SESSION 1 - NEUROENDOCRINE AND BASIC

OC1.

Patients with PHPT and FHH - surgical failure or coincidence?

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Objective: Familial hypocalciuric hypercalcemia (FHH) is an autosomal dominant disorder caused by inactivating mutations in the calcium-sensing receptor (CaSR) gene leading to – in contrast to primary hyperparathyroidism (PHPT) - usually asymptomatic hypercalcemia. It is important to establish the correct diagnosis because surgery can be curative in PHPT, but most likely ineffective in FHH. The aim of this study was to evaluate the outcome of FHH patients undergoing surgery.

Materials and Methods: All patients showed previously not published inactivating CaSR- mutations (FHH1). Patients were divided into two groups: operated (group 1) versus not operated (group 2). CaSR gene mutation analyses were conducted and various biochemical parameters, type of surgery and long-term follow-up data of 14 patients with proven FHH were evaluated.

Results: Six of fourteen patients (42.9%) underwent surgery for initially suspected PHPT: 4 patients received bilateral neck exploration (BNE) and 2 minimal invasive parathyroidectomy (MIP), respectively, with normalization of biochemical parameters immediately after surgery. However, in long-term follow-up five of six operated patients (83.3%) showed normal PTH, but elevated serum calcium levels. In contrast, only one of the operated patients (16.7%) presented PTH and serum calcium in normal range. Histology showed adenoma in 3 (50%), hyperplasia in 2 (33.3%) and normal parathyroid tissue in one (16.7%) of the patients. The comparison of the groups revealed a significant difference solely in preoperative 25(OH) vitamin D (p=0.034), but not for Ca or PTH.

Conclusion: Our results show that parathyroid surgery does not provide any long-term benefits for patients with FHH and suspected PHPT even though this coincidence seems to exist.

OC2.

A NOVEL RAPID ASSAY FOR INTRAOPERATIVE MONITORING OF PARATHYROID HORMONE DURING SURGERY FOR HYPERPARATHYROIDISM – DOES THE ADDED COST ADD VALUE?

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Objective. Intraoperative parathyroid hormone monitoring is considered standard of care during surgery in primary hyperparathyroidism (HPT). Several assays are available and their respective utilization of OR-time and –personnel differ. Here, we report data from a prospective CMA-study using a novel 'ultrafast' parathyroid hormone (PTH)-detection system. The aim of the study was to identify the potential of this novel assay to optimize parameter of OR utilization and thus health care expenditure as compared to the institutional standard procedure.

Methods. During a prospective interventional trial (DRKS # 00011066) the biochemical and procedural data of 60 consecutive cases of primary HPT operated with either focused or planned bilateral cervical exploration between 6/2016 and 6/2017 were used for time-driven activity based cost analysis (TD-ABC) on the basis of actual capacity cost rates for personnel resource. Total assay turn-over-time was defined, as the time needed "blood to value" in minutes. The I-OI-PTH assay system (Future Diagnostics) was compared to the institutional standard.

Results. Both assays were not different with respect to their diagnostic utility. With the I-OI-PTH System, assay turnover times were reduced by 32 ± 6 (range 8-76, median 28) minutes. Capacity cost rates for OR-personnel were reduced € 203.4 ± 7.9 per procedure with the novel rapid detection system. When calculating the "Best of 10" assay results, differences of turnover time were still 18 ± 4 (range 8-26, median 19) minutes, and OR-personnel capacity cost rates were still € 110,8 ± 2.0 lower per procedure with the I-OI-PTH-System.

Conclusions. These data demonstrate the potential of the I-OI-PTH, a rapid PTH detection system to substantially improve turnaround and operative times and to reduce OR-personnel utilization and costs during parathyroid surgery.

OC3.

Molecular profile and expression of iodine metabolizing genes in aggressive papillary thyroid cancer

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Introduction. BRAF mutation is well known to inhibit the iodine metabolizing genes in papillary thyroid carcinoma (PTC). But the extent of down regulation in low-risk or high-risk is not well studied. Hence we made an attempt to study the role of BRAF mutation in regulating the iodine metabolizing gene expressions in aggressive PTCs.

Methods. We selected five groups for the study: low-risk PTCs for at least 5 years of follow up (n=20), patients with extra thyroidal extension (ETE) (n=16), distant metastasis (n=20), recurrence (n=24) and Radio Iodine refractory (RAIR) (n=14). A total of 77 patients were included in the study. DNA and RNA were isolated from the samples. BRAF V600E mutation screening was performed on all samples by using RFLP-PCR. Expression levels of iodine metabolizing genes were measured by Real Time PCR. BRAF positive cases were then correlated with the levels of iodine metabolizing genes (NIS, Tg, TPO and TSHR).

Results. BRAF V600E mutation was frequently detected in RAIR (92.86%) and distantly metastasized PTCs (80%) followed by recurrent PTCs (66.67%) and PTCs with ETE (62.5%). Stage 1 PTCs showed only 50% of BRAF positivity.

When the expression levels of iodine metabolizing genes were studied in these five groups, only TPO and NIS were found to be significantly down regulated in RAIR group. Furthermore, when the BRAF positive cases were only included for analysis, we found all iodine metabolizing genes are significantly down regulated in RAIR group.

Conclusion. In agreement with previous studies high frequency of BRAF V600E mutations were detected in aggressive PTCs. In addition, significant down regulation of iodine metabolizing genes in RAIR patients were shown for the first time in comparison with the other BRAF positive aggressive tumours. Even low-risk PTC harbouring BRAF mutation show low expression levels of iodine metabolizing genes and thus may require aggressive treatments like total thyroidectomy followed by RAI treatment along with BRAF inhibitors. Thus molecular markers should be included to determine appropriate clinical management of PTC.

OC4.

Synergistic anti-cancer activity of tyrosine kinase inhibitors and paclitaxel with radiation on anaplastic thyroid cancer in vitro and in vivo

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Introduction. Anaplastic thyroid carcinoma (ATC) although rare is the most deadly form of thyroid cancer. The goal of this study was to investigate the anti-tumour activities of paclitaxel with radiation and in combination with tyrosine kinase inhibitors (TKI) in anaplastic thyroid cancer cells in vitro and in vivo.

Methods. Three ATC cell lines were exposed to TKI in the presence or absence of paclitaxel with radiation and cell viability was determined by MTT assay. Effects of combined treatment on cell cycle and intracellular signalling pathways were assessed by flow cytometry and western blot analysis. The ATC cell lines xenograft model was used to examine the anti-tumour activity in vivo.

Results. Our data showed that paclitaxel with radiation and TKIs synergistically decreased cell viability in ATC cells, and also significantly increased apoptotic cell death in these cells, as proved by the cleavage of caspase-3 and DNA fragmentation. Paclitaxel and TKI with radiation combination reduced anti-apoptotic factor in ATC. Thus, TKI that targeted the vascular endothelial growth factor receptor family (VEGFR-2 and -3) and platelet-derived growth factor receptor family (PDGFR-beta and Kit), which play key roles in tumour progression and angiogenesis. Combination therapy with paclitaxel and TKI with radiation significantly decreased vessel density, and most significantly reduced tumour volume and increased survival in ATC xenografts.

Conclusions. These results propose that paclitaxel and TKI with radiation has significant anti-cancer activity in preclinical models, potentially suggesting a new clinical approach for patients of advanced thyroid cancer type.

OC5.

Construction of a thyroid gland from primary murine and human thyroid organoids

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Introduction: Suboptimal thyroid hormone replacement therapy for hypothyroidism often results in unbalanced hormone levels leading to fatigue, constipation, weight increase and potentially cardiovascular diseases or osteoporosis.

Objectives: The aim of this study is to isolate stem cells from thyroid tissue and study their potential to generate functional thyroid tissue.

Results: We isolated, cultured and propagated primary murine and human thyroid gland tissue as 3D organoids. Thyroid organoids transcriptomically expressed multiple stem cell markers (SCA-1, CD-133, FUT4, SOX2 and EpCAM) and major thyroid gland lineages markers (Nkx2-1, thyroglobulin and T4). Gene analyses showed clear differences between organoids and the primary tissue of origin, while maintaining a thyroid specific profile. Upon induced maturation, murine and human organoids matured *in vitro* into tissue resembling mini-organs that more abundantly express the major thyroid gland markers and even secrete T4. (Xeno-)transplantation of dissociated organoids underneath the kidney capsule of athyroid mice, resulted in the generation of hormone producing murine and human thyroid resembling follicles, increasing their survival. In parallel, differentiated and medullary human thyroid gland tumour organoids could be cultured and propagated with a clear distinction in marker expression profile (Nkx2-1, thyroglobulin and calcitonin).

Conclusion: This study provides the first proof of principle that primary thyroid gland derived organoids can be cultured and are able to develop into a functional mini-gland suggesting potential applicability for thyroid gland generation purposes.

OC6.

DETERMINANTS OF HEALTH-RELATED QUALITY OF LIFE AFTER SURGERY FOR SMALL INTESTINAL NEUROENDOCRINE NEOPLASMS IN SWEDISH PATIENTS

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Background: Overall survival for patients with small intestinal neuroendocrine neoplasms (siNENs) is often long even with metastatic disease, making quality of life issues especially relevant. The impact of surgery on their quality of life is unknown. We investigated determinants of health-related quality of life (QoL) in patients who underwent surgery for a siNEN.

Methods: Patients operated for a siNEN between 1st July 1998 and 31st October 2016 at Skåne University Hospital who were alive in February 2017 were sent EORTC QLQ-C30 and EORTC QLQ-GINET21 questionnaires, after approval by the research ethics committee in Lund. Global QoL, physical function, disease-related worries, diarrhea and endocrine symptoms were evaluated with multiple regression in relation to patient-, tumour- and treatment-related factors. STATA 11® was used for statistical analysis.

Results: Between 1998 and 2016, 124 patients with a siNEN were operated. One hundred (84.0%) out of 119 alive patients answered both the questionnaires. Women had a worse global QoL ($p=0.019$), more disease related worries ($p<0.001$) and endocrine symptoms ($p=0.017$) than men. Older age was associated with more disease related worries ($p=0.007$), but less endocrine symptoms ($p=0.034$). Non-symptomatic vs. symptomatic tumour ($p=0.002$), and treatment with somatostatin analogues vs. no treatment ($p=0.040$) were associated with less diarrhea. Small vs. large bowel resection was associated with better global QoL ($p = 0.036$) and physical function ($p = 0.035$).

