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Chairman: Akira Miyauchi, Japan

Congress President: Ranil Fernando, Sri Lanka

## 1. Predictor for Prolonged Hospital Stay Post Total Parathyroidectomy in Tertiary Parathyroidism

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### Introduction

Prolonged hospital stay due to hypocalcemia is the most common cause after total parathyroidectomy surgery for tertiary hyperparathyroidism. Parameters like levels of alkaline phosphatase (ALP), parathyroid hormone (PTH), and phosphate ( $\text{PO}_4$ ) were measured preoperatively. The purpose of this study was to determine whether any of these parameters could be a predictor for prolonged hospitalization in these patients.

### Materials and Methods

Retrospective analysis of 12 tertiary hyperparathyroidism patients who underwent parathyroidectomy between January 2010 and August 2013 were studied. Levels of ALP, PTH, and  $\text{PO}_4$  were measured preoperatively during outpatient follow-up. A standardized perioperative calcium infusion protocol and discharge criteria were used.

### Results

There were nine (75%) female, three (25%) male patients. The majority were Malaysians 11 (91.7%) and 1 (8.3%) was Chinese. The mean age in this study was 42.2 years. The longest hospital stay was 11 days with ALP level 2490 U/l. The shortest hospital stay was 4 days with ALP level 132 U/l. The mean post-operative hospital stay was 6.75 days. From Spearman's Rho correlation test shows the post-operative length of stay was significantly correlated with ALP preoperative levels ( $R^2 = 0.2792$ ;  $p < 0.001$ ). However, due to incomplete data for PTH and  $\text{PO}_4$  level; the p-value was not significant which was 0.4 and 0.06, respectively.

### Conclusion

A high preoperative ALP level is a predictor for prolonged hospital stay in patients undergoing parathyroidectomy for tertiary hyperparathyroidism. This study was unable to determine the importance of the PTH and  $\text{PO}_4$  level due to incomplete data.

## 2. Indeterminate Thyroid Nodules: A Single Unit Experience

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### Background

In the preoperative decision-making of the thyroid swellings, fine-needle aspiration cytology (FNAC) is becoming an ever more vital tool. Undetermined thyroid cytology precludes any definitive distinction between malignant and benign lesions. Fine-needle aspiration cytology has become the investigation of choice because of its high accuracy, simplicity, minimal invasiveness, quick result, and reliability. There is often confusion surrounding the management of patients with an indeterminate cytology.

### Materials and Methods

A retrospective analysis was made regarding the demographical data and histology of patients who underwent thyroidectomy for Thy 3 lesions in our unit.

### Results

A total of 50 (44 females, 6 males) underwent surgery from January 2011 to November 2012 with a mean age of 43.14 years. Follicular adenoma was the commonest histological finding ( $n = 26, 52\%$ ) followed by follicular carcinoma ( $n = 6, 12\%$ ) and follicular variant of papillary carcinoma

(n = 6,12%). Follicular adenoma (n = 4,66.6%) and follicular variant of papillary carcinoma (n = 1,16.6%) were the histological findings in male patients. All the patients with follicular carcinoma were females. The average size of the nodules in follicular adenoma was 28.5 mm (3-80 mm), while that of follicular carcinoma was 31.2 mm (5-65 mm).

## Discussion and Conclusion

In our study age, sex and size of the nodule were not predictive factors that differentiate malignant from nonmalignant lesions in thyroid nodules with indeterminate cytology.

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### 3. Sleeve Gastrectomy: Is it an Effective Procedure for Type 2 Diabetes Mellitus and Obesity? A Single Unit Experience

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#### Introduction

Sleeve gastrectomy is performed to help promote weight loss and improve overall health with respect to obesity-related comorbidities in patients with severe obesity when medical treatments, including lifestyle changes have not been effective. This study reviewed prospectively collected data on a personal consecutive series of sleeve gastrectomies performed in wards 29 and 23, National Hospital of Sri Lanka over 12 months. Patients were followed-up 12 months post-operatively assessing weight reduction and glycemic control.

#### Methods

From April 2012 to March 2013, 12 sleeve gastrectomies were performed. Median age of population 47 years (SD 9 years) and male, female ratio 1 : 11. Mean preoperative body mass index (BMI) of the population 34.76 kg/m<sup>2</sup> and mean weight 85 kg. Eight patients had diabetes and five were on insulin and three on oral hypoglycemics. Mean fasting blood sugar (FBS) level 224.32 mg/dl.

#### Results

Mean BMI of the population at 6 months is 28.2 and in 12 months 26.3, with percentage BMI reduction of 18.8 and 24.3%, respectively. Mean weight at 12 months is 65 kg (24% reduction). Mean post-operative FBS value of diabetic group at 12 months is 100.87 mg/dl (55.03% reduction). None of them were on insulin and only three needed oral hypoglycemics at 12 months. A total of 58.33% patients had no complications. Two post-operative dysphagia, two gastroesophageal reflux disease, two gastrocutaneous fistula, and one post-operative bleeding were present. Overall patient satisfaction is 83.33%.

#### Conclusion

Sleeve gastrectomy is an effective procedure for obesity and uncontrolled type 2 diabetes.

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### 4. Preoperative Ultrasonographic Diagnosis of Follicular Thyroid Carcinoma

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#### Purpose

Preoperative fine-needle aspiration for thyroid nodules yields 15 to 30% indeterminate cytologic findings. The current algorithm for managing patients with indeterminate thyroid cytology is a thyroid lobectomy, followed by a completion thyroidectomy depending on histology. We investigated whether ultrasonographic (US) feature in addition to clinical characteristics would make putative diagnoses using US image to differentiate between follicular carcinoma and adenoma preoperatively.

#### Materials and Methods

Medical chart archives, clinical histopathologic data, and US images of follicular adenoma and carcinoma from April, 2005 to August, 2013 were collected retrospectively. The US findings were categorized according to the size, shape, margin, echogenicity, echotexture, presence of hypoechoic halo, microcalcification, plus tubercle-in-nodule, and trabecular formation. US features of widely invasive follicular thyroid carcinoma (FTC) were compared with those of other tumors including follicular adenoma and minimally invasive follicular carcinoma (MIC).

## Results

Out of 199 nodules in our series, 63 males and 128 females, underwent thyroidectomy at National Taiwan University Hospital from 2005 to 2013. The histopathology reading was adenoma in 160 of 199 nodules, MIC in 21 and FTC in 18. The demographic and US details of follicular adenoma, MIC, and FTC groups were compared by t-test. As far as the size, shape, halo sign, and microcalcification of US features were concerned, tubercle-in-nodule and trabecular formation were considered to be significantly related to widely invasive FTC.

## Conclusion

The US characteristics of shape, halo sign, tubercle-in-nodule, and trabecular formation may help to differentiate follicular adenoma from FTC preoperatively.

## 5. Ganglioneuroblastoma as Vasoactive Intestinal Polypeptide-secreting Tumor: A Rare Case Report in a Child

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### Background

Watery diarrhea, hypokalemia, and achlorhydria (WDHA) syndrome caused by vasoactive intestinal polypeptide (VIP)-producing tumor only rarely occurs in patients with nonpancreatic disease. VIP can be produced by mature neurogenic tumors. Mason et al first described the secretory nature of neuroblastoma. Elevated VIP plasma levels cause secretory diarrhea with excessive loss of water and electrolytes. Despite the clinical severity, diagnosis of a VIP-secreting tumor is often delayed.

### Case Report

A 14-month-old boy having advanced symptoms of persistent secretory diarrhea with hypokalemia and metabolic acidosis, extensively evaluated by physicians, was referred with radiological diagnosis of retroperitoneal mass. He was normotensive. Contrast-enhanced computed tomography (CECT) showed a heterogeneously enhancing mass of size  $5.5 \times 5.7 \times 7.1$  cm with multiple foci of calcification in the right anterior pararenal space that was displacing almost all major vessels (celiac axis, inferior vena cava, aorta, etc), pancreas, and duodenum. The right adrenal was not separately seen. Histopathology/immunohistochemistry revealed diagnosis of ganglioneuroblastoma (Stage – III).

### Result

Neoadjuvant chemotherapy was tried and after 4-cycles; it showed partial response. In the view of patient condition with persistent symptoms, we decided for surgery but parent of child denied for high-risk surgery and asked referral for higher center.

### Conclusion

In all patients with drug-resistant secretory diarrhea with hypokalemia and metabolic acidosis, VIP-secreting tumors including ganglioneuroblastoma/neuroblastoma should be considered. Diagnostic work-up must include computed tomography along with other appropriate investigations.

## 6. Endoscopic Thyroidectomy: Experience of Initial 11 Cases from Single-Center specialized in Thyroid Surgery

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### Introduction

The endoscopic technique is popularized in diseases of all organs. Thyroid endoscopic surgery is being practiced by very few, because of learning curve and fear of complications. Here, I am presenting my initial experience of 11 cases. To see the feasibility and short-term outcome of endoscopic thyroidectomy.

### Methods

All 11 cases were performed through breast and axillary approach, I have used three ports. One 10 mm port from the axilla, 5 mm port from the periareolar incision of the ipsilateral breast, and 5 mm port from the 5 cm above the 1st port. Create the space in the neck between the strap

muscle and thyroid. Handle the lower pole and cut the isthmus, then laterally separate the lobe to preserve the both parathyroid and recurrent laryngeal nerve. Finally, handle the superior pole and take out the lobe from axillary port site. Put the drain and close the skin by subcuticular absorbable stitches.

## Results

All 11 cases were female with mean age of 35 years. Mean gland weight 15 gm, mean tumor size was 04 cm, and the mean operating time was 112 minutes. There was temporary voice change in 04 patients and recovered within 6 weeks after surgery. There was no post-operative hypocalcemia. All patients were discharged within 24 hours. No other post-operative complications. Good cosmetic outcome.

## Conclusion

Endoscopic thyroid surgery is a good surgical option for the small thyroid nodules. It is an alternative of other minimally invasive surgery for the young females with small thyroid nodules.

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# 7. A Case of Radiation-induced Angiosarcoma of the Breast

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## Case Report

Radiation-induced angiosarcoma of the breast is rare and poor prognosis. We report a case of radiation-induced angiosarcoma after breast conserving surgery for breast carcinoma. A Japanese woman was diagnosed with right breast carcinoma and underwent breast conserving surgery and post-radiation therapy. Eight years later, she was 81-year-old and noticed the redness and induration of the right breast. Needle biopsy revealed the invasion of spindle-shaped cells with vascular differentiation infiltrated into the dermis. Immunohistochemistry revealed that these atypical cells were positive for CD34 and Vimentin, and she diagnosed as angiosarcoma of the breast. A computed tomography scan showed no metastasis at the time of diagnosis and surgical excision was considered. But 2 months later, pleural effusion and chest wall invasion was appeared. According to her intention, the chemotherapy was not performed. She received best supportive care and died 6 months after diagnosis of angiosarcoma. The angiosarcoma of the breast after radiation therapy was rare. There is no established treatment for it and the prognosis is poor. So, we have to take care of the sign of the angiosarcoma during the follow-up of the patients who have undergone breast conserving surgery.

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# 8. Ultrasound-guided Percutaneous Catheter Drainage in the Treatment of Acute suppurative Thyroiditis

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## Introduction

To investigate the experience of diagnosis and treatment of the ultrasound-guided percutaneous catheter drainage in the treatment of acute suppurative thyroiditis.

## Materials and Methods

A total of 25 cases of acute suppurative thyroiditis in the hospitalized patients were retrospectively studied by using their clinical data, diagnostic methods, and treatment in the past 5 years.

## Results

A total of 25 cases of acute suppurative thyroiditis cases, including 7 cases of incision and drainage therapy, ultrasound-guided percutaneous catheter drainage treatment in 18 patients. Patients admitted to hospital were treated with broad-spectrum antibiotic therapy and post-operative physical therapy, including 7 patients do not agree with ultrasound-guided percutaneous catheter drainage treatment line incision and drainage, 18 routine ultrasound-guided percutaneous catheter drainage treatment. The average on the 7th post-operative incision was discharged 2 weeks wound healing; puncture group was discharged on an average of the 6th and the 9th drainage tubes, wound healing, scarring is very small. Patients in both groups underwent pus bacterial culture and sensitivity testing, sensitive to antibiotics based on susceptibility results are applied to obtain good results. Post-operative follow-up in 2 months - 5 years, no recurrence incision group, one patients of puncture group relapsed after 1 month, after re-puncture catheter drainage cured after treatment. There were no significant changes in thyroid function.

## Discussion and Conclusion

Acute suppurative thyroiditis take ultrasound-guided puncture and drainage of pus treatment, and the combination of sensitive antibiotics, can shorten the healing process, safe and effective. More importantly, it has a cosmetic effect.

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## 9. The Safety of Video-assisted modified Radical Neck Dissection in Papillary Thyroid Carcinoma

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### Introduction

Evaluate the safety of video-assisted modified radical neck dissection in papillary thyroid carcinoma.

### Materials and Methods

We retrospectively analyzed 41 cases of papillary thyroid carcinoma patients with video-assisted modified radical neck dissection from 2006.06.01 to 2013.06.01 at the thyroid surgery department of the First Hospital of Jilin University. In order to evaluate such surgical safety, we analyzed statistically its complications.

### Results

Forty-one patients included in the study were divided into four groups by the surgical procedures as following: I. Only lateral neck dissection. II. Total thyroidectomy plus lateral neck dissection. III. Thyroidectomy plus central and lateral neck dissection. IV. Lateral plus central neck dissection. The average incidence of post-operative complications was 58.5%. The incidence of post-operative complications in group III was up to 68%, II group followed by up to 66.7%. The lowest incidence of complications in the group I was only 20%. Among complications, the temporary hypoparathyroidism was most common (41.5%). No one case happened with permanent complications. No operative mortality.

