormone (PTH) levels in the blood, due to a disorder either within the parathyroid glands (primary hyperparathyroidism) or outside the parathyroid glands (secondary hyperparathyroidism). Primary hyperparathyroidism is caused by a benign parathyroid adenoma in 80% of cases, by a multigland disorder in 15%-20%, or a parathyroid carcinoma (1%).
Method
A retrospective review and descriptive analysis were carried out using data collected from patients who were diagnosed with primary hyperparathyroidism from January 2006 to Juny 2021.
Results
Our series is composed of 322 patients, 93 of them were men (28,8%) and 234 women (72,2%), the medium age was 59,3 years. The serum calcium level was including between 8,6 to 15,7, and PTH levels were 68 to 1512.
Our patients underwent to open surgery in 206 cases, and minimally invasive surgery in 121 cases, with a conversion rate of 14,8%. The excision of one gland was performed in 278 cases, two glands in 34 and subtotal parathyroidectomy in 15 cases. In all the cases, intraoperative PTH was determinate, finding a correct decrease in 282 cases (87,6%), according Miami criteria.
The most frequent pathologic result was adenoma, followed for hyperplasia.
We found 3 cases of reappearance and 11 of persistence, and the other 308 (95,6%) patients were considered cured. 4 of our patients were diagnosed with MEN1 syndrome, and 6 had a genetic study positive of HPTR2.
Conclusion
Our results are similar to the results published in the literature.

PP157 The importance of the determination of ionized calcium for the diagnosis of primary hyperparathyroidism

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Background
One of the most important issue in patients with normocalcemic primary hyperparathyroidism is the bias in correctly classifying the patient. The measurement of blood ionized calcium levels, which ultimately is the active form, does not always exactly correlate with the corrected calcium measurement.To properly characterise this entity, we should ideally have both measurements, and we designed a study which they have been included prospectively.
Method
After excluding patients with secondary hyperparathyroidism, we included prospectively all patients referred for surgery for primary hyperparathyroidism (PHPTP) between January 2015 and December 2017. Patients were divided into 2 groups (hypercalcaemic (hPHTP)/normocalcaemic (nPHPT)).
Results
104 patients were included. By initially considering only corrected calcium levels, 45 patients (43.3%) were classified as normocalcaemic. When including the ionized calcium levels as an inclusion criterion, however, 64% of the patients who were initially classified as normocalcaemic had high ionized calcium levels and were ultimately considered to be hypercalcaemic. There were no differences in the imaging studies, the incidence of multiglandular disease or the weight of adenoma in cases of adenoma. Bone involvement as measured by densitometry was similar.
Conclusion
Most patients with apparent nPHPT have elevated ionized calcium levels. The improvement in diagnostic sensitivity supports the use of ionized calcium levels in patients suspected to have nPHPT. When these patients' diagnosis and classification is accurate, their clinical presentation and symptoms are similar to those of the classical form.

PP158 Differences in primary hyperparathyroidism between children, adolescents and adults

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Background
Beside increased awareness of primary hyperparathyroidism (pHPT) in juveniles, this condition is still extremely rare. The aim was to compare clinical and biochemical characteristics between children, adolescent and adult pHPT patients.
Method
Retrospective case-control study was conducted from 2004 until 2021 in high volume endocrine surgery center. For every child (≤15 years) and adolescent (>15 and ≤20 years) two patients from adult group (>20 years) were matched by the date of operation.
Results
During the study period a total of 1568 pHPT patients were surgically treated. There were 6 patients in children group and 9 patients in adolescent group, representing a total of 1% of all pHPT patients. Female-to-male ratio in children group was 1:2, in adolescent group 2:1 and in adult group 8:1 (p=0.001). Kidney form of the disease was the most common in children (83%), bone form in adolescents (55%) and asymptomatic in adults (39%). Preoperative PTH and serum calcium levels were higher in children than in adolescents and adults (812 ng/L and 3.87 mmol/L; 365 ng/L and 3.14 mmol/L; 332 ng/L and 2.96 mmol/L, p=0.037 and 0.001, respectively). Parathyroid adenoma was the most common pathohystology finding in all three groups (66%, 89% and 93%, respectively). Interesting finding of the study was the case of parathyroid carcinoma in a 15-years-old girl.
Conclusion
Clinical manifestations of pHPT are different between children, adolescents and adults. The disease is more severe with often end-organ damages in younger age, so this should be considered during management of these patients.