Conclusions: Male gender, younger age, treatment with somatostatin analogues, non-symptomatic tumour and small intestinal surgery compared to large bowel surgery were associated with a better quality of life.

OC7.

Long term outcome after resection and radiofrequency ablation of liver metastases in pancreatic neuroendocrine tumours

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Objectives. Pancreatic neuroendocrine tumours (p-NETs) are rare tumours that often present with or develop liver metastases. Metastases are historically treated with surgery and during the recent 20 years also with radiofrequency ablation (RFA). Previous studies of surgery/RFA of liver metastases in patients with mixed neuroendocrine tumours show five-year survival rates between 47 and 89%. The recurrence rates in these studies range from 22-60% depending on follow-up. The aim of this study was to evaluate surgery/RFA of liver metastases and also to compare the outcome to an untreated control group.

Methods. 527 patients with p-NET were treated in the Uppsala University Hospital from 1985-2017. Univariate and multivariate survival analyses were performed and $p<0.05$ was considered statistically significant.

Results. 75 patients met the criteria for inclusion; resected primary tumour, liver metastases and Swedish residency. 40 patients underwent treatment with liver surgery or RFA, 35 patients were treated conservatively and constitute the control group. Median follow up was 9.3 years. Five-year survival in the liver surgery/RFA group was 61.2% and in the control group 33.8%, $p=0.023$. In the multivariate analysis liver surgery/RFA or not did not affect survival, although three other covariates did; WHO-grade, comorbidity and number of liver metastases. In 25 patients the procedure was performed to achieve tumour reduction, and for the remaining 15 patients the intent was curative. Of these 15 patients, all were followed to recurrence except two. One patient was lost to follow up and one patient died from unrelated disease. The recurrences appeared after a median of 10 months (2-54 months).

Conclusion. Patients treated with liver surgery or RFA for P-NET liver metastases with curative intent have a very high propensity to recur if follow-up is long enough. WHO-grade, comorbidity and number of liver metastases affected long-term survival whereas liver surgery/RFA did not.

OC8.

Ampullary neuroendocrine neoplasms: experience of two pancreatic surgical centers on a rare challenging entity

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Background: Ampullary NeuroEndocrine Neoplasms (NENs) account <0.3% of gastrointestinal NENs. Surgical options include local excision/ampullectomy or pancreaticoduodenectomy (PD). We report the experience of two high-volume pancreatic surgical centers on ampullary NENs.

Methods: Clinical records of patients who underwent surgery for ampullary NENs (January 2007-November 2017) in the study centers were retrieved retrospectively. We evaluated clinic-pathological features, postoperative outcome and follow up (FU).

Results: Twenty patients (10 M/10 F, averaging 62 years) enrolled. All were non-functioning NENs; 6 patients presented with jaundice. Seven (35%) patients with a preoperative diagnosis of ampullary NEN (median size 1.5 cm) underwent transduodenal ampullectomy/tumour excision. Thirteen (65%) patients with a preoperative diagnosis of malignant papillary/periampullary neoplasm or NEN (median size 2.1 cm) underwent PD. Median operation time of ampullectomy/excision was 221 minutes with operative blood loss of 75 ml (vs 480 minutes and 350 ml in PD). Hospital stay 10 days (median) in both groups. Overall surgical morbidity was 40%: 6 patients with pancreatic fistula (5 in PD), 2 patients with abdominal haemorrhage in PD. No reoperation needed. Median tumour size 1.7 (range 0.5-6.7) cm. 11 patients had N1 on 15 with lymphadenectomy. There were 8 G1, 5 G2 and 5 G3 NENs. All G2-G3 NENs were N1 (vs. 1/8 in G1 NENs). Most (6/8) G1 NENs were <2 cm in size. Three (15%) cases were mixed exocrine/G3 NENs. After a median FU of 44 (up to 124) months 14 patients were evaluated for OS and DFS. Recurrence occurred in 4 NEN G3 (29%) patients, with a median DFS of 14 (range 2-31) months. after a R0 PD. Disease-related survival was 93%, 77%, and 66% at 1, 3 and 5 years, respectively.

Conclusion: Ampullary NENs are mostly G1-G2 neoplasms. Lymph node metastases rarely occur in G1 NENs with <2 cm in size that could undergo transduodenal excision/ampullectomy. Survival is 66% at 5 years after surgery.

SESSIONS 2- PARATHYROID

OC9.

Mild sporadic primary hyperparathyroidism - lower chirurgical cure rate and lower sensitivity of parathyroid scintigraphy associated high rate of multiglandular disease

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Background. Mild primary hyperparathyroidism, defined as protein-corrected ≤2.85mmol/L serum calcium, is the most representative type of primary hyperparathyroidism (pHPT). The aim of this retrospective study was to evaluate the patient phenotype, especially the rate of multiglandular disease, as it may lower the sensitivity of pre-operative parathyroid scintigraphy and the chirurgical cure rate.

Methods. A retrospective study in a University hospital included patients with mild sporadic pHPT who underwent parathyroid double tracer scintigraphy (^{99m}Tc/^{99m}Tc-MIBI SPECT/CT) and were operated between January 2013 to December 2015. Cured status was defined by normalization of calcium and PTH serum levels at least 3 months after surgery and multiglandular disease was defined by two abnormal resected glands or persistent disease after resection of an abnormal gland.

Results. A total of 129 patients (89% females) with median age of 63 years, median serum calcium 2.62mmol/L and median PTH level 83pg/mL underwent unilateral neck exploration (n= 71, 55%) or bilateral neck exploration (n=58, 45%). A total of 142 glands were resected: 99 adenomas and 43 hyperplasic glands. Multiglandular disease occurred in 32 patients (26%), chirurgical cure rate reached 94.5% considering normocalcemia only, and 79% considering normal PTH and serum calcium level. Normocalcemic form represented 12.5% patients (n=16), in which 50% had multiglandular disease, with the lower surgical cure rate (57% vs. 85%, p=0.014). The normal PTH level with hypercalcemia form and classic form represented respectively 32.5% (n=42) and 55% patients (n=71), multiglandular disease in 28.5% and 20% patients respectively (significantly more often in normocalcemic form, p=0.004). Scintigraphy showed 122 single foci, 5 patients had 2 foci, 34 were negative, for a sensitivity of 78%.

Conclusion. Multiglandular disease in strongly associated with mild pHPT, especially in normocalcemic form, reaching 50% cases. Bilateral neck exploration should be performed to improve cure rate.

OC10.

Does radioiodine ablation increase the risk of permanent hypoparathyroidism after total thyroidectomy plus central node dissection for papillary thyroid cancer? - a propensity matching score

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Background: Patients operated for PTC are at risk of permanent hypoparathyroidism (PH). While technical variables are particularly relevant for postoperative parathyroid failure, there are no data investigating the influence of radioiodine ablation on long-term parathyroid function. We aimed to investigate whether I^{131} is associated with PH after total thyroidectomy plus central neck dissection.

Methods: Prevalence of I^{131} treatment and PH were investigated in a prospectively maintained database of patients operated on for PTC. Only patients who developed postoperative hypocalcemia (<8 mg/dl) were included in the study. Surgical, pathology and clinical variables potentially involved in PH were selected for analysis. Interrelationship between I^{131} administration and PH was tested by bivariate and multivariate analysis and propensity matching score test adjusting for disease severity and extension of surgery.

Results: Out of 203 patients, 92 had postoperative hypocalcemia of who 64 received radioiodine ablation between 3 and 6 months after surgery. PH was diagnosed in 11/92 cases after at least 1-year follow-up and all had received I^{131}. Bivariate analysis revealed that patients receiving I^{131} had more advanced disease (extracapsular invasion, number of positive lymph nodes, tumour size, lateral dissection and MACIS) but similar number of parathyroid glands remaining *in situ* (3.2±0.9 vs. 3.4±0.8; N.S.). Multivariate analysis showed that I^{131} was the most relevant predicting variable associated to PH followed by extracapsular invasion and multicentricity. A propensity matching score analysis (11 PH vs. 22 controls) identified radioiodine as the most significant variable associated with PH ($P<0.015$) followed by modified radical neck dissection.

Conclusion: Radioiodine may increase the risk of PH in patients with PTC developing postoperative hypocalcemia. Future studies with better disease risk adjustment will help to clarify this clinically relevant issue.

OC11.

The use of a two-phase CT protocol as a first line imaging modality in parathyroid disease

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Background. Minimally invasive parathyroidectomy relies on accurate pre-operative anatomical localization. Rodgers first published his experience of 4D CT in 2006, demonstrating it to have a higher diagnostic accuracy than sestamibi imaging. The high radiation dose of this CT protocol combined with lack of clinician familiarity has meant that sestamibi has remained the front line imaging modality in most hospitals. We are a large tertiary referral hospital for endocrine disease based in London that has historically been using a combination of ultrasound and sestamibi as the mainstay of imaging in our parathyroid patients. This study investigates the potential benefits of CT imaging in such patients.

Methods. A prospective study using neck ultrasound and 2-phase CT as first line imaging in parathyroid disease. Sestamibi scanning was reserved for when there is diagnostic uncertainty following first line imaging. The 2 phase CT protocol delivers a mean radiation dose of 2mSv in comparison to 11mSv for a sestamibi SPECT/CT. The cost of the CT scan is £232.62 versus £800 for a sestamibi SPECT/CT in our institution.

Results. 30 patients underwent a 2 phase CT scan and ultrasound followed by subsequent surgery. The CT scan identified candidate adenoma(s) in all cases. 26 patients had a minimally invasive approach and four had a bilateral neck exploration. Intra-operative PTH dropped by more than 50% in all cases. The sensitivity for anatomical localization was 77% and for lateralization was 91%. Four patients had multiple adenomas and CT correctly identified two of these cases pre-operatively.

Conclusion. 2-phase CT provides excellent anatomical localization, including detecting multiple adenomas. Additional benefits over sestamibi are a significantly lower radiation dose and reduced cost to perform.

OC12.

Impact of parathyroidectomy timing on graft function after kidney transplantation

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Background: It remains debatable whether the timing of parathyroidectomy (PTx) before or after kidney transplantation (KTx) influences graft function. Therefore, we aimed to assess the impact of PTx timing (before or after KTx) on graft function in a large multicenter cohort study.