### Discussion and Conclusion

The video-assisted modified radical neck dissection is safe with less permanent complications from this surgical approach which not only preserves the neck functions, retains notch beauty, but also did not reduce the safety of surgery. However, if with central neck dissection, especially in patients with total thyroidectomy, the incidence of complications will increase. The most common complication is hypoparathyroidism, so intraoperative parathyroid protection is particularly significant.

## 10. Coexistence of Medullary Carcinoma and Papillary Carcinoma in the Same Lobe of the Thyroid: A Rare Case Report

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### Introduction

We report a rare case of coexistence of medullary thyroid carcinoma (MTC) and papillary thyroid carcinoma (PTC) in the right thyroid lobe. A 60-year-old female patient was diagnosed with MTC and PTC after right hemithyroidectomy. The extreme rarity of this pathological feature is discussed. While immunohistochemistry for calcitonin and thyroglobulin suggested histogenesis, cytopathology of the biopsy confirmed MTC and PTC. The coexistence of MTC and PTC differs from the more common mixed tumors as both tumors occurred in the single tissue. In conclusion, this case report not only can improve the clinical diagnosis rate of rare cases, but also can avoid reoperation of the patients and improve survival and the quality of life.

## 11. Positive Expression of COX-2 and MMP-9 in Papillary Thyroid Carcinoma and Clinical Significance

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### Introduction

To investigate the COX-2 and MMP-9 expression and its clinical significance in thyroid cancer.

### Materials and Methods

Expressions of COX-2 and MMP-9 with immunohistochemical assay in thyroid cancer, thyroid adenoma, nodular goitre, and normal thyroid tissue were examined and clinic pathological characteristics as well as lymph node metastasis were analyzed.

## Results

Expression of COX-2 and MMP-9 in thyroid cancer was significantly higher than that of benign thyroid lesions which was closely related to age, tumor size, tumor capsule, and the clinical stage ( $p < 0.05$ ). COX-2 was significantly correlated with lymph node metastasis ( $p < 0.05$ ). There were no significant differences of COX-2 and MMP-9 with gender ( $p > 0.05$ ).

## Discussion and Conclusion

COX-2 and MMP-9 are important malignant biological indicators in thyroid cancer, and detection of COX-2 and MMP-9 contribute to the preoperative diagnosis of thyroid cancer and determination of lymph node metastasis, tumor infiltration, so that patients receive effective treatment in time.

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## 12. Research of 450 Cases for Lymph Node Metastasis of Papillary Thyroid Cancer in CN0 Stage in Northeast China

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### Introduction

To discuss the metastasis rule of cervical lymph nodes in thyroid papillary carcinoma and to find the rational surgery pattern.

### Materials and Methods

Clinical data of the 450 cases CN0PTC patients who underwent surgery in the First Hospital, Jilin University from February 2008 to February 2011 were retrospectively analyzed.

### Result

When the tumor diameter was no less than 1.0 cm, capsule invasive or multifocal, male, age  $< 45$ , the lymph node metastasis was significantly increased ( $p < 0.05$ ). In addition, when the tumor was located in the upper pole of the thyroid, the lymph node metastasis rate was 33.57% in central areas, and the colorectal central area lymph node metastasis rate was 10.48% when it was in the lower pole of the thyroid.

### Discussion and Conclusion

The central area lymph nodes should be cleaned regularly when it was the initial surgery. When the tumor diameter  $\geq 1.0$  cm, the thyroid capsule was invaded or more than three metastasized lymph nodes were found in central area, we should expand the range of lymph node dissection (central area). It is necessary for us to clean the colorectal central area when the tumors located in the lower pole of the thyroid; and if the tumors locate in the upper pole of thyroid patients, we should perform neck dissection in central area as well.

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## 13. Application of Multifunctional reserved Cervical Lymphadenectomy in Thyroid Carcinoma

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### Introduction

To discuss the feasibility and significance of multifunctional reserved cervical lymphadenectomy in thyroid carcinoma.

### Materials and Methods

Analyzed the 65 cases of multifunctional reserved cervical lymphadenectomy of regions II to VI in thyroid carcinoma, four of them were bilateral cervical lymphadenectomy, from April 2006 to December 2009 in The First Hospital of Jilin University retrospectively, including 54 cases of papillary thyroid carcinoma, 3 cases of follicular thyroid carcinoma, and 4 cases of medullary thyroid carcinoma.

### Results

Reservation of great auricular nerve were 60 cases, lesser occipital nerve were 56 cases, and supraclavicular tegmentary nerve were 58 cases. Follow-up investigation from 1/2 to 4 years after operation manifested 1 case recurred in the 18th month, 1 case recurred in the 3rd year, no recurrence appeared in 59 cases, sensory function in auricular region recovered well during 3 months after operation in all cases, no insensible feeling occurred in cervical and shoulder, no changes of cervical appearance appeared after surgery.

### Discussion and Conclusion

Multifunctional reserved cervical lymphadenectomy can both cure the tumor radically and reserve the feeling in auricular region, cervical and supraclavicular region, which improve the quality of patients living.

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## 14. The Protection of Parathyroid Gland and its Function during Total Thyroidectomy in 1025 Cases

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### Introduction

To discuss how to protect the parathyroid gland and its function.

### Materials and Methods

The parathyroid glands were exposed during the operation in 1025 cases of patients who received the total thyroidectomy. Their nutrient vessels were recognized and protected carefully. The level of serum calcium and parathyroxin was compared before and after the operation.

### Results

A total of 36 cases (3.5%) had the symptom after surgery. Twelve cases (1.2%) had a hypocalcemia and normal parathyroxin with no symptoms, the serum calcium approached to normal level after 3~60 days by medicine, the parathyroxin approached to normal level after 5~90 days; 124 cases (12.1%) suffered a transient hypocalcemia with the normal parathyroxin level; 853 (83.2%) cases had a normal level of serum calcium and parathyroxin. No permanent hypoparathyroidism appeared in all patients.

### Discussion and Conclusion

The key point of protecting the parathyroidism's function is to identify and protect the parathyroid gland and its blood supply. The effective treatment for parathyroid gland with poor blood supply or being cut down during the operation by mistake is autoplasmic transplantation.

## 15. Denosumab for Treatment of Bone Metastases from Thyroid Cancer

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### Introduction

Evidences of denosumab for treatment of bone metastases from thyroid cancer are limited. In Japan, denosumab can be used for bone metastases for solid tumors since April 2012.

### Materials and Methods

This was observational study of four patients with bone metastases for thyroid cancer treated with denosumab. The occurrence of skeletal-related events (SREs), hypocalcemia and transition of renal function were evaluated as indicators of safety and efficacy.

### Results

In the observation period, there were four patients treated, two females and two males whose median age was 62 years old. The primary tumors were three differentiated carcinoma and one poorly differentiated carcinoma. There was one out of three patients with visceral metastasis. All patients were alive, the median duration of therapy was 6.9 months. There were one SRE (bone pain), one mild hypocalcemia with no symptoms and recovered without additional therapy, and no decrease of renal function was observed.

### Discussion and Conclusion

Denosumab use for bone metastases from thyroid cancer was safe and effective.

## 16. Experience of Minimally Invasive Endoscopic-assisted Surgical Treatment of Thyroid Cancer

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### Introduction

To investigate the role of endoscopic-assisted thyroidectomy in differentiated thyroid cancer therapy.

### Materials and Methods

A retrospective analysis of minimally invasive endoscopic-assisted surgical treatment 302 cases of thyroid cancer from January 2007 to January 2013, then summarize experiences and observations surgery recovery post-operative.



## Results

In addition to 11 cases of conversion to open surgery, we successfully completed 302 cases of endoscopic-assisted surgery in 313 cases of thyroid cancer. The operation time was 45 ~ 98 minutes, an average of 55 minutes; blood loss was 15 ~ 80 ml, an average of 30 ml, post-operative drainage 10 ~ 70 ml. Two to three days later drainage tubes were removed. Post-operative hospital stay 1 ~ 4d, average 2.4 d. Patients were satisfied with the surgical scar. No use of painkillers after surgery. One case of temporary hoarseness after surgery, recovered within 3 months; one case of post-operative transient hypocalcemia, after giving calcium, 1 week recovery; pathological diagnosis of unilateral single papillary thyroid carcinoma 79 cases (with or without goitre), unilateral multiple papillary thyroid carcinoma (with or without goitre) 101 cases, 120 cases of bilateral papillary thyroid carcinoma (with or without goitre), and thyroid follicular carcinoma in two cases. Central lymph node dissection of 1 to 12, an average of 4.2, including metastasis 45% (136 cases), lateral cervical lymph node dissection 4 to 20, an average of 8.2, including metastasis 80% (22 cases).

## Discussion and Conclusion

Minimally invasive endoscopic-assisted surgical treatment of thyroid cancer is safe and reliable, fewer complications, less trauma, better cosmetic results, and worthy of promotion.

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# 17. Persistent Hypertension after Adrenalectomy in Pheochromocytoma

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## Introduction

Many patients of pheochromocytoma have hypertension (HTN). It can be cured by adrenalectomy. However, some patients should maintain HTN medication after surgery. We reviewed medical records of adrenalectomy patients and attempt to identify risk factors of hypertension after surgery.

## Materials and Methods

We reviewed retrospectively adrenal database of the Ajou University Medical Center between 1995 and 2011. Definition of HTN was that systolic blood pressure was over 140 mm Hg or diastolic blood pressure was over 90 mm Hg. We compared between normal blood pressure patients and HTN patients on long after surgery. We investigated gender, age, body mass index, size, diabetes mellitus (DM), impaired glucose tolerance (IGT), familial history of HTN, smoking, alcohol, 24 hours urine catecholamine, histopathology, duration of preoperative HTN, serum cholesterol, and triglyceride. Statistical significance was defined as a p-value <0.05.

## Results

We identified 55 adrenalectomy and mass excision cases due to pheochromocytoma. Hypertension at diagnosis, DM or IGT at surgery, specific symptom of pheochromocytoma except sustained HTN, cardiovascular disorder at diagnosis, body mass index calculated using body weight at phone survey and DM at last follow-up were significantly different between two groups in univariate analysis. Then, we performed multivariate analysis. HTN at diagnosis was only significant factor for HTN long after surgery (p = 0.007).

## Discussion and Conclusion

HTN at diagnosis was only significant risk factor for persistent HTN. Characteristics of HTN after surgery were different from essential HTN. Further study for effect of preoperative HTN is needed.

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# 18. The Risk Factors Affecting Disease-free Survival in Low to Intermediate Risk Group with Papillary Thyroid Microcarcinomas

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## Introduction

Most papillary thyroid microcarcinomas (PTMCs) are clinically indolent and have a good prognosis. But some of patients were certainly sure of undergoing recurrence. Several risk factors affecting thyroid cancer recurrence. The objective of this study was to find out risk factors affecting the disease-free survival (DFS) in low to intermediate risk group with PTMC.

## Materials and Methods

We identified 1873 PTMC patients of low to intermediate risk group who underwent thyroidectomy between 1994 and 2010 in Ajou University Hospital. We compared DFS according to each risk factor. Definition of low to intermediate group was no distant metastasis, no gross invasion except strap muscle and no lateral neck node metastasis.

## Results

Forty-three patients had undergone recurrence. Several factors had statistical significance in univariate analysis; gross extrathyroid extension (ETE), central lymph node (LN) metastasis, N stage, and number of metastatic LN (p < 0.005). In multivariate analysis, gross ETE and more



than four metastatic LN were significant factors ( $p < 0.005$ ). Lateral neck recurrence was related to gross ETE and number of metastatic LN ( $p < 0.005$ ). Contralateral lobe recurrence in lobectomy was related with multifocality ( $p = 0.037$ ). Factors contributing bilaterality were central LN metastasis ( $p = 0.023$ ) and ETE ( $p = 0.001$ ).

### Discussion and Conclusion

The patient that have more than four metastatic LN or gross ETE need to do more aggressive treatment and careful follow-up. Lobectomy of thyroid may be favorable in specific condition; solitary tumor, no ETE, and no central LN metastasis.

## 19. The Analysis of Tumor Aggressiveness according to Tumor Size in Papillary Thyroid Carcinoma Less Than 2 cm in Size in Korean Patients

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### Purpose

Papillary thyroid carcinomas (PTCs) less than 2 cm in size are believed to be a less aggressive subset of PTC which behave more like benign lesions and are often more conservatively treated. However, it is unclear whether carcinoma no larger than 2.0 cm in diameter can be expected to have a similar favorable clinical behavior as tumors no larger than 1.0 cm. Therefore, to address this question and to characterize the biology and optimal treatment for PTC less than 2 cm, we performed a retrospective chart review.

### Methods

From October 2001 to March 2013, 649 patients underwent surgery for PTC less than 2 cm. Data from these patients were retrospectively analyzed.

### Results

The mean age of these patients was 43.2 years and 91.7% were females. A total of 52.9% of the patients underwent a total or near-total thyroidectomy. Of the 649 patients, 2196 (30.2%) had lymph node metastases. The patients present with signs of aggressiveness including multifocality (42.5%), bilaterality (24.3%), capsular invasion (44.5%). Lymph node metastases were associated with tumor size ( $p = 0.008$ ) only, but not capsular invasion, bilaterality, multifocality, age, and sex. With follow-up of up to 138 months, seven patients had a local recurrence (recurrence rate = 1.1%), two patients had a distant metastasis. No patients died during this period.