PP159 "Starry Sky" autofluorescence in parathyromatosis – a case report

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Background
Parathyromatosis is a rare cause of a recurrent hyperparathyroidism, due to parathyroid tissue seeding. We report a case with this condition and provide intraoperative photographs with multiple implants of scattered parathyroid tissue, together with the corresponding 18F-Choline PET-CT and its autofluorescence and histopathologic images.
Method
A 61-year-old women with MEN 1 disease presented with a recurrence of primary hyperparathyroidism. She had been operated for pHPT 20 years ago by total parathyroidectomy with partial autotransplantation of parathyroid tissue in the left forearm. Over time she slowly developed a biochemical recurrence. A 18F-Choline-PET-CT identified multiple choline-avid foci in the neck. On cervical exploration, multiple implants of parathyroid tissue were found, scattered in the former operation field. The inspection of the operating field with the fluorescence camera showed a hitherto unseen, impressive "starry sky" appearance with a multitude of fluorescent spots.
Results
We performed a right hemithyroidectomy with central lymphadenectomy removing all visible manifestations of the parathyromatosis. As it is well known and therefore not unexpectedly, the further course showed a partial biochemical persistence, despite the fact that the postoperative 18F-choline- PET- CT did not reveal any further foci.
Conclusion
Parathyromatosis is a rare but challenging cause of recurrent hypoparathyroidism. Radical resection of all macroscopic foci represents a first-line treatment, although biochemical cure is rarely achieved. In this rare form of pHPT recurrence, 18-Choline PET-CT and autofluorescence imaging could be important tools for surgical planning and as an orientation aid in the surgical field.

PP160 Metastasis to the parathyroid adenoma – case report

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Background
The primary hyperparathyroidism can be caused by an adenoma, hyperplasia or cancer. The parathyroid cancer is rare, even rare is metastasis to the parathyroid adenoma.
Method
Between 1994-2020 we have performed 3201 operations (including reoperations) for the diagnosis of primary hyperparathyroidism, only in one case we find a metastasis to the parathyroid adenoma.
Results
We described a 72 years old patient, who was operated for primary hyperparathyroidism. According to the definitive histological examination, the adenoma of the parathyroid gland was present, in which adenocarcinoma was found. Due to the immunoprofile of tumor cells, the primary origin of the tumor was in the lungs likely. Added PET / CT examination, where two foci of hypermetabolism in the right upper lobe of the lung were described. Patient was indicated for lung resection - upper right lobectomy with lymphadenectomy. After histological examination, primary adenocarcinoma of the lung was confirmed, in 2 lymph nodes there were metastases of the tumor. Chemotherapy followed. Now the patient is two years after the first operation for primary hyperparathyreoidism without recurrence of diseaeses.
Conclusion
So called a "tumor to tumor" metastasis is very rare.

PP162 Parathyroid search algorithm for the young surgeons in the Primary Hyperparathyroidism

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Background
Primary Hyperparathyroidism (PHPT) is a common endocrinological process. Parathyroidectomy is the only curative approach.
Over the past 15 years, trends in the approach to surgery have changed substantially from the majority of surgeons performing four gland explorations. Actually, most surgeons performed focused explorations thanks to imaging tests and intraoperative PTH. Consequently, experience in performing bilateral neck exploration is waning, impacting on the training of young surgeons.
Method
The objective of this presentation is to show a search algorithm for the parathyroid glands in PHPT.
Results
Steps for the parathyroid search
1.Check **normal** locations: superior parathyroid gland (SPG) 80% within 1cm cricothyroid cartilage junction. Inferior parathyroid gland (IPG) 50% within 1cm inferior pole.
2.Check **extended normal** locations: SPG 15% on posterolateral surface of upper half of thyroid lobe. 3% retroesophageal, 1% above superior pole. IPG: 25% thyrothymic horn, 12% > 1cm lateral to inferior pole, 8% median on trachea
3.Check **ectopic** locations: SPG: < 1% intrathyroidal, <1% associated with carotid or lateral scalene fat pad. IPG: 3% anterior mediastinum, lower thymus, 1% undescended (carotid bifurcation, hyoid, associated with thymus remanent), 1% subcapsular or intrathyroidal.
4.Check **acquired migrated** locations: SPG: 40% on the prevertebral fascia in a para- or retroesophageal. IPG: Rare, anterior mediastinum.
5. If three glands found, consider lobectomy
6.If four glands found, consider fifth gland, explore and resect bilateral thymus.
Conclusion
It is important to know the different locations of the parathyroid glands in PHPT and to carry out systematic search to have a higher cure rate.

PP163 Osteitis Fibrosa Cystica A rare presentation of Primary Hyperparathyroidism

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Background
Osteitis fibrosa cystica (OFC) is the most serious bone involvement of primary hyperparathyroidism (PHPT), it is characterized by subperiosteal resorption, lytic lesions and the appearance of brown tumors. Its prevalence in developed countries is only 5%.
Method
A presentation case
Results
58-year-old woman, who came to the Hospital with pain in her right shoulder after an accidental fall. The humerus radiograph shows a pathological fracture. In the analysis, serum Calcium 13.3 mg/d, Phosphorus 2.4 mg/dL, Alkaline Phosphatase 248 U/L and normal kidney function. With a diagnosis of severe hypercalcemia, treatment was started with serum therapy and intravenous diuretic with a decrease in calcemia. Later, she was admitted to the Internal Medicine hospital ward to perform a differential diagnosis of hypercalcemia secondary. The study findings are: PTH 660 pg/ml, 25 Hydroxyvitamin D: 14. Thyroid ultrasound: Posterocaudal to right thyroid lobe, an area which could correspond to a parathyroid adenoma.
Body CT: Lytic lesions with a tumor aspect in the humerus and right scapula. Diffuse increase in bone density of the calvaria, showing multiple punctate lytic lesions with a permeative appearance. With the diagnosis of PHPT causing OFC, surgical intervention was decided. A selective right approach was performed, finding a large parathyroid adenoma weighing 17 grams. PTH fell to 36 pg/ml after surgery. Actually, the patient presented calcium levels of 9 mg/dl and PTH 146 pg/ml.
Conclusion
OFC is rare in our environment; it is often confused with other neoplasms. After parathyroidectomy, patients with PHPT have a marked and sustained recovery.