Methods: Patients with ESRD-related HPT who underwent both PTx and KTx between 1994-2015 were included in a retrospective multicenter cohort study in four Dutch university medical centers. Two groups were compared according to treatment sequence: PTx before KTx (PTxKTx) and PTx after KTx (KTxPTx). Primary endpoint was estimated glomerular filtration rate (eGFR) measured at 3 and 6 months and 1, 3 and 5 years after KTx in ml/min/1.73m². The correlation between the timing of PTx and KTx and the course of renal function was assessed using generalized estimating equations (GEE).

Results: The PTxKTx group consisted of 102 (55.1%) and the KTxPTx group of 83 (44.9%) patients. Recipient age, donor type (living vs. postmortal), PTx type (total vs. subtotal), and pre-KTx PTH level were significantly different between groups. An unadjusted GEE model showed that the timing of PTx was not correlated with graft function over time (mean difference -1.2 ml/min/1.73m², 95% confidence interval [CI] -8.6 to 6.2, p=0.75). The sequence of PTx in relation to KTx also did not influence the post-transplant course of eGFR over time after adjustment for center, donor and recipient age and sex, cold ischemia time, number of HLA mismatches, donor type and PTx type, pre-emptive vs. post-dialysis KTx, and pre-KTx PTH level (mean difference -0.18 ml/min/1.73m², 95% CI: -16.9 to 16.6, p=0.98).

Conclusions: Timing of PTx, before or after KTx, does not independently impact graft function over time. Our findings support the approach to postpone PTx in patients with mildly elevated PTH levels until after KTx, given the spontaneous regression of HPT in more than half of patients after successful KTx.

OC13.

Intraoperative parathyroid glands examination in near-infrared (nir) light

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Background: The parathyroids' near infrared (NIR) light auto fluorescence and their fluorescence after i.v. Indocyanine green (ICG) are increasingly being used during thyroid surgery.

Methods: Intraoperative parathyroid glands identification through surgical dissection and auto fluorescence in NIR-light (785 nm - NIRF-800 camera, ArteMIS Handheld System, Quest Medical Imaging BV, Wieringerwerf, The Netherlands) has been performed in 18 patients before and after thyroidectomy. Then the parathyroids viability was assessed in NIR-light after the intravenous administration of 0,1 mg/kg ICG.

Results: Surgical exploration and dissection before thyroidectomy revealed 58 (83%) out of the 69 parathyroid glands explored (three absent after previous surgeries). Nine of the missing glands were found with auto fluorescence in NIR-light (3 small superior parathyroid glands, 3 inferior, 2 under the thyroid capsule and one inside the thymus) - a total of 67(97%) and two glands were not found. After thyroidectomy 29 (43%) of the 67 glands had a normal aspect on inspection, 32 (48%) showed various degrees of vascular impairment and 6 (9%) appeared ischemic. NIR examination after i.v. ICG revealed intense fluorescence emission in 14 (21%) glands, partial or reduced fluorescence in 28 (42%) and absent emission in 25 (37%) of the 67 glands. Postoperative hypoparathyroidism was not recorded in any of the patients with at least one visible parathyroid on ICG NIR fluorescence.

Conclusions: Intraoperative auto fluorescence NIR-light is an efficient method to identify parathyroid glands. The viability of parathyroids after thyroidectomy can be assessed by NIR-light i.v. ICG fluorescence.

OC14.

The Use of Auto fluorescence for the Identification of Parathyroid Glands Intraoperatively

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Several reports have recently described the use of the auto fluorescence technique, using near infrared light to detect parathyroid glands during parathyroid and thyroid surgery.

This technique is the first to provide dye-free intraoperative real-time images of the parathyroid glands.

After a brief description of the fundamental bases of this technique and a description of the Fluobeam®(Fluoptics) system, many examples will be given, to illustrate how this technique can represent a valuable adjunct to the surgeon's visual assessment, by confirming and sometimes anticipating the identification of parathyroid glands during surgery.

Eventually, we sum up the literature on the subject, to illustrate how this 'easy-to-learn' and 'easy-to-use' technique can be helpful in improving surgical performance and patients' outcomes.

OC15.

Enabling label-free real-time intraoperative parathyroid identification with a clinical prototype – a multicentric study

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Background: Identifying parathyroid glands during head and neck surgeries can be challenging, resulting in accidental healthy parathyroid gland excision or incomplete removal of diseased parathyroid glands. Thus accurate intraoperative parathyroid identification is imperative for optimal patient outcome. Routine intraoperative techniques such as frozen section biopsies or parathyroid hormone assays are invasive, time consuming and costly. Recently parathyroid glands were found to possess near-infrared autofluorescence (NIRAF) that can be utilized for its real-time identification during surgery.

Objective: To evaluate accuracy of a clinical prototype called 'PTEye' that employs NIRAF detection for label-free intraoperative parathyroid identification.

Method: The PTEye was tested across 35 patients at Center A and 10 patients at Center B, with 245 parathyroid and 458 non-parathyroid (thyroid, muscle, fat, lymph node and trachea) measurements. The PTEye was designed with a user-friendly interface and can function with operation room (OR) lights remaining on. Accuracy was determined by correlating data with the surgeons' visual confirmation for unexcised parathyroids or histology report of excised parathyroids.

Results: NIRAF counts were 5.5 times higher in parathyroid than non-parathyroid measurements (p-value<0.01). The PTEye achieved 95.5% sensitivity and 98.1% specificity (accuracy: 97.2%) at Center A, and 97.7% sensitivity and 97.0% specificity (accuracy: 97.2%) at Center B. Overall accuracy was 97.2% (kappa=0.94) with a positive and negative predictive value of 95.9% and 97.8% respectively. Furthermore, PTEye provided results in real-time without needing contrast agents while OR lights remained on.

Conclusion: The PTEye demonstrated high accuracy for label-free intraoperative parathyroid identification. The intuitive interface of PTEye and its ability to rapidly identify parathyroid glands with ambient OR lights can ensure easy usability by surgeons.

OC16.

Parathyroidectomy versus cinacalcet for tertiary hyperparathyroidism - a retrospective analysis

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Background: Persistent hyperparathyroidism (HPT) after kidney transplantation, also known as tertiary HPT, occurs in 17-50% of patients. Treatment of tertiary HPT is mandatory since persistent elevated PTH levels increase the risk of renal allograft dysfunction as well as osteoporosis. The introduction of cinacalcet in 2004 offered a medical treatment alternative to parathyroidectomy (PTx). However, the optimal management of tertiary HPT remains unclear. In this study we compared the outcomes of PTx and cinacalcet for tertiary HPT.

Methods: A retrospective analysis was performed of patients that received a kidney transplant in one of two academic centers in the Netherlands. Patients undergoing PTx within 3 years of transplantation and patients requiring cinacalcet 1 year after transplantation were included. Primary outcomes were serum calcium and PTH concentration one year after kidney transplantation and after PTx.

Results: Our study cohort consisted of 30 patients undergoing PTx and 64 still treated with cinacalcet after kidney transplantation. Patients in the cinacalcet group had PTH concentrations above the upper limit of normal (median 22.0 pg/ml) 1 year after KT, whereas serum calcium concentrations normalized (median 2.40 mmol/L). After PTx, both serum calcium (median 2.34 mmol/L) and PTH concentrations (median 3.7 pg/ml) returned to within the normal range.

Conclusion: In patients with tertiary HPT, cinacalcet normalizes serum calcium, but does not lead to a normalization of serum PTH concentrations. In contrast, PTx leads to a normalization of both serum calcium and PTH concentrations. These findings suggest that PTx is the treatment of choice for tertiary HPT.

SESSION 3 ADRENAL

OC17.

The Impact of Body Mass Index on Perioperative Outcomes of Robotic Adrenalectomy - an update

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Objectives: Robotic surgery has gained increasing popularity over the last two decades. However, factors including patient co-morbidities and tumour characteristics are still crucial factors for outcomes of surgery. Although there are many reports regarding the feasibility and safety of robotic surgery, there is still scant data about the impact of obesity on the clinical outcomes of patients undergoing robotic adrenalectomy. In this study we evaluated the impact of body mass index (BMI) on perioperative outcomes in patients who underwent robotic adrenal surgery.

Methods: Between May 2012 - November 2016, 66 consecutive patients who underwent robotic adrenalectomy were included to the study. Patients were divided into two groups based on their BMIs: non-obese (<30 kg/m2), and obese (≥30 kg/m2). Besides patient demographics, tumour size, total operative time, docking time, console time, estimated blood loss (EBL), conversion to open, complications, additional analgesia requirement, length of hospital stay and rough costs were evaluated.

Results: Of the 66 patients, a total of 20 patients were obese (30%). Between study groups, median BMI was calculated as 26 (18-29) and 33 (30-57), respectively. Groups were similar in terms of age, gender, ASA scores and previous history of abdominal surgery. There were no significant differences between groups regarding total operative time (p=0.085), docking time (p=0.196), console time (p=0.211), EBL (p=0.180), complications (p=0.991), length of hospital stay (p=0.598) and rough costs (p=0.468). Five cases were converted to open surgery. Non-obese cases requested more additional analgesia (p=0.007). We had no unexpected hospitalizations in both groups.

Conclusions: Guidelines express the advantages of robotic surgery in the obese. No statistically significant differences were detected between two groups except for the additional analgesia requirement in non-obese patients.

OC18.

Retroperitoneoscopic adrenalectomy in ipsilateral recurrent pheochromocytoma

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Objectives: Nowadays, preservation of adreno-cortical function is a major aim in treatment of genetic pheochromocytoma. Partial adrenalectomy is the option in these cases but includes the risk of ipsilateral recurrence. We present a large group of pheochromocytoma patients with ipsilateral relapse treated by minimally invasive technique.

Methods: From 11/2000 until 8/2017 we operated on 31 patients (22M, 9F; age 37.9±16.8 years [range: 9.9-70.2 years]) with 32 ipsilateral recurrent pheochromocytoma (size 2.5±0.8 cm). Thirty patients had unilateral relapse, one patient bilateral recurrence. In 28 patients genetic syndromes were identified (19 VHL, 6 MEN 2A, 2 MEN 2B, 1 SDHB). Surgical access in the primary operations was open in 19 patients (18 anterior laparotomy, 1 posterior) and minimally invasive in 13 cases (3 laparoscopy, 10 retroperitoneoscopy). In all second operations the retroperitoneoscopic approach was used (26 in 3-port-technique, 6 single access), conventional open operations did not occur. In 14 procedures for recurrent pheochromocytoma partial adrenalectomy could be performed repeatedly.