### Conclusion

In PTC less than 2 cm in size, progressively increasing frequency of signs of tumor aggressiveness including bilaterality, capsular invasion, and lymph node metastasis with increasing tumor size.

## 20. Risk Factors related to Contralateral Lobe Recurrence after Hemithyroidectomy in Papillary Thyroid Carcinoma

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### Introduction

With the general rise in papillary microcarcinoma incidence, the practice of hemithyroidectomy is increased accordingly. We investigated the outcomes of hemithyroidectomy in papillary thyroid carcinoma and evaluated the risk factors related to recurrence.

### Materials and Methods

A total of 1002 patients underwent hemithyroidectomy for papillary thyroid carcinoma in Asan Medical Center from January, 1996 to December, 2007. We included 966 patients in this study whom complete follow-up data were available for at least 12 months. Median follow-up period was 79 months (13~206). We compared the clinicopathologic characteristics of the patients with recurrence to the patients with no recurrence.

### Results

There were 127 male and 839 female patients with mean age of  $46.3 \pm 10.8$  years (17~82). Forty-two recurrences were detected and mean duration to recurrence after surgery was  $49.3 \pm 3.48$  months (12~198). Among these patients, 34 patients developed the contralateral lobe recurrence and seven patients developed the regional lymph node recurrence. One patient showed the distant metastasis. No death from thyroid cancer occurred. The patients with recurrence were younger than the patients with no recurrence ( $p = 0.03$ ). The recurrence group had larger tumor size and more common metastasis in central lymph node, significantly ( $p = 0.01$  and  $0.01$ , respectively). But when we performed multivariate analysis, there were no significant differences between these groups.

## Conclusion

The recurrence after hemithyroidectomy showed relatively very low incidence and hemithyroidectomy would be the proper practice in selected patients. Completion thyroidectomy may not be recommended in low-risk patients and close follow-up is adequate in these patients.

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## 21. Literature Review of Germline MEN1 Mutations in Korea

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### Introduction

Multiple endocrine neoplasia type 1 is an autosomal dominant disease caused by the MEN1 germline mutation. We reviewed previous reports to summarize the characteristics of germline MEN1 mutation in Korea.

### Materials and Methods

We retrieved literature of about MEN1 germline mutation in Korea using the PubMed and KoreaMed databases. We collected data about mutational types and clinical characteristics.

### Results

From the literature review, 12 cases of MEN1 mutations in Korea were found. C. 196\_200dupAGCCC was reported in three cases. Frameshift mutation was in six cases, missense mutation was in three cases, nonsense mutation was in two cases, and splice site mutation was in one case. Five mutations were novel mutations not reported previously.

### Conclusion

We summarized the characteristics of germline MEN1 mutations in Korea. Genetic tests of MEN1 will be useful in preclinical diagnosis and genetic counseling of MEN1 affected individuals.

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## 22. Bilateral Chylothorax following Left Radical Neck Dissection

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### Introduction

We report a rare case of bilateral chylothorax following left radical neck dissection. A 39-year-old female patient was diagnosed with papillary thyroid carcinoma (PTC). The chest radiograph is normal before operative. Among the surgical bilateral thyroid was cut and left soft tissue lymph nodes were radically dissected. Patients had bilateral chylothorax in the next day after surgery. Chylothorax is an uncommon complication after neck dissection. Generally occurs unilateral, bilateral rarely. This patient cured by conservative method. In conclusion, this case report not only can improve the clinical diagnosis rate of rare cases, but also can avoid more complications of the patients.

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## 23. Our Institution's Experience in Adrenocortical Carcinoma

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### Introduction

Adrenocortical carcinoma is rare malignancy with an estimated incidence of 1 to 2 per million per year. We report on our institution's series of 10 patients with adrenocortical carcinoma diagnosed from 2002 to 2012.

### Materials and Methods

Data were collected retrospectively on patients diagnosed with adrenocortical carcinoma from 2002 to 2012. This included patient's demographics, disease characteristics, operative details, and long-term outcome.

### Results

There were a total of 10 patients, 5 females and 5 males, with mean age of 60 years (47-77 years) at time of diagnosis. Majority of the patients (60%) presented with mass-related symptoms, while 20% presented with Cushing's syndrome. Most (70%) of the patients had stage 3 or 4 disease by the time of presentation. All except one underwent open adrenalectomy. Mean hospitalization stay after surgery was 7 days (2-27 days). There was no major perioperative morbidity or mortality. Majority (90%) of the patients developed local or distant recurrence within median follow-up of 30 months after initial surgery. Most of the metastases (50%) are found in the liver. During follow-up, 6 of the 10 patients died with a median survival of 36 months and all died from metastases.

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## Conclusion

Adrenocortical carcinoma is an uncommon disease presenting either with symptoms related to excess steroids or mass effect. Many presented late with either stage 3 or 4 disease. Surgery is recommended as it is currently the only option for treatment, with low perioperative morbidity and mortality. However, it is usually associated with high recurrence and poor prognosis.

## 24. Recurrent Adrenocortical Carcinoma—Challenges in Management

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### Introduction

Adrenocortical carcinomas (ACCs) need aggressive therapy.

### Aim

To review patient data with recurrent ACC and to analyze surgery, recurrences, and outcome.

### Method

Retrospective study on patients with recurrent ACC from 2004 to 2013.

### Results

5/32 patients with ACC operated elsewhere presented with recurrences. Positron emission tomography (PET) scan was useful to assess recurrences and surgical planning. Analysis of operative details of 1st surgery showed difficulty with laparoscopic/posterior-lateral approach.

Five patients with recurrent ACC.

No.	Year	Age (yrs)/ sex	Clinical	Tm. size (cm)	Primary treatment	Recurrence (mo.)	PET scan	2nd surgery	Further treatment outcome
1	2013	67/M	Conn's syn	11.5	Robotic converted to open	6	Local, liver, lung skeletal mets	Nil	Palliative CT started
2	2013	31/M	Cushing's syndrome	12.9	Laparoscopic con- verted open post- eriolateral, com- puted tomography	2	Local, pelvic nodes b/l	Open en bloc resection, pelvic lymphnode dissection	Mitotane, refused RT Fup- 6 mo.
3	2012	43/F	Cushing's syndrome	10	11 <sup>th</sup> rib posterior- lateral approach	2	Local	Open en bloc	RT, lung mets at 1 year- refused CT-Fup-1.5 yr stable
4	2012	23/F	Non- functional	13	Open surgery	3	2.5 cm local, liver, lung mets	Nil	CT 6 cycles- stable on mitotane Fup- 1 year
5	2012	25/F	Cushing's syndrome	8.6	Open surgery	4	8.7 cm local, lung mets	Nil	Ketoconazole Fup- nil

### Conclusion

Systemic recurrences concurred with tumor bed in 80% cases. PET scan was useful to detect recurrences and plan surgery. Mean duration of time to recurrence short ( $3.4 \pm 0.7$  months). Open anterior approach and en bloc resection of invaded organs by experienced team with no spillage vital to reduce recurrence.

## 25. Secondary Hyperparathyroidism

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Secondary hyperparathyroidism (SHPT) requiring parathyroidectomy (PTx) occurs more commonly in progressive chronic kidney disease (CKD). The surgical indications and prevalence of PTx for SHPT are influenced by medical treatment. Recently, induction of cinacalcet HCl has influenced the frequency of PTx. At least in Japan, number of PTx for SHPT dramatically has decreased.

Secondary hyperparathyroidism is typical multigland disease. Because fundamentally all parathyroid glands including supernumerary glands are hyperplastic and in patients with CKD stimuli to parathyroid glands persist. Therefore, it is difficult to avoid persistent/recurrent HPT. After induction of cinacalcet, it has been more difficult to detect all parathyroid glands because fibrosis, hemorrhagic infarction, and cystic degeneration has been frequently observed.

To recognize that all parathyroid glands can be removed is one of problematic issues. We performed PTx for SHPT totally in more than 3000 patients. At 1st day after PTx, intact parathyroid hormone (PTH) levels has been routinely measured. If the 1st day PTH level is more than 60 pg/ml, reoperation due to persistent HPT was significantly frequent. The missed glands were commonly mediastinal or undescended glands.

Also in SHPT, intraoperative PTH monitoring useful to recognize all parathyroid glands could be removed or at least enlarged glands are not remained. When intact PTH level at 10 minutes after removal of all glands identified drops under 30% from PTH level at the beginning of operation, the abnormal parathyroid glands successfully can be resected. We can avoid more aggressive procedures with risk of impaired recurrent laryngeal nerve, bleeding, and/or hypothyroidism.

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## 26. Sutureless Thyroidectomy: Vessel Sealing using Standard Bipolar Diathermy is Safe and Efficient Alternative

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### Background

The thyroid gland is one of the most vascular organs in the body and surgical resection mandates meticulous surgical technique and hemostasis.

### Objective

The aim of this study was to assess the safety and efficacy of the standard bipolar diathermy as a vessel sealing system in thyroidectomy.

### Methods

This is a retrospective study of 87 consecutive patients who underwent sutureless thyroidectomy from April 2011 to September 2013 at District General Hospital, Matale, Sri Lanka. The main outcome measures included operating time (the surgical time beginning with the first cutaneous incision and including the last skin suture) and complications; transient or permanent hypocalcemia, recurrent or superior laryngeal nerve injury and neck hematoma.

### Results

Out of 87 patients, 54 (62.06%) patients underwent total thyroidectomy and 29 (33.3%) patients underwent hemithyroidectomy. The mean operative time for total thyroidectomy was 97 minutes and hemithyroidectomy was 65 minutes. One (1.14%) patient who underwent total thyroidectomy developed post-operative hematoma. Temporary hypocalcemia was observed in four (4.5%) patients who underwent total thyroidectomy. No permanent recurrent laryngeal nerve palsy or hypocalcemia observed.

### Conclusion

Sutureless thyroidectomy using standard bipolar diathermy is safe, useful, and efficient alternative to conventional suture ligation technique and has the potential to reduce operating room costs for thyroidectomy.

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## 27. Detection of Adrenocorticotrophic Hormone-producing Pulmonary Neuroendocrine Carcinoma by GA-68-Dotanoc Positron Emission Tomography-Computed Tomography

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### Introduction

Approximately, 10% of Cushing's syndrome (CS) are due to ectopic adrenocorticotrophic hormone (ACTH)—secreting tumors, majority of which may remain occult, undetected by routine imaging.

### Materials and Methods

We are presenting here an extremely rare case of CS caused by an ectopic ACTH secreting pulmonary neuroendocrine carcinoma of the lower lobe of left lung.

### Results

Patient had clinical and biochemical features of hypercortisolism with a negative magnetic resonance imaging of brain and a nonlateralizing sphenoidalpetrosal sinus sampling. Serum ACTH level (11.00 PM) was 132 pg/ml. Contrast-enhanced computerized tomography scan abdomen revealed bilateral adrenal hyperplasia. With a clinical diagnosis of ectopic ACTH producing tumor, positron-emission tomography-computed tomography (PET/CT) using the somatostatin receptor analog GA-68-DOTANOC was done, which revealed a hot spot in the lower lobe of

left lung. Wedge resection of lower lobe of left lung was done via left post-erolateral thoracotomy. Post-operatively patient showed significant improvement with ACTH below the detection limit (<5 ng/l). Immunohistochemistry showed tumor cells positive for ACTH, thyroid transcription factor, synaptophysin, and chromogranin and Ki-67 was approximately 1% suggestive of somatostatin receptor positive ACTH-producing neuroendocrine carcinoma.

## CONCLUSION

In patients with ectopic ACTH secretion, GA-68-DOTANOC-PET/CT may play an important role in the localization of ectopic ACTH-producing tumors. Wedge resection of lung with tumor is the therapy of choice.

## 28. Tractional Injury of Recurrent Laryngeal Nerve: Results of Continuous Intraoperative Neuromonitoring in Swine Models

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### Background

Recurrent laryngeal nerve (RLN) palsy is the most common and serious complication after thyroid surgery. Several studies have shown that routine identification of the RLN with or without intraoperative neuromonitoring (IONM) has decreased rates of permanent RLN palsy; however, unexpected RLN palsy still occurs, even though the visual integrity was assured and most nerve injuries were not recognized intraoperatively. Moreover, little is known about the biomechanical properties of RLN and limits of stretching that the nerve may undergo before structural changes occur. Also, the injury pattern of nerves under traction is poorly understood. The aim of this study is to evaluate the tractional injuries of RLN using a swine model via continuous IONM.

### Materials and Methods

Thirteen living orally intubated pigs weighing 30 to 40 kg underwent tractional injury to the RLNs. During stretching of the RLN, continuous IONM were performed using electromyogram endotracheal tube and NIM 3.0 response system. Follow-up examinations were carried out for 7 days using continuous IONM, and then fresh swine RLNs were harvested. All nerves were stretched to failure in an MTS materials testing machine at a rate of 1 cm/min (strain rate of 0.5%/s). Load deformation and stress-strain curves were determined. Histological examination by scanning electron microscopy of the stretched nerves and normal control nerves was performed.

### Results

The average structural diameter of RLN was 1.5 mm (1.2-2.0 mm). The average intraoperative tractional force at the time of loss of signals (LOS) in continuous IONM was 3.5N (2-6N). At post-operative day 7, we observed normal electromyography of RLNs using continuous IONM in all swines. After harvesting of RLNs, stress-strain curves were determined. The ultimate strain and tensile strength of the RLNs were 21.5% and 6.6 MPa, respectively. The swine RLNs have an *in situ* strain of less than 15%. And, histological analysis by scanning electron microscopy showed no abnormal structural findings in nerves which are strained by less than 15%. We could find that the reversible tractional injury might not induce the structural damage of the swine RLNs.