PP164 Acute hyperparathyroid crisis

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Background
Our aim was to identify and analyze patients with acute hyperparathyroid crisis managed during the period 2011-2020.
Method
Data of all operated primary hyperparathyroidism cases in our department are prospectively collected.
Results
During the 10-year study period, 350 primary hyperparathyroidism patients underwent parathyroidectomy. Five (1.4%) of them presented with acute hyperparathyroid crisis and composed our study group (mean age:50±6.5years, male:80%). All were symptomatic with main symptoms involving the musculoskeletal (80%) and urinary system (60%) with a duration of 3.8±0.4years. Mean preoperative PTH was 644.8±25.7pg/ml, serum calcium 16.1±0.8mg/dl, and 24hour urinary calcium 649.4±20.6mg. Sestamibi scan and ultrasound accuracy was 85.7% and 71.5%, respectively. Following successful management of acute hyperparathyroid crisis, all cases were operated. Four patients underwent bilateral and one unilateral exploration. One abnormal parathyroid was removed in 3 and two abnormal glands in 2 cases which was confirmed with frozen section. Three (43%) of the 7 glands were ectopic. In all patients, intraoperative PTH as well as postoperative PTH and calcium values confirmed the successful removal of the abnormal parathyroids. Postoperatively all cases suffered from symptomatic hypoparathyroidism. Pathology reported the diagnosis of single adenoma in 3 (60%), double adenoma in one (20%) and hyperplasia in one (20%) (mean diameter:3.4±0.5cm, weight:5102±255.3mg). During the short 60.7±5.6months' follow-up period no recurrence has occurred so far.
Conclusion
Acute hyperparathyroid crisis is an infrequent potentially life-threatening manifestation of primary hyperparathyroidism. Urgent prompt management together with thorough investigation based on a multidisciplinary approach is required for the successful outcome of these cases.

PP165 Giant mediastinal parathyroid adenoma. Review of literature

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Background

The aim of this study is to present an infrequent case of a giant mediastinal parathyroid adenoma.

Method

A 50-year-old male with personal history of bone disease and nephrolithiasis was referred to our outpatient clinic with a diagnosis of primary hiperparathyroidism.The blood test revealed hypercalcemia,hypophosphatemia and elevated PTH (446pg/mL).

Cervical ultrasound (US)revealed a normal thyroid without nodules and no evidence of parathyroid adenoma. 99mTc-sestamibi scintigraphy (MIBI) scan revealed a hyperfunctioning lower right parathyroid gland.

The patient underwent a neck exploration and a giant parathyroid adenoma was found in the upper mediastinum,which was excised.Its dimensions were 4.5×3.8cm and it weighed 11grams.Intraoperative PTH levels were measured and revealed a gradual reduction.Histological examination confirmed the diagnosis of a parathyroid adenoma.There were no postoperative complications and the patient was discharge on first postoperative day.

Results

Parathyroid adenomas are usually small,measuring <2cm and weighing <1grams.Giant adenomas (GPTA) are rare,weighing more than more than 3.5 grams,and occur more often in men.

Parathyroid glands are known to be occurring in aberrant locations,mainly in the thyroid parenchyma and less commonly in the mediastinum.The imaging studies most commonly used for localization are cervical US and MIBIscan.The limitation of cervical ultrasound is that it may not show findings when the adenoma is ectopic,as in our case. MIBI scans are more likely to localize GPTA in patients with higher preoperative PTH and larger GPTA size.

Conclusion Parathyroid adenoma is the most common cause of primary hyperparathyroidism,but GPTAs are very rare.Its ectopic location in the mediastinum is common due to its weight gain,negative intrathoracic pressure, and esophageal movement.

PP166 Minimal invasive parathyroidectomy and intraoperative parathyroid hormone monitoring

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Background
In patients with primary hyperparathyroidism (PHP), intraoperative parathyroid hormone (ioPTH) monitoring is an adjunct in clearly radiologically located adenoma for confirming (true positive-TP) adequate minimal invasive surgery. We retrospectively evaluated the risk for false negative results (FN: no significant decrease of ioPTHi despite healed disease) and analyzed the possible causes
Method
Since 2005 and introduction of minimal invasive surgery (MIS), by mini-cervicotomy (MIC) or cervicoscopy (CS), 470 patients were operated for PHP, 302 with MIS, of which 293 with ioPTH. All had imaging including ultrasound, MIBI-scan and F-choline PET (in negative or inconclusive MIBI). The ioPTH results were evaluated by Vienna criteria (decay ³ 50% from baseline value within 10 min) and Halle (decay to normal range within 15 min)
Results
Surgery included 205 MIC (8 converted to cervicotomy) and 88 CS (24 converted to MIC), 21 locoregional anesthesia (3 converted to general anesthesia). Overall success rate was 291/293 (2 patients successfully re-operated later). Respectively, analysis based on Vienna & Halle criteria showed FN results in 49 & 57 patients, positive predictive values of 99.2 % & 99.1%, negative predictive values of 7.5% & 6.6% and accuracy of 82.6% & 79.9% respectively. Size of glands, P3/P4 gland, preoperative calcium and preoperative PTH value did not significantly discriminate FN from TP
Conclusion
without challenging non-decreasing ioPTH in highly selected patients for MIS, unnecessary full explorative cervicotomy would have been performed in 49 or 57 patients. No identified risk factor could explain these FN patients.