Results: Period between initial and recurrent operation was 9 years (range: 0.6–29 years) without differences between MEN- and VHL-patients. Mortality was zero. Conversion to open surgery did not happen. Operating time was 85 minutes (range: 50-255 minutes). Estimated blood loss was 35 ml, no blood transfusion was necessary. Four of 31 patients (13%) were treated on intensive care unit postoperatively. Mean hospital stay was 3.5±1.3 days. Re-recurrences were not observed up to now.

Conclusions: In ipsilateral recurrent pheochromocytoma the retroperitoneoscopic access can be used safely, independent of the primary approach.

OC19.

Management of patients with adrenocortical carcinoma

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Objectives. Adrenocortical cancer is a rare endocrine tumour with a dismal prognosis. We report our experience in managing these patients

Methods. Data were recorded in a prospective database.

Results. 43 patients (34F: 9M, median age 52 years) were treated for ACC over 20 years at three endocrine surgery units in the Milan area, Italy. All patients underwent preoperative workout with total body CT scan and complete hormonal essays: 32 had a secreting tumour, 11 were already metastatic when diagnosed, and in ten patients carcinoma was an incidental finding. 39 patients underwent open surgery and 4 had laparoscopic adrenalectomy. Mean tumour diameter was 12.6± 10.6 cm. Neoplasms were staged according to both WHO and ENSAT classification. Six patients had neoplastic caval thrombus. In 36 patients R0 resection was performed, 7 had residual disease.

18 patients received adjuvant therapy with mitotane. 29 patients had recurrence with a median disease free survival of 15 months, among them 24 were treated with mitotane, 9 received also chemotherapy. Adjuvant mitotane did not affect recurrence rate but allowed longer survival. Patients with recurrence controlled by mitotane alone had a 40% 10-year survival, compared to 33 % of those who needed also chemotherapy. Overall 10-year survival was 54% with a mean survival of 137 +/-19 months

Conclusion. Adjuvant mitotane does not seem to be effective in reducing recurrence rate, but it allows longer survival. The presence of neoplastic caval invasion is not a contraindication to surgery since it doesn't prevent long survival. Chemotherapy may be helpful in controlling disease progression when patients with recurrence do no respond to mitotane. Aggressive management in a multidisciplinary setting is the cornerstone to achieve better results.

OC20.

Adrenalectomy in the UK: results from the British Association Endocrine and Thyroid Surgeons database

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Background. This study aimed to summarise the indications, procedures and outcomes for adrenal surgery from the UKRETS database from 2005-2017 and compare outcomes for benign and malignant disease.

Methods. A minimum dataset was obtained for all patients entered into a surgeon-reported registry during the study period. Pre-operative diagnosis, surgical technique, length of stay and in-hospital mortality was examined. Data are presented as median (interquartile range). Categorical differences were explored using Chi-squared and continuous variables compared using parametric/non-parametric tests.

Results. Data were available on 4000 patients; 57% female, median age 53 (8-88years). Surgery was performed for benign disease in 82% and malignant disease in the remainder. Pheochromocytoma was the commonest benign indication whereas adrenal metastasis the commonest malignant indication. Tumour size was significantly greater in the malignant group: 60mm (34-100mm) vs. 40mm (24-55mm), P<0.001. A minimally invasive approach was employed in 90% of benign disease and 48% of operations for cancer (P<0.001). If a minimally invasive approach was employed, conversion rate was 3.5-fold higher in the malignant group (17% vs. 4.9%, P<0.001). Length of stay was 3(2-5) days for benign disease and 5(3-8) days for malignant disease (P<0.05), likely reflecting the higher rate of open surgery in the latter group. Overall in-hospital mortality was low (<0.5%) but significantly higher in the setting of malignant disease (1.3% vs. 0.2%, P<0.001). Currently there are no data available on deviations from normal peri-operative recovery or completeness of resection for malignant disease. The incidence of missing data was up to 30%.

Conclusion. Adrenalectomy is a safe procedure but the higher incidence of open surgery for malignant disease appears to impact outcomes for malignant disease. Conclusions on quality are hampered by incomplete data. The addition of new data fields examining perioperative complications and oncological outcomes would enhance UKRETS' ability to truly assess the quality of adrenal surgery across UK.

OC21.

Efficacy of Imaging Modalities In Metastatic Adrenal Masses: Results Of Nation-Wide MAdGor Study

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Objectives: Most common second malignity of adrenal gland is metastasis. Patients undergo surgery with diagnosis of adrenal metastasis due to detected hypermetabolism resembling malignity in PET-CT performed for follow-up of who was operated for different malignity. This study investigates ability of PET-CT in discrimination of metastasis located in adrenal gland from primary masses.

Material and methods: In this multi-centric study, patients operated for suspicion of metastasis to adrenal gland were evaluated retrospectively. Data of forty-one patient was consist of gender, age, primary tumour and receive of adjuvant therapy, side of adrenal mass and time since primary tumour, detection in CT/MRI, hormonal activity, SUVMax (a-SUVx) and size of adrenal gland, and histopathology of resected specimen. Continuous variables assessed with Mann-Whitney U test while categorical variables assessed with chi-square test.

Results: Six of forty-one patients excluded due to unavailability of PET-CT report. Included 35 patients were divided in two groups according to histopathology report as metastasis or not. Of those, 17(49%) were metastasis and 18(51%) were not. There were no statistical differences among analysed values except the a-SUVx ($p<0.05$). Due to superposition of a-SUVx values and insufficient number of cases ROC analyses couldn't be performed thus cut-off value assumed as 5.01 according to study of Watanabe et al. There were no statistical differences when each group was divided as low and high according to the cut off value ($p=0.086$). In evaluation of a-SUVx, by grouping adrenal masses in three (primary malignant, primary benign and metastatic), PET-CT is able to discriminate primary benign from metastatic lesion ($p=0.003$) while not primary malignant from metastatic ($p=0.42$) and primary malignant from primary benign ($p=0.55$).

Conclusion: PET-CT is not able to discriminate primary lesions from metastasis solely. However, statistical difference of a-SUVx value was obtained between primary benign lesions and metastatic lesions in this study, further investigation with more cases are still needed.

OC22.

Prognostic Factors for Adrenocortical Carcinomas - Analysis of 72 Consecutive Cases

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Background: Adrenocortical carcinomas (ACC) are aggressive tumours with poor prognosis, even with multimodal treatment. The aim of our study was to determine general survival rates, analyse the effect of certain prognostic factors on the survival and to identify positive and negative predictors of survival.

Material and methods: The study included 72 patients. We analysed demographic and clinical characteristics of the patients, tumour characteristics, the therapy they received and survival rates of the patients. In statistical analysis we used Kaplan-Meier's survival curves, log-rank test and the logistic regression model.

Results: The mean age was 50 years. Only two patients were diagnosed in stage I of the disease, while more than half were in stage II of the disease. At time of diagnosis regional and distant metastasis were present in 12% and 9% of patients. Nearly 90% of the patients were treated with a potentially radical operation.

One, five and ten-year survival of patients with ACC was 52.5%, 41.1%, and 16.4% respectively. According to the univariate logistic regression analysis, variables that effect survival rate were: gender, age, stage of the disease, tumour weight, presence of lymphatic and distant metastasis, local tumour invasion, surgical approach and mitotane therapy.

The results of multivariate logistic regression analysis showed that independent prognostic factors of survival were the presence of lymphatic metastasis (RR=7.37, 95%CI=2.31-23.48) and therapy with mitotane (RR=0.11, 95%CI=0.04-0.27).

We also performed another multivariate logistic regression analysis that did not include therapy with mitotane. This analysis identified the following negative predictors of survival: presence of lymphatic metastasis (RR=2.74, 95%CI=1.01-7.45) and local tumour invasion of surrounding tissue (RR=2.61, 95%CI=1,19-5.76).

Conclusion: Negative predictors of survival for patients with ACC are presence of lymphatic metastasis and local tumour invasion of surrounding tissue. The only positive predictor of survival for patients with ACC was therapy with mitotane.

OC23.

Adrenal haemorrhage: differentiated diagnosis and surgical tactics

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Background. Haemorrhage to adrenal glands (AH) with hematoma formation is rare tumour-like lesion. The main issue is AH differentiation from true tumours to avoid excessive surgery.

Methods. Retrospective analysis of institutional experience.

Results. The study involved 13 patients (24-74 years; equal sex proportion) operated for AH, representing 1.34% of 967 adrenalectomies performed in hospital since 1996. In most cases (11) AH was diagnosed incidentally by computed tomography (CT) or ultrasound. Nine patients had a history of blunt trauma, three received anticoagulants. Mean size of AH was 51±9 mm (8-91 mm). No hormone alterations were revealed.

A second group consisted of 22 not operated patients (17-57 years) with supposed diagnosis of AH. They were followed-up with CT monitoring. 21 patients had a history of blunt back or abdominal trauma; 5 received anticoagulants.

The native CT density of AH always exceeded “safe” 10 HU cut-off (24.12±8.16 HU; range: +12-49 HU). In contrast to true adrenal tumours, AH in both groups didn’t increase their radiologic density on CT examination. In 6 patients low (<20%) contrast enhancement was seen at periphery of lesion (capsule). All 13 patients from 1st group were operated by laparoscopic adrenalectomy without complications, but tumour dissection was compromised with perifocal infiltrations caused 1 conversion. Indications to surgery included: size >4 cm, irregular margins of hyperdense lesion that supposed malignancy. Tumour enlargement or appearance of malignant signs, which forced on surgery in 2nd group of patients, was not observed during follow-up. AH demonstrated shrinkage and increasing of density within 3-6 months.

Conclusions. The crucial feature of AH against adrenal tumours (particularly malignant) is absence of contrast tumour enhancement on CT. History of blunt trauma, taking anticoagulants, gradual shrinkage of tumour and thickness of its capsule suggest AH and justify further follow-up avoiding surgery.

OC24.

Transperitoneal laparoscopic surgery in large adrenal masses

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Background: To evaluate the applicability, safety and short-term results of laparoscopic surgery in adrenal masses over six centimetres.