### Conclusion

Tractional injury of RLNs caused by force of over 3.5N or strain of over 15% in swine models.

## 29. Thermal Injury of Recurrent Laryngeal Nerve: Results of Continuous Intraoperative Neuromonitoring in Swine Models

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<sup>1-8</sup>Department of Surgery, Korea University College of Medicine, Seoul, Korea

### Background

Recurrent laryngeal nerve (RLN) palsy is the most common and serious complication after thyroid surgery. Several studies have shown that routine identification of the RLN with or without intraoperative neuromonitoring (IONM) has decreased rates of permanent RLN palsy; however, unexpected RLN palsy still occurs, even though the visual integrity was assured and most nerve injuries were not recognized intraoperatively. Moreover, little is known about the thermal injury of RLN and limits of temperature which may induce the injury of RLN. The aim of this study is to evaluate the thermal injuries of RLN using a swine model via continuous IONM.

### Materials and Methods

Six pigs weighing 30 to 40 kg underwent thermal injury to the RLN. During the experiments, continuous IONM were performed using electromyogram endotracheal tube and NIM 3.0 response system. For the first and second swines, we tested what temperature cause RLN injury with water.

After identification of RLN, we input the water that have different temperature. From the third swine, we examined the safety of using harmonic scalpel around RLN. We determined the limitation of safe distant and duration of using harmonic scalpel.

## Results

For the first and second swines, we tested what temperature cause RLN injury with water. Under 10  $\mu$ l water, the latency of RLN prolonged 10% without change of amplitude. From 20 to 70  $\mu$ l water, there were no change of amplitude or latency. But, water over 80  $\mu$ l cause obvious loss of signal (LOS). And we could not observe recovery of signals during 30 minutes. For the experiment with harmonic scalpel, we found that the safe distant between the harmonic scalpel and RLN is over 3 mm. Over 3 mm, there was no limitation of duration of activation for safety. Within 3 mm, we observed the LOS after 5 seconds. Within 1 mm of distant between the harmonic scalpel and RLN, we observed LOS from starting of activation.

## Conclusion

Thermal injury of RLNs caused by temperature of over 80  $\mu$ l and under 10  $\mu$ l in swine models. The safe distant of using harmonic scalpel is over 3 mm. Within the distant of 3 mm, the safe duration of activation is within 5 seconds.

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# 30. Painful Musculoskeletal Conditions presenting to General Surgical Unit and their Association with Endocrine Disorders: A Prospective Analysis from A Peripheral Hospital in Sri Lanka

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## Introduction

Various painful musculoskeletal conditions like flexor tenosinovitis, frozen shoulder, plantar fasciitis, carpal tunnel syndrome, dequarvain's tenosinovitis and tennis elbow, and so on are commonly managed in the general surgical units in peripheral hospitals of Sri Lanka. Many of them are associated with endocrine diseases, such as hypothyroidism and diabetic mellitus (DM) which are poorly evaluated.

## Goal

The goal of this study is to analyze their association with diabetes mellitus and thyroid status.

## Materials and Methods

This study included 284 patients presenting with rheumatic conditions to Base Hospital, Muthur, Sri Lanka since May 2012 till August 2013. Their fasting blood sugar levels and thyroid function tests were done. Data were collected prospectively using an interviewer administered questionnaire.

## Results

All were adults with majority being females ( $n = 194$ , 68.3%) with the median age of  $48.2 \pm 12.6$  (mean  $\pm$  standard deviation). Nearly one-third of the patients have suffered simultaneously or previously from more than one conditions ( $n = 92$ , 32.4%). DM was present in 24.65% of patients. Hypothyroidism was revealed in 8.8% ( $n = 25$ ). Prevalence of both of these conditions in the study group is significantly higher than that of age – sex standardized prevalence in Sri Lankans (DM- 24.64 vs 10.3%, hypothyroidism 8.8% vs 2.5%). Moreover, both are highly prevalent in patients with multiple symptoms than single complaint (DM- 31.52 vs 21.35%, hypothyroidism – 17.39 vs 4.69%).

## Discussion and Conclusion

It is wise to evaluate glycemic and thyroid status in patients with painful musculoskeletal conditions as they have significant association, especially in those with multiple symptoms.

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# 31. Comparison of the Hemodynamic Parameters between Transperitoneal and Retroperitoneoscopic Adrenalectomy for Pheochromocytoma

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## Background

Hemodynamic instability still underlies difficulties during adrenalectomy for pheochromocytoma. Little is known about hemodynamic instability during laparoscopic retroperitoneoscopic adrenalectomy. The aim of this study is to compare perioperative differences in hemodynamic parameters between transperitoneal adrenalectomy (TPA) and retroperitoneoscopic adrenalectomy (RPA) for pheochromocytoma.

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## Methods

Thirteen patients underwent the TPA and another 13 patients underwent RPA. These patients were compared to investigate the differences in hemodynamic parameters between the two groups. Prospectively established data were retrospectively reviewed.

## Results

Demographic and clinical parameters at presentation were similar between the groups, except for less operative time, intraoperative blood loss, and shorter hospital stay in the RPA group. The RPA was similar to the TPA on the incidence of intraoperative blood pressure fluctuation. While compared with the TPA, the process of the RPA could effectively control the degree of fluctuations in intraoperative systolic blood pressure ( $p < 0.05$ ). Morbidity occurred in the RPA; one patient developed a pleural effusion. There was no perioperative mortality.

## Conclusion

Compared with TPA, the RPA is safer and more effective than TPA for pheochromocytoma. The good hemodynamic stability observed with this technique makes it very attractive for the treatment of pheochromocytoma.

## 32. Perioperative Outcomes of Transaxillary Robotic MRND using Single Incision Technique

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<sup>7</sup>Sang-Wook Kang, <sup>8</sup>Jong Ju Jeong, <sup>9</sup>Kee-Hyun Nam, <sup>10</sup>Woong Youn Chung, <sup>11</sup>Cheong Soo Park

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### Introduction

We have performed 200 cases of robotic MRND with acceptable post-operative outcomes and excellent cosmesis. After performing 200 cases of robotic MRND using two separate incisions, we eliminated the anterior chest wall incision. The aim of this study was to evaluate the technical feasibility and safety of transaxillary single incision robotic MRND.

### Materials and Methods

Between March 2013 and October 2013, 30 patients with thyroid cancer underwent single incision robotic MRND in the Department of Surgery, Yonsei University College of Medicine, Seoul, Korea. Operation times, numbers of retrieved lymph nodes (LNs), post-operative hospital stays, complications were reviewed retrospectively, and these results were compared with double incision robotic MRND.

### Results

Mean operation time was  $284.9 \pm 35.9$  minutes and mean post-operative hospital stay was  $5.6 \pm 1.1$  days. No serious post-operative complication occurred. Mean tumor size was  $1.2 \pm 0.6$  cm and papillary thyroid cancer was in 30 cases (100%). The mean number of retrieved central LNs per patient was  $6.5 \pm 6.2$ . The mean number of retrieved lateral LNs was  $26.6 \pm 9.1$ . Central neck LN metastasis occurred in 23 (76.7%) and lateral neck LN metastasis in 28 cases (93.3%). According to tumor nodes metastasis staging, 24 patients (80.0%) were of stage I, 3 patients (10.0%) were of stage IVA.

### Conclusion

The robotic MRND procedure using a gasless TAA is a feasible, safe, and good surgical outcome. Single incision robotic MRND procedure also have same conclusion. If surgeons have mastery of the standardized technique of the robotic surgical procedure, single incision robotic MRND can be performed safely.

## 33. Medullary Thyroid Cancer: An Important Differential for elevated Carcinoembryonic Antigen

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<sup>2</sup>Mount Elizabeth Novena, Singapore

### Introduction

Elevation of serum carcinoembryonic antigen (CEA) is commonly associated with gastrointestinal malignancy. However, there are other causes for a raised serum CEA which should be considered when a gastrointestinal cause is not detected. Medullary thyroid carcinoma (MTC) accounts for 5-10% of all thyroid malignancies. Besides calcitonin, CEA is also secreted by the tumor and can be raised in patients with MTC.

### Materials and Methods

We present two patients with elevated CEA who were initially investigated for gastrointestinal malignancies but were eventually diagnosed of MTC.



## Results

The first patient presented with elevated CEA (22 ug/l). She was followed-up for 7 years after initial investigations revealed no significant abnormality. The CEA remained elevated during this period. Subsequent work up for a 1.7 cm left thyroid nodule suggested a follicular neoplasm for which she underwent a hemithyroidectomy. Final histology showed MTC and a completion thyroidectomy with central neck dissection was performed.

The second patient was investigated for a raised CEA of 12.5 ug/l. Six months after initial negative investigations, a 2.0 cm right thyroid nodule with associated cervical lymph nodes were detected on ultrasound. Cytology suggested MTC and she then underwent total thyroidectomy with central and right lateral neck dissection. Both patients had their CEA normalized after the operations.

## Discussion and Conclusion

Medullary thyroid carcinoma has a poor survival outcome compared with other types of thyroid cancers. Carcinoembryonic antigen is a useful tumor marker especially when calcitonin level is normal. Medullary thyroid carcinoma should be considered as a cause for elevated CEA especially when a gastrointestinal cause has been ruled out.

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## 34. Review of Scarless (in the Neck) Endoscopic Thyroidectomy: A Single Institution's Experience

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### Introduction

Endoscopic thyroid surgery has evolved tremendously in order to limit visible scar. We started performing scarless (in the neck) endoscopic thyroidectomy (SET) in our institution in 2005. We aimed to report on the surgical outcome of our patients.

### Materials and Methods

Between April 2005 and April 2012, we performed a total of 80 cases of SET. Our patient selection criteria were preoperative diagnosis of a benign nodule, with no previous neck irradiation or surgery. We adopted the axillary approach for the majority of the cases. The patients were reviewed 2 weeks post-operatively and subsequently at 3 to 6 monthly intervals.

### Results

There were four conversions to open thyroidectomies (5%). One was technically difficult due to the large gland size (8.5 cm), two were due to inability to identify the recurrent laryngeal nerve. The last case was to control bleeding in a patient with Graves' disease. Overall morbidity was 6%. There was one patient with transient neuropraxia of the recurrent laryngeal nerve. Two patients had mild bruising over the chest wall region and one had subcutaneous emphysema which resolved spontaneously. There was one case of neck hematoma which required neck exploration 2 hours after the initial surgery.

### Discussion and Conclusion

Endoscopic thyroidectomy is gaining popularity among both surgeons and patients because of its cosmetic superiority when compared with the open method. It is a safe and effective approach to manage benign and selected low-risk malignant thyroid conditions.

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## 35. Surgical Management of Primary Hyperparathyroidism: A Single-center Experience

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### Introduction

Surgical management of primary hyperparathyroidism (PHPT) mandates expert care by experienced endocrine surgeons. Our objective is to evaluate the outcomes of parathyroid surgery for PHPT in a single endocrine surgery unit.

### Methods

Retrospective analysis was conducted on consecutive patients undergoing parathyroid surgery for PHPT in 2002 to 2005 (3.5 years) and 2010 to 2013 (3.5 years). Parathyroid surgery was not performed in 2006 to 2009 due to service relocation to another hospital.

### Results

In this study, 84 patients (61 females, age  $56.7 \pm 15.9$  yrs) underwent 53 (63.1%) focused parathyroidectomy, 22 (26.2%) bilateral and 9 (10.7%) unilateral neck explorations. Preoperative adjusted-calcium was  $2.90$  ( $2.57$ - $3.77$ ) mmol/l. Thirty-four (40.5%) patients had symptomatic PHPT.

Six surgeons were responsible for all procedures in which 86.9% were performed by two of them. Diagnosis was single adenoma in 63 (75%) patients, multiple adenomas in 17 (20.2%) patients, four-gland hyperplasia in three (3.5%) patients and parathyroid carcinoma in one (1.1%) patient. Median gland size and weight were 15 (6-45) mm and 532 (23.5-14069) mg, respectively. In 83 (98.8%) ultrasound performed, 65.0% correctly localized the offending glands, while 12.0% localized wrongly and 22.8% failed to localize. For 69 (82.1%) sestamibi-scans performed, 57.9% were correct localization but 14.4 and 27.5% were wrong and failed localization, respectively. Median operating time was 60 (15-320) minutes. There was no post-operative hemorrhage but one recurrent laryngeal nerve injury (1.3%) occurred. Hypocalcemia occurred in 21 (25.0%) patients. Median hospital stay was 2 (1-13) days. In 28.6-month follow-up, three (3.5%) patients had persistent PHPT and two (2.3%) developed recurrent PHPT. Bilateral explorations resulted in permanent hypocalcemia in 9.1% patients.

### Conclusion

Surgical cure rate of PHPT was 94.2%. Accuracy of preoperative imaging localization was disappointing. Localizing an experienced endocrine surgeon was far more important to guarantee a high cure rate.

## 36. Role of Fine-needle Aspiration Cytology in Preoperative Diagnosis of a Thyroid Nodule: A Retrospective Study in a Tertiary Care Hospital

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### Introduction

The aim of the study is to evaluate the accuracy of fine-needle aspiration cytology (FNAC) in the diagnosis of thyroid lesions in comparison with post-operative histopathological examination.