PP167 Association between breast cancer and primary hyperparathyroidism

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Background
Past studies have shown concomitant breast cancer (BC) and primary hyperparathyroidism (pHPT) but without any definitive evidence of common etiological pathway. Our aim was to evaluate this association using data in a tertiary centre
Method
Retrospective analysis (2002-2020) of all patients surgically treated for pHPT (group 1) or BC (group 2) and a crossover group 3 (BC and pHPT)
Results
Distribution of 4953 patients: 430 in group 1, 4523 in group 2 and 16 in group 3. Age at diagnosis did not show any significant difference between groups 1 and 3. Date of diagnosis for pHPT preceded the one for BC in 75% of the cases. Mean calcemia and parathormone levels were significantly higher when comparing groups 1 and 3. When comparing group 3 with incidence rates of pHPT and BC in the Swiss population for each group age, pHPT was 3 times higher and incidence of BC in the pHPT population was 10 times higher. These results should be viewed with caution, given the small number of patients in group 3
Conclusion
Due to the sample of group 3, we cannot conclude on a definitive association between pHPT and BC. Other studies with stronger results showed that pHPT should be considered as a possible cause of hypercalcemia in patients with non-aggressive BC. We suggest that all BC patients have a baseline serum calcium levels and in case of elevation without evidence of metastatic involvement, a serum PTH levels being checked. MIBI-scans are also able to identify BC incidentalomas.

PP168 Ectopic intravagal adenoma causing persistent severe hyperparathyroidism

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Background
Persistent hyperparathyroidism after surgical management occurs in about 3-6% of cases and failure to cure are usually due to an unidentified ectopic or supernumerary gland. Intravagal parathyroid adenoma are rare and can lead to unsuccessful surgical treatment.
Method
We present the case of a 49yo woman with persistent primary hyperparathyroidism after multiple ineffective attempts of surgical treatment.
Results
The patient was diagnosed with primary hyperparathyroidism at the age of 22 and between 1994 and 2004 she underwent two cervical explorations with resection of the thyrothymic ligaments. Because of a persistent hyperparatyroidism a further mediastinoscopy followed by a thoracoscopic thymectomy were performed without identification of pathological parathyroid tissue. As complications of the persistent hypersecretion she developed a severe hypercalcemia, recurrent nephrolithiasis, chronic pancreatitis, osteoporosis, gastric ulcer, depression and musculoskeletal pains. By consequence, 15 years after the last surgery, radiological studies (cervical ultrasound, 99m-Tc-Sestamibi scan and 18F-fluorocholine PET/CT) were repeated. The 18F-fluorocholine PET showed a spot of high uptake 2cm cranially to the carotid bifurcation. A left submandibular latero-cervical exploration was performed and an intravagal autofluorescent oval structure was resected. The PTH value at the first postoperative day came back to normal and the patient went home at D7 with a left recurrent nerve palsy. The istopathological analysis confirmed a hyperplastic parathyroid gland.
Conclusion
The high accuracy of 18F-fluorocholine in detecting parathyroid adenoma together with the use of intraoperative autofluorescence provide the opportunity to improve the surgical management of patients with persistent hyperparathyroidism due to ectopic localization.

PP169 Vitamin D deficiency reduces risk of protracted post-thyroidectomy hypoparathyroidism. Is pre-thyroidectomy parathyroid preconditioning possible?