Methods: Demographic data, preoperative hormonal activities, imaging modalities, surgical and medical history, operative findings, operation time, conversion to open surgery, complications, duration of hospital stay and histopathological results of 128 patients, who underwent laparoscopic adrenalectomy between December 2012 and December 2017, were evaluated retrospectively.

Patients included in the learning curve (n=23), robotic surgery cases (n=15) and patients with suspected metastasis (n=4) are excluded from the study. Two subgroups were analysed based on the threshold of 6 cm maximum diameter (Group 1: <6cm, Group 2: ≥6 cm). The results of two groups were compared.

Results: A total of 86 patients were included in the study. The median age was 41.5 (19-79), female / male ratio was 62/24 and the mean body mass index was 29.4 ± 6.6. There were 64 cases in Group 1 and 22 cases in Group 2. There was no difference in age and body mass index between the groups (p = 0.07 and p = 0.36, respectively). MR was the most commonly used imaging method in both groups (p = 0.06). Functional mass ratio and mass sides were similar between the groups (p=0.30 and p=0.17, respectively). The mean mass size was 36 ± 11 mm (group 1) and 82±16 mm (group 2). In group 2, one case was converted to open surgery after laparoscopic completion of the dissection, because of suspicion of invasion. Conversion rate was similar between the two groups (p = 0.18). The duration of surgery was 136± 8 min in group 1 and 177±15 min in group 2 (p = 0.014). Morbidity and lengths of hospital stay were similar (p = 0.76, p = 0.34 respectively). Adrenocortical carcinoma was detected in three cases in group 1, which were completed laparoscopically and in two cases in group 2, which were converted to open surgery (p = 0.46).

Conclusion: Although open surgery is still recommended in the guidelines, studies are now being carried out to ensure that laparoscopy can be safely performed on masses over 6 cm. There was no difference between short-term follow-up and histopathological results in our study. However, oncologic principles were not compromised in the presence of clinical suspicion and laparoscopy was not insistent.

OC25.

Early prediction of post-thyroidectomy hypocalcemia: validation of a new score based on the gradient of PTH descent and the number of identified parathyroid glands

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Background: Hypocalcemia is the most frequent complication after total thyroidectomy (TT). We pretend to detect factors that favour its onset and develop a predictive score for its development.

Methods: Prospective, monocentric cohort study on 352 consecutive patients undergoing TT, between May 2012 and September 2015, excluding completion thyroidectomy or concomitant parathyroid pathology. We determined the preoperative and 4-hours post-thyroidectomy PTH values, and the corrected calcium according to proteinemia at 24 hours, defining hypocalcemia for values below 8 mg/dL.

Collected data included age, gender, surgical indication and extension, number of parathyroid glands identified (NPGI), PTH value and its gradient of descent, among others. A multivariate model was performed using logistic regression from the results of the bivariate analysis. From independent predictive factors, a predictive score was built and validated by ROC curves in another group of 118 consecutively operated patients, between October 2015 and December 2016.

Results: 73 patients (20.7%) developed hypocalcemia, symptomatic in 43 (12.2%). In bivariate study, it was favoured by addition of lymphadenectomy, prolonged surgeries, incidental parathyroidectomy, lower postoperative PTH values and higher gradient descent ($p = 0.036$, 0.038, 0.002, <0.001 and <0.001, respectively). NPGI was inversely related to hypocalcemia ($p < 0.001$). On multivariate analysis, NPGI and PTH gradient emerged as independent predictors. A hypocalcemia prediction score was developed using the equation: $p = 1/1 + e^{-(-5.369+0.343\times NGPI+0.058\times \text{gradient of PTH drop})}$. Validation of this score in an independent group of patients showed again a high predictive capacity of hypocalcemia, with an AUC = 0.956.

Conclusions: PTH decline gradient and NPGI during TT predict the appearance of postoperative hypocalcemia. A score generated combining both factors allows the stratification of patients' risk and the substitution treatment needed.

OC26.

Transoral thyroid and parathyroid surgery in German speaking countries - implementation and evaluation of the Trans Oral Endoscopic Thyroidectomy Vestibular Approach (TOETVA)

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Background. Natural orifice transluminal endoscopic transoral parathyroidectomy and thyroidectomy was first described by German study groups several years ago. While development of these innovative and new techniques, which allowed for surgery without visible scars, did not become well accepted in the Western world, it led to and optimized and routinely used transoral endoscopic thyroidectomy vestibular approach (TOETVA) technique implemented by Anuwong.

Herein we report the preparation, step-by-step implementation, and first promising results for TOETVA of an international surgical cooperation.

Methods. Our Thai-Austrian-German cooperation started in June 2017. Between June and November 2017, the first 10 TOETVA procedures were performed in female and male patient(s) presenting with single thyroid nodules, sporadic primary hyperparathyroidism and solitary parathyroid adenoma or thyroglossal duct cyst. TOETVA was performed using 3 laparoscopic ports inserted at the oral vestibule and CO2 insufflation pressure at 6-8 mmHg was used. Each surgery was performed using laparoscopic instruments and ultrasonic or bipolar devices. Surgical outcomes, complications, conversions to open technique were determined.

Results. Six patients presented with single thyroid nodules, two patients had multinodular goitre with scintigraphic cold nodules and multifocal hyperfunctioning thyroid tissue, one patient suffered from sporadic primary hyperparathyroidism with a left sided parathyroid adenoma and one patient suffered from a thyroglossal duct cyst.

No conversion to conventional open surgery was necessary. Average tumour size was 2.1cm (1-4cm). Median blood loss was 20mL (6-100mL). No temporary or permanent hoarseness or mental nerve injury occurred, while transient hypoparathyroidism was evident after successful parathyroid resection. Five patients developed a slight postoperative hematoma and no infection was identified.

Conclusions. The TOETVA technique is feasible and safe. This approach shows promise for patients who are motivated to avoid a neck scar. After successful implementation in Austria and Germany further TOETVA procedures are destined in strictly selected patients.

OC27.

Thyroid cartilage electrodes versus tube electrodes in intra-operative neuromonitoring: a prospective evaluation of 20 cases.

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Background. During thyroid surgery, recurrent laryngeal nerve visualization remains the gold standard to avoid vocal cord palsy. Neural monitoring added a new functional dynamic tool. In order to detect clinically relevant EMG changes, it is crucial to calibrate initially the system with the highest amplitude that can be achieved. In our series of over 1500 thyroid surgery procedures, we were not able to use our monitoring or we had to adjust the tube during the procedure in 3% of all of our cases. We developed electrodes that can be placed directly on the thyroid cartilage (TC) to avoid external factors that cause this distortion.

Methods. A prospective observational analysis was performed. We constructed a database of 10 cases where EMG signals were recorded simultaneously from tube and thyroid cartilage electrodes; so confounding patient-specific variables could be excluded. With our promising results we performed 10 cases under general anaesthesia with a laryngeal mask and only our TC electrodes.

Results. We compared and evaluated data from these 20 thyroid surgery cases where we used our electrodes. Placement of acquisition electrodes on the thyroid cartilage provides a more stable detection signal with higher amplitude at the vagal nerve (209mV-1993mV), the recurrent laryngeal nerve (206mV-1987mV) and especially the external branch of the superior laryngeal nerve (101mV-931mV) as compared to signals detected with the electrodes on the endotracheal tube.

Conclusion. Both endotracheal tube electrodes and thyroid cartilage electrodes reliably record evoked laryngeal EMG signals. But with acquisition electrodes on the thyroid cartilage, external factors such as rotation, traction and dislocation of the endotracheal tube electrodes can be avoided. In addition, the use of a laryngeal mask and nerve monitoring is possible. There is a tendency of higher and more stable EMG-signals when compared with the classic tube electrodes.

OC28.

Randomized controlled trial of platysma muscle suture versus no suture for wound closure after thyroid surgery

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Background: Suturing the platysma muscle during wound closure after thyroid surgery is frequently described in the literature. However, there is no prospective evidence to support its use or benefit. The aim of this study was to evaluate how a platysma muscle suture impacts initial postoperative pain following thyroid surgery.

Methods: Participants were randomly assigned to Group A (platysma suture) or Group B (no platysma suture) in this prospective, patient-blinded trial and were followed up for six months. The primary outcome measure was wound-specific pain 24h after thyroid resection. Secondary endpoints were intra- and perioperative analgesia requirement, postoperative pain and complication until day 14 and Patient and Observer Scar Assessment Score (POSAS) six months after surgery.

Results: Forty-one patients were randomized to each group. Visual analogue scale (VAS) scores for wound-specific pain were lower in patients without platysma suturing 24h after surgery (median 3.15±1.46 (Group A) vs. 2.17±1.41 (Group B), P=0.002). There were no differences in peri- and postoperative need for analgesics, postoperative wound complication or cervical scar cosmesis six months after surgery (median POSAS 23.9±9.5 (Group A) vs 26.5±8.7 (Group B), P=0.148).

Conclusion: Omitting a suture of the platysma muscle after thyroid surgery results in less initial wound-specific pain with no difference in postoperative wound complications or cosmetic results.

Trial registration: (www.clinicaltrials.gov; NCT02951000).

OC29.

Definition of cut-off values for recovery of EMG amplitude after transient recurrent laryngeal nerve injury during thyroid surgery

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Background: Early recognition of impending injury to the recurrent laryngeal nerve (RLN) might anticipate the loss of EMG signal or weaken damage to the nerve. The latter situation allows recovery of EMG signal even intraoperatively. This study aimed the evaluation of objective cut-off values of EMG amplitude predicting intact early postoperative vocal fold (VF) function after transient RLN injury.

Methods: This was a prospective study encompassing 9 hospitals from 4 countries. Included in this study were patients with transient nerve injury in thyroid surgery under continuous vagus stimulation.

Results: A total of 68 cases with transient loss of neural monitoring signal (LOS) were included. Early postoperative VF palsy was less often noted after transient LOS type 2 than LOS type 1(25 vs. 64 %; P = 0.003). ROC analysis showed 49 % vs. 455 µV for LOS type 1, and 44 % vs. 253 µV for LOS type 2 as predictive relative vs. absolute values for prediction of intact VF function. An amplitude recovery of ≥50% of initial baseline amplitude could predict in all cases intact early postoperative VF function, independent of the type of LOS injury (P <0.001). Recovery of amplitude to ≥500 µV results in normal VF function after transient LOS type 1, whereas a minor number of nerves showed impaired VF function independent from absolute amplitude value recovered after transient LOS type 2. There were none permanent VF palsy during the 6 months follow-up in both groups.