### Methods

Retrospective study of 800 patients undergoing surgery for thyroid nodule in a tertiary care hospital between January 2009 and September 2013. The data was taken from the departmental records and the results were recorded. FNAC was compared with post-operative histopathological examination report. Sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy were calculated. Thyroid-stimulating hormone (TSH) values were noted in all the patients.

### Results

Out of 800 patients, the results of FNAC were benign in 66%, suspicious in 10%, malignant in 20%, and inadequate in 4%. Sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy were 46.67, 97.14, 87.5, 80.95, and 82%, respectively. There was no significant variation in TSH value either in benign or malignant lesion.

### Conclusion

In the present study, the sensitivity, specificity, and diagnostic accuracy of FNAC in the evaluation of thyroid nodule is comparable with world literature. Hence, FNAC plays a vital role in the diagnosis of a thyroid nodule.

## 37. Association between BRAF Mutation and Lymph Node Metastasis in Patients with Papillary Thyroid Cancer

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### Introduction

The papillary thyroid cancer (PTC) is the most frequent subtype among thyroid cancers. Lymph node (LN) metastases are frequent in PTC and the incidence is 60% on average. Recent studies have shown an increase in mortality or recurrence with LN metastases. However, preoperative ultrasonography has limitation because of low sensitivity (9.5~61%) for central LN metastases. Therefore, we investigated whether preoperative BRAF analysis may assist determination of surgical extent.

### Materials and Methods

From January 2009 to October 2010, we retrospectively enrolled 749 PTC patients; 578 BRAF positive and 171 BRAF negative groups were performed. Propensity score matching using statistically significant risk factors was used to generate two matched cohorts, each composed of 171 patients.

### Results

In BRAF positive group, male gender, the capsular invasion ( $p < 0.001$ ), T4 ( $p < 0.001$ ) and N1 ( $p = 0.012$ ) were more frequent and the number of LN metastases was more than those in the other group. However, the matched BRAF positive and negative cohorts were not different with regard to N stage and the number of LN metastases after propensity score matching using gender, capsular invasion. Additionally, the LN metastasis showed a strong correlation with age, tumor size, gender, capsular invasion, and multifocality in multivariate analysis ( $p < 0.05$ ).

## Discussion and Conclusion

BRAF mutation was not useful to predict the LN metastasis. Therefore, other clinicopathological features were important to tailor surgical extent.

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## 38. Zuckerkindl Tubercle and its Clinical Association for Thyroid Surgery

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### Introduction

The Zuckerkindl's tubercle (ZT) of the thyroid gland is a well-described important anatomical landmark in thyroid surgery. But, only few studies have illustrated its clinical association.

### Methods

Patients who had thyroidectomy between January 2007 and October 2013 were retrospectively reviewed. The presence of ZT and the patients' characters were identified. Presence of ZT was classified into two groups according to grading proposed by Pelizzo et al (1998). Grades 0 and 1 were grouped into small ZT, while grades 2 and 3 were grouped into large ZT.

### Results

A total of 595 thyroid surgeries performed and were recruited in the study. The prevalence of ZT according to the grades 0, 1, 2, and 3 were 21.7, 24, 17.5, and 36.8%, respectively. Large ZT was seen more in patient with large goiters ( $p < 0.001$ ), longer duration of goitre ( $p = 0.009$ ), and hyperthyroidism ( $p < 0.001$ ). Most patients with pressure symptoms; 157 (65.1%) had grade 2 and 3 with odds ratio = 2.12 (95% confidence interval 1.51, 2.97) ( $p < 0.001$ ). The presence of ZT was not associated with thyroid malignancy in our study.

### Conclusion

Our series disclosed a significant enlarged ZT in most of large goiters causing pressure symptoms. Hyperthyroidism and long-standing goiters strongly associated with enlarged ZT. Although no association between the presence of ZT and malignancy, an enlarged ZT might preclude the completeness in thyroid resection and cause residual disease after thyroidectomy in thyroid malignancy.

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## 39. A Case of a Renal Metastasis from Thyroid Follicular Cancer

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### Case

We report a rare case of thyroid cancer with a renal metastasis. The patient was a 78-year-old-woman and she underwent left hemithyroidectomy in her 30s. She had been explained that the tumor was benign. In 2010, she was referred to our hospital due to umbilical hernia. Computed tomography (CT) scan showed a left renal tumor, 11 cm in diameter, with multiple lung tumors, in addition to umbilical hernia. The renal tumor had contrast enhancement and central necrotic change. The findings of the imaging tests made us consider the possibility of a renal cell carcinoma with multiple metastases. After admission, left nephrectomy was performed. Histopathologically, the renal tumor revealed the origin of thyroid follicular carcinoma. Cancer cells were positive for thyroglobulin and thyroid transcription factor-1 (TTF-1). Post-operative diagnosis was thyroid follicular cancer with kidney and multiple lung metastases. She continued to be under observation with no treatment, because she refused any treatment.

### Conclusion

Although it is unusual that thyroid cancer metastasize to the kidney, the immunostaining of thyroglobulin and TTF-1 are useful to make a certain diagnose.

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## 40. Analysis of Clinical Outcomes and Prognostic Factors of Follicular Thyroid Carcinoma: 26 years Experience in Single Institution

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### Background

Follicular thyroid carcinoma (FTC) is the second most common thyroid malignancy. Generally, FTC is more aggressive and has a poorer prognosis than papillary thyroid cancer (PTC). We evaluated the clinical outcomes to determine the risk factors for distant metastasis and recurrence in FTC.

## Methods

From 1986 to 2012, total 219 patients surgically treated for FTC with an average follow-up of 80.8 months were retrospectively analyzed after histologic reclassification according to the subtype. Twenty-six patients had widely invasive FTC, and 170 had minimally invasive FTC. Distant metastases were observed in 19 patients (8.68%) and 12 (5.48%) patients had recurrence. We reviewed the comprehensive patients's clinicopathological characteristics and assessed whether there was a relation between clinicopathological features, distant metastasis, recurrence and patient survival.

## Results

Univariate analysis showed that age ( $\geq 45$ ), tumor size ( $\geq 4$  cm), widely invasive type, and lymph node (LN) metastasis were significant risk factors for distant metastasis. Widely invasive type and LN metastasis are significant risk factors for recurrence. The overall survival rate was significantly better in the groups of patients who were under 45 years old, with the minimally invasive type, and who did not have distant metastasis. Multivariate analysis showed that age and subtype were significant risk factors for distant metastasis. However, there was no relationship between clinicopathological characteristics and incidence of recurrence.

## Conclusion

According to our data, FTC is a generally nonaggressive disease with a good prognosis. Age and subtype were significant risk factors for distant metastasis. We suggest that older patient with widely invasive subtype should be carefully followed because of higher incidence of distant metastasis.

# 41. Successful staged Operative Management of Primary pigmented Nodular Adrenocortical Disease and Cardiac Myxoma Presenting Simultaneously in a Rare Case of Carney's Complex

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## Background

The Carney's complex (CNC) is a dominantly inherited syndrome characterized by spotty skin pigmentation, endocrine overactivity, and myxomas described by J. Aidan Carney and colleagues in 1985. Though few hundred cases are reported of this rare entity, simultaneous presentation and surgical management of primary pigmented nodular adrenocortical disease (PPNAD) and cardiac myxoma is less reported in literature. Further, sequence of surgical management is still unclear.

## Patient and Methods

We report a rare case of CNC with a synchronous presentation of bilateral adrenal hyperplasia, pituitary adenoma, and cardiac myxoma.

## Results

A 22-year-old male was diagnosed with adrenocorticotrophic hormone (ACTH) independent hypercortisolism. A magnetic resonance imaging (MRI) revealed pituitary macroadenoma and bilateral adrenal hyperplasia. Screening echocardiography revealed a 3 cm left atrial tumor arising from intratrial septum suggestive of myxoma. A diagnosis of carneys complex was made. Surgical management was planned in two stages. The patient first underwent complete resection of a 3.5 × 3.0 cm, jelly-like tumor attached to interatrial septum through a transatrial transseptal approach under cardiopulmonary bypass and arrested heart. He underwent bilateral laparoscopic adrenalectomy after 6 weeks. Histopathology confirmed presence of atrial myxoma and bilateral adrenocortical pigmented nodular hyperplasia PPNAD. Post-operative recovery was uneventful. Post-operative screening echo showed no residual tumor.

## Conclusion

A high degree of suspicion and screening echo is advised for CNC to exclude atrial myxomas when a young adult presents with ACTH independent hypercortisolism. After optimal control of hypercortisolism, cardiac myxomas should be removed first, followed by adrenalectomy.

# 42. Thyroid Lobectomy for Treatment of Well-differentiated Thyroid Cancer confined to One Lobe

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## Introduction

There has been controversy of the lobectomy for well-differentiated thyroid cancer (WDTC). Current guidelines recommend total thyroidectomy for the cancer over 1 cm, despite previous report suggesting that the lobectomy provides similar excellent outcomes. The purpose of our study is to report our experience of WDTC treated by thyroid lobectomy.

## Materials and Methods

We retrospectively analyzed 284 patients with WDTC treated by thyroid lobectomy at Department of Surgery in Chosun University Hospital from January 2002 to December 2010. Overall survival (OS) and disease-free survival (DFS) were determined by the Kaplan-Meier method. Factors predictive of recurrence by univariate and multivariate analysis were determined using the  $\chi^2$  test and Cox proportional hazard model, respectively.

## Results

With a mean follow-up of 60.4 months, OS and RFS for all patients were 97.9 and 96.5%, respectively. No patient died due to WDTC. Univariate analysis showed statistically significant differences in recurrence by tumor size ( $p = 0.013$ ) and presence of invasion ( $p = 0.039$ ). However, multivariate analysis showed no significant difference in local recurrence.

## Conclusion

Patients with WDTC confined to one lobe can be safely treated by lobectomy.

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## 43. 'Short-Stay' Thyroid Surgery: A Safe and Feasible Alternative in Sri Lanka

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### Introduction

Short-stay thyroid surgery (<24 hours hospital stay) has gained popularity in recent years. The economic benefits in a stretched health service could, well mean, that it be widely adopted in Sri Lanka if its safety and feasibility is evaluated.

### Methodology

A prospective study was carried out in a surgical unit of the National Hospital of Sri Lanka. A total of 100 carefully selected patients meeting inclusion criteria who underwent total thyroidectomy were evaluated according to stipulated discharge criteria. Patients not meeting these criteria remained in hospital. Comprehensive information was provided at recruitment and at discharge.

### Results

A total of 97/100 had met with established discharge criteria within the 23-hour post-operative period. Difficulty in tolerating diet(1), excessive pain at surgical site(1), and symptomatic hypocalcemia requiring intravenous calcium supplementation(1) were reasons for failure to discharge.

There were four readmissions, that is, for symptomatic hypocalcemia (3) and surgical site infection(1). There were no complications of post-operative stridor or permanent recurrent laryngeal nerve injury.

### Conclusion

Short-stay thyroidectomy was well received by the majority of patients and their relatives. The results affirm that the 'short-stay surgery' model is safe and effective for total thyroidectomy. Careful patient selection and individualized patient education are of paramount importance toward successful short-stay surgery.

With increasing surgeon experience and improved patient education and selection, we are of the opinion that this approach can be considered safe and feasible in a tertiary care setting in Sri Lanka.

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## 44. Locally advanced Papillary Cell Carcinoma of Thyroid with Tracheal Invasion presented with Stridor

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### Introduction

Papillary carcinoma is a common thyroid malignancy reported worldwide. Primary mode of spread in papillary carcinoma is via lymphatic system. In locally advanced papillary carcinoma, the most commonly involved structures include the strap muscles (53%), recurrent laryngeal nerve (47%), trachea (37%) and stridor is the presenting symptom in approximately one-third of patients with laryngotracheal invasion.

### Case Presentation

A 60-year-old woman with a long-standing goitre presented with episodic shortness of breath, noisy breathing with impending stridor. There was a history of recent rapid enlargement over the duration of past 2 months. Clinical examination revealed multinodular goitre with retrosternal

extension. Her computed tomography (CT) scan neck confirmed a multinodular goitre with retrosternal extension and tracheal invasion. Thus, she underwent emergency tracheostomy to relieve stridor. The procedure was complicated due to the invasion of tumor in to trachea up to the level of jugular notch, extending from thyroid isthmus. Patient was stabilized and total thyroidectomy was done without resection of the trachea. Post-operative period was uneventful.

### Discussion

Papillary thyroid carcinoma is known for their indolent nature and erratic behavior. A judicious combination of surgical clearance combined with radio ablation is the key to the management of such tumors. In conclusion, there is no consensus regarding the management of patients with thyroid malignancies invading larynx and trachea. The surgeon would decide between a complete ablation of tumor at the cost of extensive mutilation and a less radical dissection, which leaves residual tumor to be treated by complementary radiotherapy and radio-iodine.

## 45. Thyroid Malignancy in Large Goiter and Analysis of the associated Factors and Surgical Complications

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### Introduction

The objectives of this study were to analyze the rate of thyroid malignancy in large goitre and its associated factors as well as to evaluate the surgical complications in performing thyroidectomy for large goiters.

### Materials and Methods

Patients who had primary thyroid surgery between June 2007 and May 2013 were retrospectively reviewed. Based on classification of large goiters as proposed by Bajnok et al 1999, patients who underwent thyroidectomy with a resected specimen of  $\geq 50$  gm in hemithyroidectomy or  $\geq 100$  gm in total thyroidectomy were recruited in the study. The associated factors for thyroid cancer in large goiters and the surgical complications were recorded.