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Background
Introduction:
Hypoparathyroidism(hypoPTH-PT) is the most frequent complication after total thyroidectomy(TT) but its recovery mechanisms remain unknown. Secondary hyperparathyroidism due to Vitamin D deficiency is well documented but its role in hypoPTH-PT recovery process is not documented.
Objectives: To assess whether preoperative vitamin D values(preVitD) influence on hypoPTH-PT evolution.
Method
Methods:
Retrospective study including all TT from May-2014/June-2019, regardless etiology and including any kind of lymphadenectomy. Definitions: HypoPTH-PT:iPTH <14 pg/mL 24h after surgery. Definitive hypoPTH-PTH>365 days, transient hypoPTH-PT:<365 days; Protracted HypoPTH-PTH:>30 days but <365 days.
Results
Results:
402 patients were initially collected, 1.26% remained hypoPTH-PT at last visit. Transitory hypoPTH-PT rate:37%(53.1% protracted). After exclusions 369 patients remained. PreVitD levels did not correlate with hypoPTH-PT(transient/definitive) development. Analyzing transient hypoPTH-PT subgroup, preVitD levels<20 ng/mL were associated with faster parathyroid function recovery: median recovery:19vs35 days,p=0.03). Univariate analysis reveals preVitD median value was lower in transient hypoPTH-PT<30 days group compared to protracted hypoPTH-PT(19.7vs23.9,p=0.010). Furthermore percentage of preVitD deficiency patients was significantly higher in transient hypoPTH-PT(<30 days) (55.2%vs31.5%,p=.010). Although median iPTHio drop were less in hypoPTH-PT<30 days (89.6%vs94.6%,p0.002), multivariate analysis revealed that preVitD deficit acted as protective factor for protracted hypo-PTH development (Odds ratio(OR)0.52,p=0.021) while lymphadenectomy (OR2.4,p=0.003) and female sex (OR2.4,p=0.05) acted as risk factors.
Conclusion
Conclusions:
Among patients with transient hypoPTH-PT, preVitD deficiency appears to protect against protracted hypoPTH-PT, promoting faster recovery. Underlying mechanisms may have biological implications and clinical application, wondering if any kind of parathyroid preconditioning prior to TT may be possible.

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Background
Non-functional cysts of parathyroid glands are rare clinical entity that account for 0.6% of all thyroid and parathyroid masses.. Signs and symptoms can occur in these patients when cysts became large, usually signs arrive because of compression of trachea or esophagus.
Method
We present a patient with big cystic formation of parathyroid gland. 38-years old male had problems with swallow and hard breathing. Ultrasonography and computer tomography of neck revealed large hypodense lesion behind right lobe of thyroid gland, that lowers down in anterior mediastinum. The size of parathyroid gland was 105x88 mm. After Fine needle aspiracion biopsy in evacuated fluid level of parathyroid hormone was 340 ng/L. MIBI Scintigrafy showed affunctional zone in right lobe of thyroid gland. Preoperative values of calcium was 2,42 mmol/L, level of phosphorus was 37,8 mmol/L, and level of serum parathyroid hormone was 37,8 pg/mL.
Results
We operated the patient, evacuated a cyst with macroscopic size of 80x65x60 mm with thin wall, pathohistological finding confirmed cyst of parathyroid gland. Patient was discharged from hospital at second postoperative day.
Conclusion
Every non-functional, anechoic, hypodense lesion in the neck must be evaluated with ultrasound and fine needle aspiration biopsy. High level of parathyroid hormone in evacuated cysts must arouse suspicion of parathyroid cyst. Operation must be done by experienced endocrine surgeon to avoid cyst rupture and potential complications (parathyreomatosis, recurrent nerve injury).

PP171 What can we expect from ^{18}F-fluorocholine PET/ CT localization in PHPT?

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Background

Our study describes biochemical characteristics and postoperative histopathological results of patients who underwent surgery for PHPT and ^{18}F-choline PET /CT for preoperative parathyroid localization, as compared to the gold standard.

Method

Patients with PHPT and indication for parathyroidectomy during 2021 in three tertiary hospitals were included. Two groups were stablished according to preoperative parathyroid imaging.^{18}F-choline PET /CT was performed when other localization modalities were negative or discordant.

Results

Preliminary results show that of 65 patients who underwent parathyroidectomy, 26 had a ^{18}F-choline PET /CT. ^{18}F-choline PET /CT localized hyperfunctioning parathyroid tissue in 24/26 (92%). 69% of them, a selective or unilateral approach was performed, and 31% underwent a bilateral exploration. In choline subgroup, 4 presented multiglandular disease, compared to 2 in the other subgroup. The pathological study showed: 63% adenoma in choline subgroup vs 97% in the other subgroup; and 31% vs 0% hyperplasia respectively. Median gland weight was lower in choline subgroup (445.5 mg [80-5000] vs 720 mg [180-7560] p= 0.01). Median calcium level was lower in choline subgroup (10.5 mg/dl [9.4-11.2] vs 10.7mg/dl [9-13] p= 0.04), while postoperative (<24h) PTH level was higher (31.1 pg/dl [7.8-130] vs 22.5 [5-167.7] p=0.03).

Conclusion

^{18}F-choline PET /CT is an anatomical and functional study that allows abnormal parathyroid gland identification in patients with PHPT and negative or discordant first line localization modalities. According to our results, these glands present a lower weight and are associated with lower preoperative calcium levels.

PP172 Postoperative parathyroid hormone as an early predictor of postoperative hypocalcemia and persistent hypoparathyroidism