Conclusions: LOS type 1 result in more severe damage to the nerve than LOS type 2, affecting older patients disproportionally. Although of transient nature, postoperative VF function recovers slower in segmental type 1. Independent of type of LOS, intraoperative recovery of EMG amplitude ≥ 50% of initial baseline strongly predicts intact postoperative VF function.

OC30.

Improving outcomes from thyroidectomy - effect of surgeons' annual operative volume on late hypocalcaemia - Analysis of United Kingdom Registry of Endocrine and Thyroid Surgery (UKRETS).

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Background. United Kingdom national guidelines suggest that 20-30 thyroidectomy cases per year are required to maintain surgical expertise. We investigated the effect of surgeon's annual endocrine case-load on late hypocalcaemia (6 months post-surgery) (LC), which reflects surgical damage to the parathyroid glands and is arguably the most sensitive key performance indicator in thyroidectomy.

Methods: Data on thyroidectomy in UKRETS from 01/09/2010 to 31/08/2016 were analysed. Bilateral thyroid operations were examined. Exclusion criteria included unilateral procedures, patient age >85 or <18 years, patients lost to follow-up or death <6 months post-operatively, and surgeons contributing <10 operations overall. Data analysis was performed using general additive models (GAM) and mixed effect logistic regression (GLMM) to take account of clustering of cases among surgeons. The effect of patient age, gender, annual rate (AR) of operations per surgeon and lymph node dissection (LND) on LC was examined.

Results: In total 12,485 thyroidectomies by 218 surgeons were analysed. AR ($p=0.012$) and LND ($p< 0.0000001$) were significant factors affecting LC. Categorization of AR (<25, 25-50, 50-75, 75-100 and >100 operations per year) showed that LC rates peaked in surgeons performing 25-50 cases per year and declined with higher volume in both non-LND and LND groups - LC rate was 6%, 6.6%, 4.5%, 4.1% & 3% for the above categories of AR without LND, and 15.1%, 16.6%, 11.7%, 10.8% & 8 % respectively with LND. Follow-up LC data in UKRETS was missing in 2172/12485 cases (17.4%).

Conclusion: Surgeon annual operative volume of thyroidectomy may be a factor in determining LC. The results of this study are limited by a high proportion of missing data, which could potentially bias the outcome, but tentatively suggests the minimum recommended number of thyroidectomies per annum should be increased to > 50 cases per year.

OC31.

The assessment of cricothyroid muscle innervation pattern using intraoperative electromyography

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Background: The aim of this study was to assess the cricothyroid muscle (CTM) innervation pattern, using CTM electromyography (EMG) intraoperatively.

Methods: A total of 106 subjects with median age of 45, undergoing surgery for thyroid disorders were enrolled in this study, and the innervation variants of the CTM were assessed with intraoperative EMG application, between February of 2015 and 2016.

Each neck side was accepted as a separate entity. After the completion of thyroidectomy, intraoperative EMG was performed by the surgeon via inserting needle electrodes into the cricothyroid and cricopharyngeal muscles (CPM). The EMG waveform amplitudes and latencies obtained from the vocal cords, CT and CP muscles via stimulation of external branch of the superior laryngeal nerve (EBSLN), recurrent laryngeal nerve (RLN), pharyngeal plexus (PP) and vagus, were recorded. EMG response over 100 μV was accepted to be positive.

Results: One hundred eighty-two CTMs of 106 patients were evaluated. Positive EMG waveforms were achieved from 181 CTMs with EBSLN stimulation disclosing the mean amplitude and latency values of 6812 μV and 3.29ms. Positive EMG responses of 132 (74%) CTMs were gained with stimulation of 172 RLNs. The mean amplitude of CTMs with RLN stimulation was 373 μV that is 5.5% of that with EBSLN stimulation, and the mean latency was 4.22ms. Positive EMG responses were obtained from 96 (55%) and 10 (0.6%) CTMs with stimulation of vagus nerve and PP, respectively, disclosing the amplitude and latency values of; 406 μV, 6.23ms and 296 μV, 4.78ms.

Conclusion: In the present study, high EMG amplitudes were gained from the CTMs with EBSLN stimulation in compliance with the anatomical findings. However RLN, PP and contralateral EBSLN were found to contribute to the motor innervation of the CTM, supporting the knowledge that larynx has a complex neural innervation pattern.

OC32.

Percutaneous ultrasound examination of vocal cords: do we need laryngoscopy?

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Background. The amount of thyroid and parathyroid surgeries increases annually. The main diagnostic procedure for larynx paresis is endoscopic laryngoscopy, though it has several disadvantages: this is an invasive procedure, causing discomfort to the patients. This work represents the experience of implementation of 1252 percutaneous ultrasound examination of the vocal cords. The aim was to evaluate a possibility of percutaneous ultrasound examination for detection of vocal cords mobility after thyroid and parathyroid surgery comparing with the laryngoscopy.

Methods. The first stage of the work included 809 patients, who were subjected to percutaneous larynx ultrasound check-up. During the second stage 443 patients were examined before and after operative treatment by laryngeal ultrasound and endoscopic laryngoscopy.

Results. It was possible to visualize vocal cords in 85.9% of patients (90.6% of female patients and 27.9% in men, $\chi 2 = 183.6$; $p < 0.001$). The visualization of vocal cords is feasible in 97.4% of patients under 40 years and in 57.1% in patients over 80 years ($\chi 2 = 42.4$; $p < 0.001$). Diagnostic efficiency of ultrasound visualization of vocal cords abnormality appeared to be 91.4%. The sensitivity of the method reached 62.5%, specificity 95.3%. Diagnostic efficiency of ultrasound visualization of vocal cords paresis reached 97.7%. The increase of this index is caused by sensitivity growth, which was 88.2%. Specificity grew also up to 98.5%.

Conclusions. Percutaneous ultrasound examination of vocal cords is effective and convenient method of control over larynx function in patients after thyroid and parathyroid surgery and could be used for majority of patients.

OC33.

Clinical value of ipsilateral central neck dissection in the management of patients with papillary thyroid carcinoma eligible for thyroid lobectomy

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Background. Thyroid lobectomy (TL) is the preferable option in patients with small (T1) clinically unifocal, N0 papillary thyroid carcinoma (PTC). Conversely, patients with central neck node metastases require total thyroidectomy (TT) and bilateral central neck dissection (CND). However, it is difficult to pre-operatively define central neck involvement. We aimed to verify if routine ipsilateral CND and frozen section examination of the removed nodes (IpsiCND-FSE) in PTC patients scheduled for TL can intraoperatively identify patients who would benefit from TT and CND.

Material and Methods. Between October 2014 and June 2017, 30 clinically unifocal, T1, N0 PTC patients underwent thyroid lobectomy plus IpsiCND-FSE (TL-Group). If FSE was positive for metastases, TT and bilateral CND were accomplished during the same procedure. TL-Group was compared to a control group (C-Group), who underwent TT plus ipsilateral CND, matched by a propensity score analysis.

Results. The TL-Group and C-Group were well matched for age, sex, tumour size (P=NS). At final histology, occult lymph node metastases (>2mm) were found in 5/30 patients in the TL-Group and in 6/30 in the C-Group (P=NS). Micrometastases (≤2mm) were observed in 5/30 patients in the TL-Group and in 4/30 in the C-Group (P=NS). Overall, 10 patients per group (33.3%) were staged pN1a at final histology. FSE correctly identified all the 5 patients with metastases >2 mm (16.6%) in TL-group, who underwent TT and bilateral CND during the same procedure. No definitive complication occurred in both groups. At a mean follow up of 17.0 months (range: 4-47), no patient showed local and/or nodal recurrence in both groups.

Conclusion. Ipsilateral CND allows for an accurate risk stratification of PTC patients eligible for TL. IpsiCND-FSE can safely and correctly identify intraoperatively patients who benefit from TT and bilateral CND, reducing the need of a second-step completion procedure and, theoretically, the risk of recurrence.

OC34.

Role of surgery in primary thyroid lymphoma. A multi-institutional registry

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Objectives: to evaluate the role of surgery in diagnosis and treatment of primary thyroid lymphoma.

Methods: a retrospective study setting from a multi-institutional national registry. We evaluated demographic, clinical, diagnostic workup (fine needle aspiration, FNA; core needle biopsy, CoreNB), surgery (open surgical biopsy, OpenSB; some form of elective thyroidectomy, ThyrSurg), histology (diffuse large B-cell, DLBC; extranodal marginal zone lymphoma of mucosa-associated lymphoid tissue, MALT; other), Ann Arbor staging and outcome data. Endpoint was to evaluate parameters associated with surgical procedures.

Results: we studied 54 patients. Fast growing mass was the most frequent suspicious symptom (43 patients, 79.6%). Non-surgical diagnostic workup included FNA (47 patients, 87%) and CoreNB (11 patients, 20.4%) with sensitivity in diagnosing lymphoma of 53.2% and 90.9%. OpenSB (21 patients, 38.8%; sensitivity of 95.2%). ThyrSurg was performed in 22 cases (40.7%), for definite diagnosis in 4(7.4%), as elective treatment in 4(7.4%) and incidentaloma in14 (25.9%). Ann Arbor Staging IE/IIE/IIIE/IVE was 19/23/4/8. Final lymphoma type was DLBC in 33(61.1%), MALT 9(16.5%), mixed DLBC-MALT 3(5.5%) and "other" 7(12.9%). Cases with ThyrSurg not undertaken were statistically associated with obtaining FNA and CoreNB during diagnostic workup, Ann Arbor Staging IE, and MALT lymphoma. Incidentaloma cases were statistically associated with Hashimoto's Thyroiditis history, non-obtainment of FNA or CoreNB during diagnostic workup, Ann Arbor Staging IE, and MALT lymphoma. Lymphoma-related death in 10 cases (18.5%) was statistically associated with higher age and DLBC lymphoma type.

Conclusion: 1. Fast growing thyroid mass is the most frequent suspicious symptom. 2. Use of CoreNB yields the best sensitivity in diagnosis, and its use should be generalized. 3. ThyrSurg Inicidentaloma cases were associated with incomplete diagnostic workup, lower staging (IE) and MALT. 4. ThyrSurg was scarcely indicated as elective treatment. 4. Lymphoma-related mortality was associated to elder and DLBC.