### Results

A total of 611 patients were recruited in this study. The prevalence of large goiters and thyroid malignancy in large goiters was 410 (67.1%) and 115 (28.0%), respectively with odds ratio = 1.52 (95% confidence interval 1.02, 2.28) ( $p = 0.042$ ). The significant associated factors on univariable analysis were age ( $p = 0.017$ ), male ( $p = 0.031$ ), solitary nodule ( $p = 0.045$ ), and euthyroidism ( $p = 0.012$ ). However, only age and solitary nodule were significant on multivariable analysis. There were 104 (25.4%) temporary hypocalcemia, 9 (2.2%) permanent hypoparathyroidism, 8 (2.0%) post-operative hemorrhages, 6 (1.5%) surgical site infection, 3 (0.7%) recurrent laryngeal nerve (RLN) injury, 1 (0.2%) thoracic duct injury, and 1 (0.2%) death after thyroid surgery for large goiters.

### Conclusion

This study disclosed a high prevalence of thyroid cancer in large goiters and the result suggests that age and solitary nodule are factors that associated with malignancy, while permanent hypoparathyroidism and RLN injury are rare in our series.

## 46. Malignancy in Thyroid Nodules: A Prospective Study of Clinical Predictors

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### Introduction

The malignancy rate described in thyroid nodules varies between 5 and 15%. Numerous risk factors have been described and validated. The challenge lies in deciding whether the patient requires an operation or not.

### Materials and Methods

We prospectively analyzed clinical criteria, ultrasound and cytology data, to predict malignancy in 195 adult patients with thyroid nodules undergoing surgery.

### Results

We compared the malignant ( $n = 102$ ) with the benign ( $n = 93$ ). Among the clinical features, older age group ( $> 50$  yrs), gender ( $M = F$ ), features of compression, and nodule size were not risk factors. Using the palpatory technique, the number of inadequate/nondiagnostic cytology was 24%, in which the malignancy rate was 47.9%. In the cytologies reported as benign, the rate of malignancy was 33.9%. Among the ultrasound

features studied, hypoechogenicity (60.3%), punctuate microcalcification (85.5%), irregular margins (68.4%), intranodule vascularity (61%), and significant lymph nodes (84.4%) were risk factors.

### Discussion and Conclusion

Contrary to the established clinical predictors of malignancy, extremes of age, size of nodule, and gender were found to have poor predictive value. The features that have maximum predictive value using ultrasound were significant lymph nodes, punctuate microcalcification, and irregular margins. The large number of inadequate cytology and the corresponding malignancy rate brings out the inadequacies of the palpatory technique of fine-needle aspiration cytology. Hence, clinical predictors of malignancy in thyroid nodules continues to be a problem for endocrine surgeons. Improvement in cytological sampling, diagnosis as well as molecular analysis, may improve prediction.

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## 47. Incidental Thyroid Cancer in Surgically managed Patients with Hyperthyroidism

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### Background

The incidence and aggressiveness of thyroid cancer associated with hyperthyroidism is a matter of controversy. The objective of the study is to analyze the incidence and clinicopathologic features of incidental thyroid cancer in surgically treated patients with different forms of hyperthyroidism.

### Methods

In this retrospective review of 1158 patients operated for various thyroid disorders from January 2008 to May 2013, 232 patients operated for different forms of hyperthyroidism namely Graves' disease, toxic multinodular goitre, and toxic adenoma were included in the study. Their clinicopathologic parameters and post-operative outcomes were analyzed.

### Results

Among 232 patients, there were 47 male and 185 female patients. Thyroid cancer was detected in 17 patients with an incidence of 7.32% and male to female ratio of 1:16. Thyroid cancer was most frequent in Graves' disease with an incidence of 3.87% as compared with 2.58% in toxic multinodular goitre and 0.86% in toxic adenoma ( $p = 0.426$ ). Solid, hypoechoic nodules with foci of microcalcification which were photopenic on scintigraphy had a higher risk of malignancy. Papillary thyroid carcinoma was the most frequent pathology (94.1%) followed by follicular thyroid carcinoma (5.8%). No significant difference with regard to age, gender, cytology, tumor size, or extrathyroidal invasion.

### Conclusion

The incidence of thyroid cancer in surgically managed hyperthyroid patient was 7.32%. The frequency of thyroid cancer is higher in Graves' disease, papillary thyroid cancer being the most common pathology.

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## 48. Coexistence of Papillary Thyroid Cancer and Thyroiditis

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### Background

The association of autoimmune thyroid diseases with papillary thyroid cancer (PTC) and its impact on aggressiveness remains a subject of debate. The aim of this study was to evaluate the prevalence of coexistent thyroiditis in PTC and clinicopathologic features of PTC with and without thyroiditis.

### Patients and Methods

A retrospective analysis of 1641 patients who underwent total thyroidectomy from January 2008 to November 2013 among which 349 patients were included in the study and categorized into three groups. Group 1- PTC with thyroiditis ( $n = 68$ ), Group 2- PTC with coexistent benign pathology ( $n = 95$ ), and Group 3- thyroiditis alone ( $n = 186$ ) based on histopathology. Their clinicopathologic features and post-operative outcomes were analyzed.

### Results

PTC was diagnosed in 68 of 254 patients with thyroiditis (26.77%) compared with 95 of 1387 with other benign thyroid pathology (6.8%,  $p < 0.05$ ). There was female preponderance ( $M : F = 60 : 8$  vs  $72 : 23$ ,  $p = 0.012$ ), longer duration ( $9.69 \pm 5.943$  months vs  $8.85 \pm 2.66$ ,  $p = 0.002$ ), preoperative hypothyroidism, higher thyroid autoantibodies ( $p < 0.001$ ) in the group 1 as compared with group 2. Younger patients were



predominantly affected in group 1 (age in years =  $37.10 \pm 12.17$  vs  $40.23 \pm 15.39$ ), it was not statistically significant ( $p = 0.185$ ). Higher T-stage ( $p = 0.014$ ) and metastatic nodes ( $p = 0.006$ ) were observed in group 2, but the total number of nodes dissected was higher in group 1. There was no significant difference in multifocality, radioiodine dosage, hypocalcemia, recurrent laryngeal nerve injury, and locoregional recurrence.

### Conclusion

Patients with PTC and coexistent thyroiditis were predominantly younger female patients with smaller tumor size and lower rates of extrathyroidal invasion and metastatic lymph nodes.

## 49. Diffuse Sclerosing Variant of Papillary Thyroid Carcinoma is an Aggressive Subtype: Comparison with Conventional Variant after Propensity Score Matching

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### Background

The diffuse sclerosing variant (DSV) is considered an aggressive subtype of papillary thyroid cancer (PTC). This study analyzed the tumor aggressiveness of DSV with cervical node metastases.

### Methods

Of the 7,061 patients with PTC analyzed between January 2009 and October 2012, 166 had the DSV (Group I) and 6,467 had the conventional subtype (Group II). Propensity score matching using demographic and pathologic factors, except for cervical node metastasis, was used to generate two matched cohorts, each consisting of 166 patients.

### Results

The demographic (age, sex) and pathologic (size, extrathyroidal extension, thyroiditis, multifocality) characteristics of the matched cohorts were similar. Diffuse sclerosing variant was significantly associated with cervical node metastasis, including both central ( $p < 0.001$ ) and lateral ( $p < 0.001$ ) node metastasis.

### CONCLUSION

Diffuse sclerosing variant of PTC had a more aggressive pattern than conventional PTCs. Following meticulous preoperative evaluation to determine the need for lateral neck dissection, patients with DSV should undergo central and, if necessary, lateral compartment node dissection.

## 50. Adrenal Schwannoma: A Rare Entity of Adrenal Incidentaloma

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### Background

Schwannomas are benign tumors originating from Schwann cells of peripheral, motor, sympathetic, or cranial nerves of the head and neck region and the upper and lower extremities. Schwannomas also may be found in the retroperitoneum and juxta-adrenal area. Adrenal schwannoma is a rare type of adrenal incidentaloma, usually detected on imaging or autopsy, and reported to date in only 33 patients in the English language literature. We report a case of an incidentally discovered and laparoscopically resected adrenal schwannoma.

### MATERIALS

A 38-year-old female patient presented with adrenal incidentaloma on fludeoxyglucose (FDG) positron emission tomography (PET) scans. This patient had undergone radical total thyroidectomy for papillary thyroid cancer 2 years earlier. Routine follow-ups had shown an about 4 cm sized left adrenal mass with heterogeneous FDG uptake. Hormonal activities of this tumor were not investigated in biochemical analysis.

### Results

Laparoscopic left adrenalectomy was performed. The tumor was clearly resected without conversion to an open method. Final histopathological examination confirmed adrenal schwannoma.

### Conclusion

Adrenal schwannoma, a type of adrenal incidentaloma, is rare. Correctly classifying this tumor can be challenging because imaging studies are nonspecific and many entities appear similar histologically. Complete laparoscopic excision allows for definitive diagnosis with histological evaluation and represents the treatment of choice.

## 51. Analysis of Factors predicting Bilateral Lateral Neck Metastases in Patients with Unilateral Papillary Thyroid Carcinoma

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### Background

Papillary thyroid carcinoma (PTC) frequently involves lymph nodes (LNs) in the lateral compartment, but unilateral PTC rarely metastasizes to bilateral LNs. This study analyzed the clinicopathologic features of patients with PTC limited in one lobe showing bilateral lateral neck node metastases (N1b).

### Methods

Of 457 patients with unilateral PTC and lateral neck metastasis analyzed between January 2010 and October 2012, 426 had ipsilateral (Group I) and 31 had bilateral (Group II) metastases. The clinicopathologic characteristics of the two groups were evaluated.

### Results

Age, thyroiditis, capsular invasion of primary tumor, and central neck node metastasis were similar in the two groups. Mean primary tumor size ( $1.87 \pm 1.06$  cm vs  $1.31 \pm 0.90$  cm,  $p = 0.002$ ) was significantly larger, and male gender (51.6% vs 25.5%;  $p = 0.001$ ), multifocality (38.7 vs 21.8, 38.7%,  $p = 0.022$ ) and aggressive PTC subtype (74.2 vs 8.7%,  $p = 0.005$ ) were significantly more frequent in patients with bilateral than ipsilateral metastases.

### Conclusion

Although primary tumors are located in one lobe, male patients and those with multifocal tumors, primary tumors > 1 cm in size, and aggressive PTC subtype should undergo meticulous preoperative evaluation of bilateral lateral neck compartments to determine whether bilateral lateral neck dissection is needed.

## 52. Ultrasonography for Preoperative staging of Papillary Thyroid Carcinoma cannot Detect Micrometastases in Central Neck Nodes

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### Background

The aim of this study was to assess the detection rate and sensitivity of preoperative ultrasonography relative to the size of metastatic foci.

### Materials and Methods

Between January 2011 and May 2011, 724 patients with papillary thyroid carcinoma (PTC) who underwent thyroidectomy with routine central neck node dissection were enrolled in this study. All patients underwent preoperative ultrasonography (US) for the evaluation of primary tumor and lymph node (LN) metastasis. The accuracy of preoperative US for detecting metastatic central neck nodes was assessed relative to pathologic findings of the surgical specimen.

### Results

Of 724 patients, 233 (32.2%) had central neck node metastasis; 112 (15.5%) had metastatic LNs 2 to 4 mm, 55 (7.6%) had nodes 4 to 6 mm, 19 (2.6%) had nodes 6-10 mm and 13 (1.8%) nodes >1 cm. The sensitivity of preoperative US for detecting central neck node metastasis was 25.7% for all metastatic foci, including those with psammomatous calcification. The sensitivities of preoperative US for detecting nodes >2 mm, >4 mm, >6 mm, and >1 cm were 40.8, 52.7, 68.4, and 76.9%, respectively.

### Conclusion

The sensitivity of preoperative US in detecting central LN metastasis increases with increasing node size. However, the sensitivity of US in detecting metastatic LN <5 mm in size was <20%. Thus, depending on the exact staging of central neck nodes, frozen sections for these nodes may be required to plan the extent of surgery.

## 53. Renal Metastasis from Follicular Thyroid Carcinoma

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### Background

Follicular thyroid carcinoma (FTC) is a well-differentiated tumor, accounting for about 5 to 15% of all thyroid carcinomas, and almost always manifesting as an asymptomatic thyroid mass. Although cervical lymph node metastases are rare, being present in about 5% of patients with

FTC, distant metastases are more common, being present in about 20%. The major sites of distant metastases of FTC are the lungs and bones, with minor sites including the brain, liver, skin, pleura, and diaphragm. Renal metastasis from FTC is very rare. We report a rare case of renal metastasis from FTC 5 years after total thyroidectomy and modified radical neck dissection.

### Case

The patient, a 54-year-old man who presented with an anterior neck mass, underwent bilateral total thyroidectomy with central compartment neck dissection and left modified radical neck dissection in June 2008, followed by high-dose radioactive iodine therapy (150 mCi). An about 7 cm-sized mass occupying the entire isthmus of the thyroid and multiple masses on the left lobe of the thyroid were removed. The pathologic diagnosis was FTC, widely invasive type. In January and August 2009, he received high-dose radioactive iodine therapy, at doses of 250 mCi and 300 mCi, respectively, for pulmonary metastasis from thyroid-carcinoma, followed by external beam radiation therapy (6400cGy). In July 2013, a computed tomography (CT) scan demonstrated a new, 4 cm sized mass in his left kidney, for which he underwent a left radical nephrectomy. Final pathology confirmed that the latter lesion was a metastatic, poorly differentiated carcinoma from the thyroid.