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Background
Hypocalcemia and persistent hypoparathyroidism over 6 months (HypoPTH_6), are the main complications after thyroidectomy, as results of parathyroid injuries. Parathyroid hormone (PTH) represents a marker of parathyroid function. In this study data, prospectively collected, are retrospectively analyzed with the aim to identify the best PTH cut-off, 4 hours after surgery (PTH4), as a predictor of these complications
Method
293 patients were enrolled, PTH was evaluated preoperatively, 4 hours and 6 months after surgery. Calcemia was registered preoperatively, after 24 hours (Ca_IGPO), and 6 months (Ca_6m) from surgery: calcemia below 8.5 mg/dl was considered hypocalcemia. ROC analysis was run to define the best cut-off values to predict postoperative hypocalcemia and HypoPTH_
Results
A correlation between PTH4 and Ca_IGPO was identified, as well as PTH4 and HypoPTH_6. PTH4 cut-off values to predict hypocalcemia and HypoPTH_6 were 10.5 pg/ml (sensibility 85.7%, specificity 70%) and 4.5 pg/ml (sensibility 83.2%, specificity 50%) respectively, according to the ROC analysis. Moreover, Ca_IGPO was found to be correlated to Ca_6m, being the predictive cut-off value 8.68 mg/dl (sensibility 65%, specificity 83.3%). These cut-off values were used to develop a final test combining PTH4 and Ca_IGPO in series (sensibility 50%, specificity 83.2%) and in parallel (sensibility 83%, specificity 61.7%)
Conclusion
Postoperative hypocalcemia and HypoPTH_6 are correlated to PTH4 levels, however low sensitivity and specificity preclude the use as predictor in clinical settings

PP173 Leontiasis Ossea: A forgotten late complication of long-standing secondary heprparathyroidism

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Background
Leontiasis ossea is a term first coined by Virchow in 1864 and is a rare late complication of secondary hyperparathyroidism characterized by progressive increase in size of facial bone structures which eventually leads to severe disfigurement, exophthalmos, loss of vision and respiratory distress. The incidence of this complication has been gradually reduced due to better medical control of secondary hyperparathyroidism. Herein we present a case of leontiasis ossia as a consequence of long-standing poorly controlled hyperparathyroidism.
Method
A 56-year-old male patient with end-stage renal failure and severe uncontrolled secondary hyperparathyroidism presented emergently due to progressive enlargement of the upper mandible and facial disfigurement that caused respiratory disturbances and difficulty in eating.
Results
At admission serum parathormone levels were 3400 pg/mL with normal calcium levels of 8.6 mg/dL. Low-dose skeleton CT imaging revealed diffuse disruption of bone architecture with salt-and-pepper appearance of the skull bones and generalized osteopenia. Sestamibi scanning demonstrated a hyperfunctioning lower right parathyroid gland. The patient underwent neck exploration subtotal (3 and 1/2) parathyroidectomy with a fragment of the most normal appearing gland left in situ. Postoperatively, “hungry bone” syndrome ensued, with a nadir of serum calcium levels at 6.9 mg/dL, which was managed with oral calcium supplementation. Two years postoperatively, the patient’s condition is stable with regression of the craniofacial disfigurement.
Conclusion
Leontiasis ossea is an extremely rare condition in the current era of medical management. Timely surgical intervention is mandated to avert disease progression that leads to airway compromise.

PP174 Preserving the parathyroid vascular pedicle may be the answer to postoperative hypocalcemia

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Background
Hypoparathyroidism after total thyroidectomy remains the most common complication. We describe our experience in preserving the parathyroid pedicles coming from the inferior thyroid artery(ITA). Our aim was to assess the feasibility of the technique and postoperative hypoparathyroidism rates.
Method
Consecutive patients undergoing total thyroidectomy(with or without central lymphadenectomy) were included. Operative technique was standardized amongst two Endocrine Surgeons (recognition, dissection and preservation of parathyroid pedicles). Capsular dissection was employed where pedicle recognition was not achieved. Data collection was retrospective from a prospectively maintained database. Demographic, pathological, operative and biochemical parameters were collected and subgroup outcomes were compared.
Results
54 patients were included in the study, 37 were female(68.52%), 38 underwent central compartment lymphadenectomy(70.37%) and 19(35.19%) had thyroiditis. In 51 patients (94.44%) it was possible to preserve at least 1 parathyroid pedicle. Of those, 48 patients (94.12%) had normal post-operative parathyroid function and 3 patients (5.88%) had temporary hypoparathyroidism. None of the patients suffered from persistent hypoparathyroidism. Of the 198 recognized parathyroid glands, 134 had successful anatomical preservation of the parathyroid pedicle(corrected success rate of 84.60%). Feasible recognition of parathyroid pedicles was only possible in 44.44% of identified parathyroid glands, in obese patients with thyroiditis.
Conclusion
Anatomical preservation of the parathyroid pedicles, despite its high surgical demand may be a promising technique, avoiding permanent hypoparathyroidism. Feasibility is determined by patient and disease-related factors. Larger scale studies are needed to further investigate the usefulness of the technique.