OC35.

Changing trends in cure of sporadic medullary thyroid carcinoma following systematic preoperative calcitonin screening: results from a monocentric series of 178 operated patients.

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Background. The prognosis of medullary thyroid carcinoma (MTC) remains suboptimal, since most series have reported no significant amelioration in cure rate and survival in recent decades. However, some experiences have suggested earlier diagnosis and better prognosis in recent years following the adoption of systematic preoperative calcitonin measurements as diagnostic tool. The aim of the present study was to determine the time trend cure rates in sporadic MTC according to the use of calcitonin screening.

Methods. A retrospective analysis of 178 consecutive sporadic MTC patients operated between 1980 and 2016 at a tertiary academic referral center was performed. The impact of prognostic factors on cure rate and survival following the introduction of routine preoperative calcitonin screening in 2001 was evaluated according to the time of surgery.

Results. Since 2001, significant declines of node positive tumours (from 50.8% to 31%), stage III/IV at diagnosis (from 55.9% to 32.7%) and distant metastases (from 8% to 3%) were observed, with a concomitant significant increase in survival (66% vs. 90.7%; P<0.0001) and cure rate (64.7% vs 37.2%; P=0.0005). At univariate analysis, cure was achieved more frequently in patients undergoing surgery after 2000 (64.7% vs. 37.2%; P=0.0005), at stage I/II (82 % vs. 16.6%; P<0.0001), without lymph-node metastases (79.2% vs. 16.4%; P<0.0001), and in presence of a preoperative calcitonin screening (63.8% vs 20.5%; P<0.0001). At multivariate analysis, only preoperative calcitonin screening and stage at diagnosis were independent prognostic factors for cure (P<0.0001 and P=0.0082 respectively).

Conclusion. The outcome of sporadic MTC improved in the new millennium. Earlier diagnosis could be achieved by routine calcitonin screening, leading to less advanced stage at diagnosis and subsequent significantly improved cure rate and survival.

OC36.

The impact of change from AJCC TNM 7 to TNM 8 and comparison with MACIS score in non-medullary thyroid cancer

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Background. In 2018 the AJCC TNM classification changes for differentiated and anaplastic thyroid carcinoma (DTC and ATC). We investigated the impact that TNM 8 will have on our cohort of patients and compared the mortality rates with the MACIS prognostic scoring system.

Method. A retrospective analysis of a prospectively maintained database of consecutive patients with DTC/ATC. Patients were staged according to the TNM 7 and 8 criteria and their MACIS scores calculated. Five-year disease specific mortality was calculated. Proportions were compared with Fisher's exact test, and Chi Squared goodness of fit tests.

Results. Since 2002 our unit has treated newly presenting thyroid cancer in 310 patients. Patients with non DTC/ATC (n=51) and those with follow-up <36month (n=100) were excluded leaving 159 patients (155 DTC/ 5 ATC) to be studied.

The distribution of MACIS scores was <6: 65%, 6-8: 21%, >8: 13% with corresponding disease specific five-year mortality of 0%, 14% and 81%.

For TNM 7 the distribution of stages was I: 53% (n=85); II: 11% (n=16); III: 15% (n=23); IV: 23% (n=35) and differed from TNM 8; I: 76% (n=122); II: 10% (n=17); III: 4% (n=7); IV: 9% (n=14)($p<0.001$).

The overall disease specific five-year mortality rates by stage for TNM 7 vs. TNM 8 are as follows: Stage I: 0/85 (0%) vs. 3/100 (3%) [p=0.251]; Stage II: 0/16 (0%) vs. 6/16 (37.5%) [p=0.018]; Stage III 3/23 (13.0%) vs. 2/7 (28.5%) [p=0.565]; Stage IV 20/32 (62.5%) vs. 11/11 (100%) [p=0.020].

Conclusions. The change from TNM 7 to TNM 8 has resulted in the predicted down-staging of more patients into stage I disease. The change in distribution of mortality more accurately reflects a significantly worse prognosis for stage IV disease. The outcomes for TNM 8 stage II disease are significantly worse compared to TNM 7. When looking at all stages, TNM 8 is an inferior predictor of mortality compared with MACIS. The change from TNM 7 to 8 will make historical comparisons impossible and provides a strong case for reverting to MACIS as the universal comparator for prognosis of mortality in DTC/ATC.

OC37.

The role of molecular markers in determining the extent of surgery in thyroglossal cyst carcinoma

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Background. The aim of the study was to assess the role of molecular markers in determining the extent of surgery in thyroglossal cyst carcinoma (TCC).

Materials. Between 1994 and 2016 thirty-seven cases of TCC were operated in an academic tertiary referral center in Italy. Sistrunk's procedure along with a total thyroidectomy was the surgical strategy applied routinely in all cases based on the authors' published experience. Of these, 15 (40%) cases of TCC did not demonstrate metastasis to the thyroid. These cases were retrospectively reviewed and tested for the presence of one of the most commonly encountered mutations in differentiated thyroid cancer: BRAF, N-RAS, and H-RAS. The primary outcome of interest was the correlation between mutational marker positivity and the stage of the primary tumour. Therefore, its implication on the extent of surgery required.

Results. All 15 cases were papillary carcinomas (PTC): classical variant (n=10), follicular variant (n=3), and microcarcinoma (n=2). These were found in 12 females and 3 males (4:1) with an average age of 55 years (range: 38-76 years). The average tumour size was 17 mm (range: 2-40 mm). According to the AJCC-TNM staging system these represented: stage I (n=3), stage II (n=1), and stage III (n=11). Cancerous invasion of pericystic soft tissue and/or hyoid bone placed the lesion in stage III. BRAF 600E was the only mutational marker identified in 7/15 (47%) of TCC cases, and all were stage III necessitating the need for radioactive iodine ablation (RIA) therapy and thus a total thyroidectomy. The mutation negative cases were: stage I (n=3), stage II (n=1), and stage III (n=4). Mutation positivity correlated significantly with extracystic cancerous extension [1.0 (7/7) vs. 0.5 (4/8); p value =0.03].

Conclusion. BRAF 600E positivity seems to be predictive of local aggressiveness and implies the need for a total thyroidectomy and RIA therapy.

OC38.

The expression of tumour stroma markers regarding aggressiveness and metastasizing in small papillary thyroid cancers

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Background: Small (<20mm) papillary thyroid cancers (PTC) are classified as low risk cancers, yet some tumours cause distant metastases or even death. This indicates differences in the biological behaviour of small PTCs. Tumour stroma and the microenvironment for tumour progression has been extensively studied in many tumours indicating the stroma being a source of tumour markers for detection and predicting cancer aggressiveness. Studies of collagen type 1 (Col-1), type 4 (Col-4), fibronectin 1 (FN-1), alpha smooth muscle actin (ACTA2 or α-SMA), fibroblast activating protein alpha (FAPα) and osteopontin (OPN) indicate that these stromal components play a part in metastasis, angiogenesis and apoptosis, hence affecting tumour's aggressiveness.

Methods: Nine non-metastatic small PTCs (pT1N0) and 9 metastatic small PTCs (pT1N1b) including corresponding metastatic lymph nodes. Paraffin-embedded, formalin fixed tissue from local biobanks. The expression of Col-1 and Col-4, FN-1, α-SMA, FAPα and OPN were analysed by immunohistochemistry. The expression was scored based on distribution, location and intracellular expression.

Results: The analyses of the Col-1 and Col-4 showed that both types of collagen were found as fibres in-between follicular cells in normal thyroid samples. There were no differences when comparing scores between PTCs in the non-metastatic and the metastatic group. The distribution scores for both Col-1 and Col-4 were higher and almost significant for healthy tissue compared to cancer tissue. There was a significant correlation between the expression of Col-1 in lymph nodes and corresponding primary tumours. The statistical analysis of FN-1, α-SMA, FAPα and OPN is still on-going and will be added.

Conclusion: The expression of Col-1 and Col-4 in papillary thyroid carcinomas seems to differ from healthy thyroid tissue. These pilot study findings indicate the need for a planned larger cohort study.

OC39.

Impact of intraoperative frozen section analysis on surgical management in thyroid malignancy - a comparison of Mainz single Center and German multicenter PETS II Trial

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Background. Since the 1980s, the utility of intraoperative frozen section (iFS) analysis is controversially discussed. The German Prospective Evaluation Trial for Thyroid Surgery (PETS II) offered a unique possibility for an analysis of the topic by comparing Mainz single center results to a large national collective.

Methods: For PETS II, 22011 cases of patients undergoing surgery for benign or malignant thyroid disease were registered in a period between July 1, 2010 and December 31, 2012. Of these, 569 operations (69.8% female, 30.2% male patients) were carried out at Mainz University Medical Center (UMC).

Results: At Mainz UMC, the overall malignancy rate was 20.9% (119/569), vs. 12.2% (2620/21442) at the remaining German hospitals participating in PETS II. IFS analysis was performed in 35.7% (203/569) (Mainz), vs. 21.8% (4681/21442) (Germany). Preoperatively diagnosed medullary thyroid carcinoma (MTC) excluded, iFS was analyzed in 34.0% (188/553) (Mainz), vs. 21.7% (4630/21366) (Germany), with a sensitivity of 73.8% (Mainz), vs. 62.2% (Germany). In Mainz, the entities, undetected by iFS, were in 52.9% (9/17) papillary thyroid carcinoma (PTC, including 11.8% (2/17) pT1a, 17.6% (3/17) follicular variant), 11.8% (2/17) follicular thyroid carcinoma (FTC), 11.8% (2/17) minimally invasive FTC (MIFTC), 17.6% (3/17) MTC and in 5.9% (1/17) poorly differentiated thyroid carcinoma (PDTC). In Germany, the entities, undetected by iFS, were in 67.7% (262/387) PTC (including 28.7% (111/387) pT1a), 11.9% (46/387) FTC, 7.0% (27/387) MIFTC, 2.8% (11/387) wide invasive FTC (WIFTC), 8.8% (34/387) MTC, 0.3% (1/387) PDTC and in 1.5% (6/387) other entities. Completion surgery was performed in 7.6% (9/119) (Mainz), vs. 17.2% (451/2620) (Germany).

Conclusions: The comprehensive use of iFS has an impact on intraoperative management in thyroid surgery, potentially reducing the rate of unnecessary total thyroidectomy and completion surgery. Benign and malignant lesions can be distinguished with a particular restriction in papillary microcarcinoma, the follicular variant of PTC and FTC.