## 54. Clinical Experiences of Parathyroid Carcinoma in a Single Institution

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### Introduction

Parathyroid carcinoma is a rare neoplasm found 0.1 to 4.0% of patients with primary hyperparathyroidism. This study describes our experiences with parathyroid carcinoma.

### Materials and Methods

Of 90 patients with primary hyperparathyroidism analyzed between March 2005 and March 2013, six were diagnosed with parathyroid carcinoma. One patient was lost to follow-up and the remaining five patients were enrolled in this study.

### Results

Two patients presented with bone pain at diagnosis, whereas the other three were asymptomatic. Four patients (80%) were female and one (20%) was male, with a mean age of 47.6 years (range, 32-67 years). Mean serum calcium concentration was 12.62 mg/dl (range, 9.8-17.7 mg/dl). Three patients had mild to moderate hypercalcemia, one had a normal serum calcium level, and one had severe hypercalcemia. The mean serum parathyroid hormone (s-PTH) concentration was 289.54 pg/ml (range, 91.8-844.9 pg/ml), with all five patients having high s-PTH concentrations. All patients underwent complete surgical excision. Mean tumor size was 2.0 cm (range, 1.2-4.5 cm), two patients had vascular and capsular invasion, and median follow-up period was 43 months (range, 3-96 months). No patient experienced loco-regional recurrence or distant metastasis during follow-up.

### Conclusion

Despite the small number of patients assessed, our results indicate that the clinical features of Korean patients with parathyroid carcinoma may differ from those of patients in other countries.

## 55. Reducing Neck Incision Length during Thyroid Surgery does not Improve Satisfaction in Patients

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### Background

Post-operative neck cosmesis is a major concern of patients undergoing thyroid surgery. Patients will likely be more satisfied with the long-term cosmetic appearance of smaller than larger thyroidectomy scars. We therefore investigated the relationship between scar length following conventional thyroid surgery and patient satisfaction.

### Methods

An anonymous scar-assessment questionnaire was administered to patients who underwent conventional thyroid surgery. The 2,041 patients were asked to rate their satisfaction with their scars on a 10-point Likert scale, with 1 being very unsatisfied and 10 being very satisfied.

## Results

The mean satisfaction score was significantly lower in the benign condition than in malignancy ( $6.9 \pm 2.5$  vs.  $7.4 \pm 2.5$ ;  $p = 0.021$ ), whereas there were no differences in satisfaction score among subgroups of patients with benign condition ( $p = 0.837$ ). In patients with thyroid cancer, the mean satisfaction scores were similar among subgroups according to operation type and scar length ( $p = 0.820$ ).

## Conclusion

Incision length was not associated with patient satisfaction in thyroid surgery patients and therefore may not be critical in decision making for thyroid cancer surgery.

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## 56. Tuberculous Cervical Lymphadenopathy Mimics Lateral Neck Metastasis from Papillary Thyroid Carcinoma

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### Background

Tuberculosis (TB) lymphadenitis is a frequent cause of lymphadenopathy in areas in which TB is endemic. Cervical lymphadenopathy in TB can mimic lateral neck metastasis (LNM) from papillary thyroid carcinoma (PTC). This study evaluated the clinicopathological features of patients with PTC and TB lateral neck lymphadenopathy.

### Methods

Of the 9,098 patients who underwent surgery for thyroid cancer at the Thyroid Cancer Center of Gangnam Severance Hospital between January 2009 and April 2013, 28 had PTC and showed TB lymphadenopathy of the lateral neck nodes. The clinicopathologic features of these 28 patients were evaluated.

### Results

Preoperatively, all 28 patients were diagnosed with PTC and showed cervical lymphadenopathy. All had radiological characteristics suspicious of metastasis in lateral neck nodes. Based on results from intraoperative frozen sections, 19 patients were able to avoid lymph node dissection (LND). Seven of eight patients who underwent LND had metastasis combined with tuberculous lymphadenopathy, with the remaining patient negative for LNM.

### Conclusion

Intraoperative sampling and frozen sectioning of lymph nodes suspicious of metastasis can help avoid unnecessary LND for tuberculous lymphadenopathy.

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## 57. Solitary Lateral Neck Node Metastasis in Papillary Thyroid Carcinoma

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### Background

Papillary thyroid carcinoma (PTC) is associated with a high incidence of regional node metastasis, but the patterns of lateral neck node metastasis (LNM) vary. Occasionally, PTC patients have a solitary LNM (SLNM). We assessed whether selective single level node dissection is appropriate in PTC patients with SLNM.

### Methods

We retrospectively reviewed the medical records of 241 PTC patients who underwent total thyroidectomy with central neck dissection plus ipsilateral internal jugular node dissection (level II-IV) between January 2010 and December 2011. Of these patients, 51 had SLNM and 190 had multiple LNM (MLNM). The clinicopathologic characteristics of the two groups were compared.

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## Results

Age, gender ratio, and numbers of lateral neck nodes harvested ( $29.4 \pm 11.0$  vs.  $30.3 \pm 9.5$ ;  $p = 0.574$ ) were similar in the SLNM and MLNM groups. Mean primary tumor size was significantly smaller in the SLNM than in the MLNM group (1.03 cm vs. 1.35 cm;  $p = 0.037$ ). The proportion of patients with primary tumor  $\leq 1$  cm was significantly higher in the SLNM group (60.8% vs. 38.4%;  $p = 0.006$ ), whereas the proportions with maximal node size  $\leq 0.7$  cm (28.9% vs. 73.3%;  $p < 0.001$ ) and capsular invasion (62.7% vs. 83.7%,  $p = 0.002$ ) were significantly lower in the SLNM than in the MLNM group.

## Conclusion

Selective single level neck dissection can be considered an alternative to systemic lateral neck dissection in PTC patients with SLNM, maximal metastatic node size  $\leq 0.7$  cm, and no extrathyroidal invasion.

# 58. Parathyroid Carcinoma: Diagnostic and Surgical Challenges

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## Background

The diagnosis of parathyroid carcinoma (PC) is difficult and always not suspected until at the time of surgery or even thereafter. We report experiences in managing these patients to provide effective approach to this rare tumor.

## Methods

We retrospectively reviewed 7 patients treated for primary hyperparathyroidism secondary to PC at Hospital Putrajaya from 2006 to 2013. Their data analyzed with respect to the clinicopathological features, treatment and outcome.

## Results

All patients presented with hypercalcemia symptoms. Majority had marked hypercalcemia with high parathyroid hormone (PTH). None had palpable neck mass, lymphadenopathy or vocal cord palsy. Four patients underwent an en-block resection as malignancy was suspected intraoperatively. Another three had parathyroidectomy; two of them had tumor adherent. On final histology, two reported as carcinoma, two as uncertain of malignancy, and three as adenoma. The mean size of the tumor was 2.7 cm. At a median follow-up of 35 months, three patients were still alive without evidence of disease (two of them had re-exploration for local recurrence). One patient died due to complication of surgery during the third exploration. Another three had persistent hypercalcemia after the third exploration due to distant metastasis (two died due to the disease).

## Conclusion

Parathyroid carcinoma should be considered in a patient with severe hypercalcemia, high PTH level and tumor size  $> 2$  cm. They should be closely follow-up even though the final histology is benign. When a tumor infiltration is encountered intraoperatively, it is prudent to proceed with a complete *en block* resection to ensure better prognosis.

# 59. Outcome of Adrenalectomy for Primary Adrenal Cushing's Syndrome

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## Introduction

Cushing's syndrome patients are severely compromised, therefore surgery may carry a high morbidity and mortality. We reported our experiences in performing adrenalectomy in patients with Cushing's syndrome secondary to primary adrenal disease.

## Patient and Methods

We retrospectively reviewed 19 patients who underwent adrenalectomy for Cushing's syndrome secondary to adrenal tumor in Putrajaya Hospital from 2002 to 2012. Their clinical data were analyzed with respect to clinicopathological features, medical treatment, operative procedure and clinical outcomes.

## Results

Eight patients were preoperatively treated with ketoconazole and all patients were given steroid supplement perioperatively. Fourteen patients had laparoscopic procedure in which one patient had converted to open due to bleeding and five patients had open surgery. On final histology 16 reported as adrenocortical adenoma, two as adrenal cortical oncocytoma and one as adrenocortical carcinoma. None of them developed post-operative complication. Thirteen patients continued monitoring with us. At a median follow-up of 24 months (range 12-72 months) seven patients

had incomplete clinical recovery (symptoms were in control and medication dosage was tapered down) whereas five patients had complete clinical recovery (symptoms resolved fully with no medication). One patient with adrenocortical carcinoma progressed to distant metastasis despite on mitotane and succumbed to death after 2 years.

## Conclusion

Surgery for Cushing's syndrome secondary to adrenal disease is safe and effective, especially in adrenocortical adenoma however preoperative optimization is crucial to ensure a successful outcome. Clinical recovery may be incomplete, however quality of life does improve considerably. Survival for patient with adrenocortical carcinoma remains poor.

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## 60. Laparoscopic Transperitoneal and Retroperitoneal Adrenalectomy: Which is the Procedure of Choice?

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### Introduction

Laparoscopic adrenalectomy has become the standard treatment for benign adrenal masses either with laparoscopic transperitoneal (LTP) or laparoscopic retroperitoneal (LRP) approaches. The aim of this study was to evaluate the learning curve and safety of LRP compared with LTP.

### Methods

All laparoscopic adrenalectomies performed by a same surgeon were reviewed retrospectively from 2005 to 2013. The patient's characteristics, presenting features, and operative outcomes were evaluated.

### Results

A total of 58 LTP and 48 LRP were performed. From 2005 to 2010 LTP was the only procedure performed. However, since 2011, LRP has gained popularity as the preferred technique and LTP was reserved for bigger tumor. Majority were functioning tumors (85%) and all tumors were benign. Bilateral adrenalectomies done in 3 patients (1 LTP; 2 LRP). There were two pregnant patients in the series. Mean operative time was less in LRP (110 vs 128 min). Tumor size in LRP was 26 mm (3-100 mm), whereas in LTP was 34 mm (2-160 mm). Conversion rate in LRP was lower (2% vs 15%). Overall morbidity was 7% with more complications in LTP (three cardiac event, one bronchospasm, one upper gastrointestinal bleeding, and one minor kidney injury). In LRP group, one patient had chest tube insertion for subcutaneous emphysema and one patient had flank hematoma. One patient died following cardiac event in LTP group.

### Conclusion

Both LTP and LRP were safe and effective for treatment of adrenal diseases. Retroperitoneal approach is the procedure of choice; however, mastering both approaches is an advantage when dealing with bigger tumor.

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## 61. Is Short Stay Thyroidectomy Feasible, Acceptable, Safe and Cost-effective in Developing Countries? A Case Study from India

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### Introduction

With the increasing healthcare cost, rising disease burden and out of pocket expenditure by the patients, innovative healthcare models need to be worked out, to reduce the financial burden on the society with optimal utilization of limited resources. Literature in the western countries with strong support system has shown that it is possible to do short stay thyroidectomy; however, such practice is not so well-studied in context of developing countries.

### Materials and Methods

It was a prospective study in which 30 benign euthyroid patients with thyroid volume less than 80 ml, who underwent hemithyroidectomy between years 2012 and 13 at Sanjay Gandhi Postgraduate Institute, Lucknow, were recruited in the study. Another set of 30 patients unwilling for short

stay or not fulfilling the inclusion criteria were recruited as controls. Outcome was assessed on the various parameters like patient satisfaction, cost benefit, and complication rates. Data were analyzed using SPSS software 17.

## Results

There was no significant difference between the two groups in terms of complication like post-operative hemorrhage, voice change, or wound infection. Patient felt satisfied with the care provided to them and more than 90% of the patient felt the duration of hospital stay was appropriate. There was significant difference in the cost benefit between the two groups.

## Conclusion

Even though the number of patients is less, but it showed that the thyroidectomy can be done as short stay procedure without much morbidity and is the first step toward short stay total thyroidectomy in countries like India with limited resources.

## 62. Carbimazole-induced Vasculitis with Pulmonary and Renal Involvement in Patient of Graves' Disease: Rare Presentation

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Carbimazole and propylthiouracil (PTU) are the commonly used drugs for treatment of toxic goiters. Classical vasculitis is an uncommon side effect of these drugs, more common with patients receiving PTU than with carbimazole and methimazole (25-32%, 3.4% and 7.1%). Only few cases have been reported worldwide with pulmonary and renal involvement. We report such a case of a 40-years-old gentleman of Graves disease since 2005 and on irregular treatment with neomercazole. He presented with features of uncontrolled thyrotoxicosis (palpitation, heat intolerance, weight loss, etc.) along with history of bloody sputum for 2 months. On examination, he had diffuse thyromegaly with mild ophthalmopathy (CAS 1/7). Chest examination revealed vesicular breath sound with bilateral diffuse crepitation. Biochemically, he had elevated serum T3, T4, and suppressed thyroid-stimulating hormone. He also had elevated serum creatinine, with ground glass opacities in both lung fields on computed tomography. With high suspicion of vasculitis (? Drug induced), antibodies assays (ANCA, anti-MPO, etc.) and renal biopsy were done which confirmed the diagnosis. In view of large gland size, patient was prepared for surgery (total thyroidectomy) with short period of preparation with intravenous (IV) and oral steroids, beta blockers, and Lugol's Iodine. Post-operatively, he was put on EUVAS (European Vasculitis Society) protocol for ANCA associated vasculitis and received six cycles of IV cyclophosphamide followed by maintenance doses of azathioprine. Patient recovered well. This case was reported in view of rarity of occurrence of carbimazole-induced vasculitis involving pulmonary and renal system. Timely management in these patients can improve the outcome.