PP175 Parathyroid carcinoma: a single center experience

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Background
Parathyroid carcinoma (PC) is a rare neoplasm, found sporadically or within genetic syndromes, whose management is challenging because of the lack of reliable features to distinguish malignant from benign disease.
Method
From 2013 to 2021, four PC were treated at our Academic Hospital. In only one case diagnosis was preoperatively suspected by citology.
Results
Case 1: A 62-year-old man was admitted for left-sided palpable neck mass, hypercalcemia and elevated PTH. FNA revealed suspected PC. A huge cystic mass (9 cm. of diameter) was excised *en bloc* with thyroid; a central neck limphadenectony (CNL), a microurgical dissection from the adherent oesophagus were performed. Genetic studies and pathology confirmed PC within MEN1. Case 2: A 48-year-old woman underwent total thyroidectomy (TT) for a suspected right thyroid lesion that microscopically proved to be PC. Case 3: A 47-year-old man was admitted for primary hyperparathyroidism with severe hypercalcaemia and kidney failure. A suspected parathyroid adenoma in the right lower position was removed by minimally invasive approach. Pathology revealed PC and patient had completion hemithyroidectomy and CNL. Case 4: A 65-year-old man suffering from polycystic kidney disease, renal failure, goitre, and tertiary hyperparathyroidism underwent TT, parathyroidectomy and CNL for suspected PC, pathologically confirmed, in the left lower position.
Conclusion
PC should be suspected when severe hypercalcemia and cervical mass are associated with kidney and skeletal disease. Parathyroid surgery remains the mainstay of treatment. Prognosis is determined by the extent of surgery and the referral to endocrine surgery centres.

PP176 PTH variation vs PTH4h as predictive factors for hypocalcemia after thyroid surgery

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Background
Hypocalcemia is the most frequent complication of thyroid surgery. With the purpose of early identification and treatment of hypocalcemia, avoiding unnecessary supplementation and supporting early discharge, the interest in predictive factors has increased.
In a center with routine measurement of PTH 4hours after the surgery (PTH4h), the authors evaluate and compare the predictive role of perioperative PTH variation.
Method
Retrospective study including patients submitted to total thyroidectomy/totalization procedures between March 2016 and December 2020 that had measured PTH in the pre- and postoperative period.
The patients were categorized into 3 groups according to postoperative calcium (Ca24h): A ≥8.5mg/dl; B 7.8 – 8.4mg/dl; C ≤7,7mg/dl.
Results
In the presented study 143 patients were selected (18 males, 125 females; mean age 58 years; 129 thyroidectomies, 14 totalization procedures) and divided into group A 42%, B 41% and C 17%.
The mean PTH4h was 46pg/mL, 31pg/mL and 18pg/mL in groups A, B and C, respectively. The PTH variation was 7%, -39% and -63% in groups A, B and C.
In the linear model, PTH4h and PTH variation explained 14,7% and 20,2% of Ca24h variation, respectively ($p < 0,001$).
A cut-off with acceptable sensibility and specificity can be defined [-82,59; -64,95]% for PTH variation and [9,65; 18,66]pg/mL for PTH4h.
Conclusion
In our study perioperative PTH variation seems to predict more accurately postoperative hypocalcemia, enabling the identification of patients with higher risk. However, one limitation to be pointed is the timing variability of preoperative PTH measurement.

PP177 Evaluation of the diagnostic power of the different samplings in intraoperative parathyroid hormone monitoring performed according to the Rome criterion in primary hyperparathyroidism

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Background
Intraoperative parathyroid hormone (ioPTH) allows to verify the procedure's efficacy. Aim of this study is to evaluate diagnostic accuracy of the Rome criterion, one of the validated protocols for ioPTH, also verifying the diagnostic power of the individual assays
Method
Two hundred and five patients operated from 2013 to 2020 for single parathyroid adenoma were included. Age, sex, year of surgery, baseline PTH (bPTH), PTH value 10 minutes after Parathyroidectomy (ioPTH-10), PTH value after 20 minutes after (ioPTH-20), surgical technique, ultrasound and scintigraphy results, their consistence, histology were evaluated
Results
From univariate analysis the variables at risk of persistence were: sex (Males versus Females), ioPTH-10, ioPTH-20, US (nondiagnostic) Scintigraphy (nondiagnostic), US+Scintigraphy (inconsistent) and intrathyroid localization. The accuracy of ioPTH-10 and ioPTH-20 were compared with baseline by ROC curves. Multivariate logistic regression showed that the decrease rate ioPTH-20/bPTH ($p<0,05$) and scintigraphy ($p<0.05$) were at risk for persistence. The ratio ioPTH-20/bPTH in the Rome criterion showed the highest diagnostic power. This finding was not influenced by type of surgery, histology nor intraoperative localization of the adenoma, which was significantly associated with the successful procedure but independently of ioPTH
Conclusion
The Rome criterion has shown its high reliability in detecting persistence. The ratio ioPTH20/bPTH is by far the best performing. Further studies are needed to evaluate whether ioPTH10 can be considered nonessential, resulting in reduced procedure costs

PP178 Our experience in the management of parathyroid carcinoma

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Background
Parathyroid carcinoma (PC) represents only 0.005% of all cancers and less than 1% of primary hyperparathyroidism. Lymphatic dissemination and distant metastasis rates are low at diagnosis. The aim of this case series is to present our experience in the management of PC during the last 10 years.
Method
We report 5 patients (four men and one woman), with a mean age of 46 years (range: 37-52), operated between January 2011 and March 2021 and followed up to the present. 80% of patients (n=4) had calcemia >14 mg/dl and PTH >1,000 pg/ml, with associated symptoms (two hypercalcemic crisis, and two nonspecific digestive discomfort and generalized osteomuscular pain). MIBI scintigraphy and cervical ultrasound were used to locate the pathological gland, and intraoperative PTH monitoring was performed. One patient was diagnosed in the anatomopathological study of a hemithyroidectomy with parathyroidectomy for follicular proliferation in cytology.
Results
In all cases, a parathyroidectomy associated with an ipsilateral en bloc loboisthmectomy was performed. Two patients remain with normal PTH and without local recurrences in imaging tests during a follow-up period of 10 and 1 year. Two patients have been reoperated up to 4 times for recurrences in a period of 10 and 8 years. One patient presents with elevated PTH after surgery in March 2021.
Conclusion
PC has low malignant potential and 10-year survival of up to 77%. However, it presents high local recurrence rate (approximately 50%), requiring long-term follow-up.