OC40.

Evaluation of clinicopathologic factors of patients with follicular lesion of undetermined significance (FLUS) with fine needle aspiration biopsy made from thyroid nodules.

yunus nadi yuksek, aneah, tanju tütüncü, aneah; samet şahin, aneah; hikmet pehlivan, aneah; barış saylam, aneah; gül dağlar, aneah

Background: The Bethesda classification is widely used in the evaluation of fine needle aspiration biopsy results in patients with thyroid nodules. There are SIX groups in this class atypia (or follicular lesion) of undetermined significance (AUS/FLUS) are present in group 3 and cannot be categorized as benign or malignant. AUS and FLUS are in the same group but have different malignancy risks. The purpose of our work; fine needle aspiration biopsy from the thyroid nodule is an investigation of the clinicopathologic features of patients with focal lesions of unknown origin.

Methods: Fine needle aspiration biopsy performed due to thyroid nodule between June 2013 and November 2016 in Ankara Numune Training and Research Hospital General Surgery Clinic, Department of Breast Endocrine Surgery. Demographic, clinicopathologic and ultrasonographic findings of 29 patients were analysed.

Results: Total thyroidectomy was performed in all patients. Eight patients (27.6%) had malignant pathology report. The entire malignant lesion was papillary thyroid cancer. None of the papillary thyroid cancer patients had lymphovascular invasion, capsular invasion or lymphatic metastasis. The mean nodule diameter was 28 mm in patients with papillary thyroid cancer. After univariate analysis of clinicopathologic factors to assess malignancy risk, detection of multiple nodules in the thyroid was found to be associated with malignancy ($p = 0.027$). In the fine needle aspiration biopsy, nuclear grooving was found to be statistically significant.

Conclusion: The presence of nuclear grooving in the cytological examination and the number of multiple nodules in the ultrasonographic examination clearly increase the risk of malignancy in patients who have FLUS with fine needle aspiration biopsy from the thyroid nodule. In these patients, surgery should be performed in the frontal plane when the treatment plan is evaluated.

SESSION 6 - BEST 4 ABSTRACTS

OC41.

Autofluorescence in Parathyroidectomy: Clinically Valuable Correlations?

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Background: The inability to identify parathyroid tissue at surgery results in failure to cure hyperparathyroidism and occurs in 2-5%. The poorly understood characteristic of parathyroid tissue to manifest auto fluorescence (AF) under near-infrared (NIR) light has been considered an intraoperative adjunct in parathyroid surgery. This study sought to explore potential clinical correlates for AF and assess the clinical utility of AF in parathyroid surgery.

Methods: Consecutive patients undergoing all forms of parathyroid surgery (bilateral, unilateral and focused lateral approaches) for both primary and tertiary disease were included. NIR imaging was used intraoperatively and the degree of AF of parathyroid glands graded by the operating surgeon. The following variables were assessed for correlation with AF; pre-operative serum calcium and PTH, Sestamibi positivity, gland weight and histological composition.

Results: 96 patients underwent parathyroidectomy over an 8-month period: 49 bilateral explorations, 41 unilateral and 6 focused lateral: a total of 284 glands. 257 glands (90.5%) were successfully visualised with NIR. The intensity of AF varied between patients and with distance of the camera from the operative field, size and depth of incision. Correlation was found between the degree of fluorescence and pre-operative serum calcium and PTH, but not between gland weight or Sestamibi positivity. In those with tertiary disease, a predominance of oxyphil cells was also found to correlate with increased AF.

Conclusion: Autofluorescence intensity correlates with serum calcium, PTH and gland composition. Further refinements would be required for this information to be of value in a clinical setting. The inability of NIR to visualise 9.5% of all glands and the variation in signal intensity with factors such as depth of incision represent obstacles to the routine adoption of this technology and precludes any meaningful impact on rates of failure to cure.

OC42.

Impact of short-term preoperative 1,25vitamin-d3 administration on postoperative hypocalcaemia in patients with total thyroidectomy - results from the prospective, randomized, multicenter HypoCalViD trial.

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Background. Total thyroidectomy is a standard procedure for many thyroid conditions. Postoperative hypocalcaemia (PoH) is a frequent condition, affecting QOL and hospital stay. Low vitamin D is a risk factor, however, the utility of preoperative Vitamin-D to prevent PoH is unclear. This study evaluated the clinical outcome of short-term preoperative Vitamin-D3 administration in total thyroidectomy during a prospective randomized trial (DRKS#00005615).

Patients scheduled for total thyroidectomy received Calcitriol at 0,5µg, bid, 3 days prior to surgery (interventional group), while the control group did not. The primary endpoint, i.e. the number of patients with PoH, was defined as serum-calcium <2,1 mmol/l on any postoperative day prior to discharge. Patients were followed for secondary endpoints, such as number of days in hospital, duration of PoH and QOL (SF36 and Bohrer's-HSS, a patient reported hypoparathyroidism symptom score).

From 07/2014 to 10/2016 six CAEK-centers of endocrine surgery recruited 287 patients of which 246 were included into the final analysis. Pooled postoperative hypocalcaemia rates were not different between groups (29.2% intervention vs. 33.6% control group, n.s. chi2). Hypocalcaemia rates of individual study sites varied greatly: average 31.3%, range 16% - 64%. Duration of postoperative hypocalcaemia was significantly shorter in the intervention group: 5.4 versus 9.7 days for controls ($p<0.01$, Wilcoxon-Mann-Whitney-U-Test). The average number needed to treat, to obtain normocalcaemia at day three, was calculated with 12.5 and as low as 3 for study sites with higher hypocalcaemia rates.

Short-term Calcitriol administration prior to thyroidectomy does not affect the rate of postoperative hypocalcaemia, but significantly reduces its duration. Hypocalcaemia rates varied considerably between study sites, highlighting the impact of surgical technique. Study sides with higher hypocalcaemia rates benefit from the effect of faster calcium convalescence.

OC43.

Contralateral surgery in patients scheduled for total thyroidectomy with initial loss or absence of the NM signal

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Background: Staged thyroidectomy has been proposed to prevent bilateral recurrent laryngeal nerve paralysis when the neuromonitoring signal is lost (LOS) after first side lobectomy. This complication, however, is rare (<0.4%) and staged thyroidectomy implies a second surgical procedure not exempt of complications. Furthermore, 40-60% of patients with LOS will recover intraoperatively and/or will show a normal laryngoscopy the day after. The present study aimed at analysing the results of contralateral surgery after first side LOS/absence of the NM signal.

Patients and Methods: Neuromonitored total thyroidectomies were included in the study. Those with an initial absence of the NM signal or LOS at V2-R2 were analysed. Cases of purposeful nerve transection for cancer or undergoing reoperation were excluded. Prevalence of intraoperative recovery of the NM signal at V3-R3 and correlation between LOS and postoperative (24-48h) laryngoscopy was investigated. The number of completed total thyroidectomies and eventual changes of surgical strategy was recorded.

Results: Of 462 total thyroidectomies, 40 presented first side events: absence of signal (n=8) or LOS (n=32). Total thyroidectomy was completed in 29 patients and a change of strategy was adopted in 11 cases of goiter (8 Dunhill procedures, 3 hemithyroidectomies). Intraoperative recovery of the signal at V3-R3 was observed in 15 cases (2/8 cases of signal absence and 13/32 of LOS) after a mean of 30 min., 5 of whom (33%) exhibited postoperative vocal cord dysfunction. The NM signal persisted in 25 cases of who 15 (60%) exhibited vocal cord dysfunction. Postoperative laryngoscopy was normal in 50% of the patients. One patient with advanced cancer developed bilateral vocal paresis that was treated conservatively.

Conclusion: Intraoperative signal recovery (positive V3), cautious contralateral surgery and/or change of surgical strategy can offer a sound alternative to routine staged thyroidectomy after initial LOS.

OC44.

Pheochromocytoma and paraganglioma: value of functional studies for prediction of postsurgical disease recurrence

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Background: Pheochromocytoma and paraganglioma (P&P) are rare chromaffin tumours. Disease recurrence following surgical resection is usually insidious. Accurate preoperative prediction of the risk of malignancy of (P&P) still remains a challenge

Methods: Aim of this study was to evaluate 68Gallium Dotatate PET/CT (68GaDO) and 18FDG-PET/CT imaging modalities in addition to [(123)I]-metaiodobenzylguanidine(MIBG) that is the gold standard diagnostic modality. We aimed to assess first diagnostic sensitivity of these functional scans in biochemically-diagnosed tumours compared to MIBG, second to assess their ability to predict recurrent disease based on SUV intensity in relation to histological Pheochromocytoma of the Adrenal Gland Scaled Score (PASS) and proven disease recurrence. Other parameters included demographics, operation, resection status, tumour size, plasma metanephrines, 3-methoxytyramine (3MT), genetics, and follow up.

Results: 16 patients (F=11, 50(12-82) years) were studied prospectively. MIBG, 68GaDO, 18FDG-PET/CT were positive in 14/16(87.5%), 15/16(94%), and 14/16(87.5%) respectively. Compared to MIBG, sensitivity of 68GaDO and 18FDG-PET/CT were 100% and 87.5% respectively. 18FDG-PET/CT detected mediastinal lymphadenopathy in 3(19%)patients (False positive for metastatic disease in 2/3(67%) which were shown to be inflammatory. Five (31%) patients developed disease recurrence (malignancy=3, VHL=2) over a follow-up period of 14.5(6-132) months. Recurrence was higher with PASS=or>4 vs. PASS<4 (p=0.039), in R1 vs R0 resection (p=0.001), in patients with higher 18FDG-PET/CT SUV (8.1(7-25.6) vs 4.5(2.2-14.5), p=0.006) and 68GaDO SUV (31.6(20-43.8) vs 19.1(14-28.7), p=0.037) recurrence vs. no recurrence respectively. Plasma metanephrine levels, 3MT, surgical approach, tumour size were not associated with recurrence

Conclusion: In this small but well-studied group of patients ^{18}FDG-PET/CT and ^{68}GaDO are sensitive diagnostic modalities and can be used to identify P&P patients with higher risk of recurrence which is currently underestimated, and will need closer follow-up. Another advantage is tumour uptake characterization which will guide subsequent radio-targeted treatment