PP179 Serotonin syndrome after use of methylen blue in parathyroidectomy

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Background
Methylene blue is a potent inhibitor of monoamine oxidase A. In addition, it is a dye that has the property of being easily absorbed by endocrine tissues. Its affinity for parathyroid tissue is related to the size of the gland. Its intraoperative use to locate parathyroid adenomas is wide. Multiple side effects have been described in relation to its use together with antidepressant medications.
Method
To present a clinical case of neurological alteration after perioperative use of methylene blue.
Results
A 71-years old woman with depression on clomipramine treatment, hypertension, osteoporosis and hypercalcemia and primary hyperparathyroidism. Sestamibi parathyroid scanning localized an adenoma to the right inferior neck. The patient underwent an uneventful right inferior parathyroidectomy with the use of rapid-infusion intravenous methylene blue at 5mg/Kg weight.
After surgery, the patient presents a low level of consciousness, generalized hypotonia and altered eye movements. A normal CT scan, head MRI, and lumbar puncture are performed. Progressive and complete improvement 48 hours after surgery with a diagnosis of serotonin syndrome due to a probable drug interaction with methylene blue and clomipramine.
Conclusion
The side effects of methylene blue appear to be dose dependent. Its use has been described at a dose of 0.4mg/Kg associated with the use of near-infraread fluorescence. However, the use of methylene blue in association with any antidepressant should be avoided or its use should be discontinued 4 weeks before surgery. The diagnosis should be considered in patients with autonomic, neuromuscular or neurological changes and should be managed accordingly.

PP180 Transoral endoscopic parathyroidectomy, vestibular approach (toepva); a video case presentation

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Background
With concordant pre-operative localization using Technetium 99m sestamibi scintigraphy and ultrasonography, transoral endoscopic parathyroidectomy via vestibular approach (TOEPVA) can be performed safely and efficiently. Herein, we present a video-case where we performed TOEPVA for a single parathyroid adenoma and would like to discuss the approach.
Method
Case:
Results
A 58-year-old female theater artist presented with fatigue and osteoporosis. Her serum calcium level was 11.3mg/dL and parathormone (PTH) was 161ng/L. Both ultrasonography and Technetium 99m sestamibi scintigraphy showed a parathyroid adenoma, near the lower pole of the left thyroid lobe. TOEPVA was performed successfully and excision of the parathyroid adenoma was corrected with intraoperative PTH measurement. Intraoperative recurrent laryngeal nerve monitoring was used during surgery. She was discharged postoperative day one with an 8.3 mg/dL calcium level and 40.84 ng/L PTH level. No perioperative complication occurred and pathological assessment resulted in a 2cm parathyroid adenoma.
Conclusion
TOEPVA is an efficient technique for preoperatively well-localized parathyroid adenoma treatment with excellent cosmetic results. This may be preferred by surgeons planning to carry out TOETVA (transoral endoscopic thyroidectomy, vestibular approach).

PP181 Clinicopathological characteristics of incidental parathyroidectomy after total thyroidectomy: The effect on hypocalcemia. A retrospective cohort study

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Background
The reported rate of incidental parathyroidectomy (IP) during total thyroidectomy varies between 6.4 and 31.1%. The aim of this study was to investigate the clinicopathological characteristics associated with IP.
Method
This is a retrospective cohort study which included 2556 patients who underwent total thyroidectomy between 2002 and 2012 at a single tertiary institution. Demographics, clinicopathological risk factors, and postoperative calcium levels were compared between IP and control group.
Results
Incidental parathyroidectomy occurred in 18.3% of patients. IP patients had higher risk of postoperative biochemical (40.3% vs 17.3%, $p < 0.001$) and symptomatic hypocalcemia (14.3% vs 7.3%, $p < 0.001$) than no-IP group. Multivariate analysis showed malignancy, tumor size >10 mm, thyroid capsule invasion, extrathyroidal extension, lymph node metastases and central neck dissection, operation time, RLN injury, thyroid gland dimensions were independent risk factors for IP.
Conclusion
Our results indicate that patients with certain preoperative findings such as larger thyroid dimensions, diagnosis of malignancy and especially tumor >10 mm, extrathyroidal extension, and lymph node metastasis are at higher risk of IP and postoperative symptomatic hypocalcemia and these patients should be adequately informed and treated. A meticulous intraoperative identification and the preservation of all parathyroid glands results in lower incidence of IP and postoperative hypocalcemia.