## 63. Follicular Thyroid Carcinomas with Distant Metastasis: An 8-Year Retrospective Study

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### Introduction

In previous literatures, the two most frequent sites of distant metastases have been reported to be lung and bone in follicular thyroid carcinoma (FTC) cases.

### Materials and Methods

In 131 patients with follicular thyroid tumor who underwent surgical resection in our department from January 2005 to December 2013, 11 FTC patients with distant metastases were included. Clinical course and post-operative outcomes were reviewed retrospectively.

### Results

In 7 of the 11 patients, distant metastasis coexisted with primary tumor and total thyroidectomy was performed. In the remaining four patients, in whom the thyroid tumor was supposed to be follicular adenoma, hemithyroidectomy was performed and they were found to be FTC by presentation of subsequent distant metastasis (the mean disease-free interval was 9.4 years). Only one patient (9.1%; 1/ 11) died due to pancytopenia caused by metachrous spinal column metastasis 14.7 years after the hemithyroidectomy, while all of other 10 patients were confirmed to have been survived during the follow-up (median; 5.8 years). A total of 8 (72.7%) and 6 patients (54.5%) had bone and lung metastasis, respectively (in three patients, overlapped). Other distant metastasis, skin and brain was observed in one case, respectively. All of the patients with bone metastasis required external irradiation, medications by narcotics, or orthopedic surgery for pain and/or pathological fractures.



## Conclusion

Since, the life expectancy of FTC patients with distant metastasis may not necessarily be short, bone metastasis, which is the most frequent type of distant metastasis of FTC, would detract from quality of life for a long time.

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## 64. BRAF Mutations in Papillary Thyroid Cancer from an Endemic Goiter Area

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### Introduction

Thyroid cancer is one among the most frequent 20 cancers in the world. A total of 70-90% of thyroid cancers are papillary thyroid cancer (PTC). It is postulated that PTC is aggressive in endemic goitre area.

### Materials and Methods

We studied the prevalence of BRAF gene (present in the downstream of MAPK pathway) mutations in a total tissue samples of 57 (45 papillary thyroid carcinoma, six normal tissues, and six MTC and parathyroid adenomas. All samples are from North Indian population). We performed restriction fragment length polymorphism-polymerase chain reaction method for BRAF mutation analysis and confirmed randomly selected sample by sequencing.

### Result

In a total of 45 PTC, 64% of the cases (29/45) showed positive BRAF mutations (heterozygous). The BRAF single nucleotide change from thymine to adenine at 1799 position (V600E) was detected in sequencing. The data were further analyzed on the histopathological database. There were 36 PTC not otherwise specified (NOS) and 9 variants of PTC. From that, we concluded 13/19 of the lymph nodal metastatic PTC had BRAF positivity (68%), 90% of PTC poorly differentiated areas had BRAF mutation (4/5), out of 2 papillary thyroid microcarcinomas none was positive for BRAF mutation. Among the variants of PTC, we found 2/2(100%) tall cell variants and 2/5(40%) follicular variants of PTC were positive for BRAF mutations, meanwhile none out of two oncocytic variants of PTC had BRAF mutations. All our controls were negative for BRAF mutation.

### Conclusion

The study shows high prevalence of BRAF mutations in papillary thyroid cancers from endemic goitre area. BRAF positivity correlated with aggressive presentation of PTC.

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## 65. Virilizing Adrenal Tumor

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### Introduction

Virilising tumors are rare and predominantly occur among children. Most virilising tumors originate from ovaries. Adrenal cortex produces sex hormones and is a potential source of such tumors. Virilising adrenal tumors are predominantly carcinomas, commonly among the children. We report a case of virilising adrenal cortical tumor in an adult female.

### Case Report

A 28-year-old nulliparous female presented to gynecologist for secondary amenorrhea of 5-year duration. She was otherwise well with no other symptoms. Clinical examination revealed a hirsute lady with acne, male pattern pubic hair distribution and minimally developed breasts. Abdominal ultrasound and subsequent computed tomography scan showed a large right adrenal mass, measuring 15 × 13 × 13 cm.

Hormonal assay showed markedly elevated level of testosterone and dehydroepiandrosterone, the female hormone level were within normal range. She underwent laparotomy and right adrenalectomy, a well encapsulated tumour weighing 1.34 kg removed.

Postoperative recovery was uneventful and repeat hormonal assay at one week post-surgery showed very low level of both testosterone and DHEA. Pathology examination confirmed an adrenal cortical tumour, with no frank malignant histologic features.

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## DISCUSSION

Review of literature showed reported cases of virilising adrenal tumor among adult females are uncommon. The probability of carcinoma among these tumors is high. However, based on the symptoms and gross pathologic features, this patient may be an adenoma.

## 66. Well-differentiated Thyroid Carcinomas in Patients with Hyperthyroidism

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### Introduction

The coexistence of hyperthyroidism and thyroid cancer is rare. We recorded six cases of hyperthyroid patients who underwent total thyroidectomy and diagnosed with thyroid carcinoma.

### Methods

A retrospective review of six thyrotoxic patients who underwent surgery and diagnosed with well-differentiated thyroid carcinoma. Cases were collected from local database over a period of 3 years from April 2010 to April 2013 in Hospital Pulau Pinang.

### Results

Four patients had underlying Graves' disease, while the other two had toxic multinodular goitre. Half of the cases were suspected or diagnosed with thyroid cancer based on clinical features, imaging, or fine-needle aspiration cytology prior to surgery, while the other three were confirmed to have thyroid cancer following histopathological examination of thyroid specimens. Four patients had papillary thyroid carcinoma, all of them had underlying Graves' disease. One patient had extensive disease with neck, mediastinal, and lung metastases; one had unilateral nodal spread; and two had confined disease with no nodal metastases. Three patients underwent radioactive iodine treatment/ablation of individualized regime. No further treatment for one patient with papillary microcarcinoma. The two patients with multinodular goitre were diagnosed with follicular thyroid carcinoma. No cases of medullary or anaplastic thyroid cancer documented.

### Conclusion

All hyperthyroid patients should be assessed with careful clinical examination and neck ultrasonography. Thyroid nodules among thyrotoxic patients should be investigated and managed accordingly, following the established algorithm of thyroid nodule.

## 67. Laryngoscopy in Thyroid Surgery by General Surgeon

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### Introduction

Preoperative and post-operative laryngoscopy has been recommended for diagnostic and treatment plans of vocal fold dysfunction, a standard procedure in all patients who undergo thyroid surgery. The aim of this study was to find a more selective approach by defining patients at risk of developing vocal fold palsy (VFP).

### Materials and Methods

The history of neck explorations, voice symptoms, and results of laryngoscopy was registered in all patients who underwent thyroid surgery between March and September, 2013. Patients with pathologic findings at post-operative laryngoscopy underwent reassessment of voice and vocal fold mobility 2 weeks, 3 months later.

### Results

Preoperative pathologic laryngoscopy findings was detected in 5 of 568 patients (0.88%). Post-operative laryngoscopy revealed new development of VFP in 41 of 568 patients (7.2%). Of the 41 patients, four patients were performed recurrent laryngeal nerve (RLN) resection and anastomosis due to direct tumor invasion, four patients were performed shaved RLN, two patients had iatrogenic RLN injury. Six patients had no symptoms at post-operative assessment. Among them, three patients had new development of symptoms and persistent VFP at reassessment of 2 weeks later. A total of 20 patients had persistent voice symptoms and VFP at post-operative 2 weeks later. Three months later, 5 of the 11 reassessment patients had persistent symptoms and VFP. All patients with a permanent VFP had symptoms immediately after operation, asymptomatic VFPs always recovered.

### Discussion and Conclusion

Preoperative laryngoscopy is justified in symptomatic patients. Post-operative laryngoscopy is essential standards in thyroid surgery patients. Post-operative laryngoscopy should be reserved for symptomatic patients.

## 68. Clinical Features and Prognostic Factors for Tumor Recurrence in Micropapillary Thyroid Cancer

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### Introduction

In South Korea, the incidences of papillary thyroid microcarcinoma (PTMC) patients have increased markedly over the past 10 years. The increased use of thyroid ultrasonography and technical improvements associated with fine-needle aspiration biopsy has resulted rapidly increase in the rate of PTMC patients and facilitate diagnosis of recurrence.

### Materials and Methods

A total of 991 patients underwent thyroidectomy for PTMC between 1994 and 2004. The median follow-up period was 104 months.

### Results

The median follow-up period was 104 months. Of the 931 patients, 92 patients were treated hemi- or subtotal thyroidectomy, 839 patients were treated near-total thyroidectomy. Recurrence was observed in 40 of 931 patients (4.3%): tumor size > 0.5 cm, bilaterality and presence of central cervical node metastasis at initial surgery were associated with recurrence.

Most common sites of recurrence were cervical lymph node. Most recurrences can be successfully treated with further revision neck surgeries, and radioiodine therapy.

### Discussion and Conclusion

Although PTMC is generally associated with an excellent prognosis, only one patient died of PTMC. Nevertheless, approximately 4.3% of patients developed recurrent disease. Tumor size > 0.5 cm, N1a, and bilaterality were independent predictors of recurrence. Central compartment neck dissection should be performed when cervical lymphadenopathy is discovered either preoperatively or intraoperatively. Moreover, we should pay attention to post-operative follow-up ultrasonography.

## 69. High Thoracoabdominal Approach for Large Adrenal Tumors: A Single Institutional Experience

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### Introduction

Adrenalectomy for large pheochromocytoma, malignant tumor which involves adjacent organs and/or structure is still challenging surgical procedure. Thoracoabdominal approach (TAA) has been described as a superior approach for large tumor in several textbooks. They uniformly described that thoracotomy was placed on the lower (e.g., 10th) intercostal space. In our institution, TAA through higher (6th-8th) intercostal space has been employed for a long time. In this approach, large surgical field can be easily attained and adrenal tumors always sit on the center of the surgical field. Dissection of the adrenal vein can be performed with good visibility. However, high invasiveness of TAA has been concerned.

### Materials and Methods

TAA approach for adrenal and retroperitoneal tumor in our institution is retrospectively reviewed. A total of 49 patients with adrenal tumor underwent adrenalectomy through TAA between 1995 and 2012. The number of right and left adrenalectomy was 32 and 17, respectively. Pathological diagnoses were 26 cases of pheochromocytoma, 6 cases of adrenocortical carcinoma, and 17 cases of miscellaneous tumor.

### Results

Mean diameter of the tumor was 9.9 cm (4-28 cm). Median operation time was 225 min. (118-600 min) Median blood loss was 348 ml (41-4980 ml) Transfusion was required in nine patients. Ten patients required admission to intensive care unit. No post-operative pneumonia, pneumothorax, or ileus developed.

### Discussion and Conclusion

High TAA for adrenal tumors is considered to be as safe as conventional abdominal approach and versatile procedure.

Several approaches have been developed. Among them, abdominal approach has been most frequently employed. However, good surgical field cannot be often attained in the deep area by this approach.

The charts were reviewed retrospectively:

- Laparoscopic adrenalectomy has been gold standard for adrenal tumors. However, laparoscopic approach is not sometimes applicable to large tumors especially pheochromocytomas, malignant tumors.

- Laparoscopic approach is not applicable to such tumors.
- Adrenal gland is located in the apex in the abdominal cavity.
- Abdominal approach makes surgical distance to be long.
- It is often difficult to attain good surgical field by anterior or posterior approach.
- In the past literatures, TTA refer to thoracotomy between 10 and 12th intercostal space and concomitant laparotomy.
- The major drawback of anterior approach is ileus resulting from wide dissection of abdominal cavity and long incision of abdominal wall.
- The major drawback of thoracotomy is pulmonary complication, for example, pneumonia.
- The advance of anesthesia eludes pulmonary complication.
- The high TTA enables wide exposure of upper abdominal cavity even if there is a large adrenal mass.
- In our institution, high TTA has been adopted for more than 30 years.

Here, we report our procedure in detail and clinical outcome and complications.

The TTA is most useful when a large, malignant adrenal tumor requires *en bloc* resection with lymphadenectomy. However, the drawbacks of this approach are as follows: (a) Morbidity is significantly increased because the pleura and peritoneum are violated and (b) it is useful only for unilateral adrenalectomy (Surgical Endocrinology p. 276).

The patient is placed in the lateral position with flexion of the table at the 11th rib. On the left, a straight incision is made from the end of the 11th rib, where the sacrospinal muscle lies lateral to the abdominal wall. The dissection is then carried through the abdominal muscles and rib. The 11th rib is excised, subperiosteally, back to its angle. If a malignant adrenal neoplasm extends into the inferior vena cava or hepatic vein, the thoracoabdominal incision can be combined with a median sternotomy to allow complete resection. On the right, a similar incision is made along the course of the 10th rib when the right adrenal gland lies higher than the left. The intercostal neurovascular bundle should be preserved. The pleural cavity and diaphragm are routinely entered on the right, but this may not be necessary on the left side. The diaphragm is incised in the line with skin incision posteriorly. Incising the diaphragm posteriorly avoids opening the peritoneum and exposing the abdominal contents. The lung is retracted superiorly and the liver anteriorly, on the right side, to provide a wide exposure for adrenalectomy. Thereafter, the adrenal gland is removed as previously described. The diaphragm and the peritoneum, if entered, should be sutured. A tube thoracostomy is then placed the 7th or 8th intercostal space (Surgical Endocrinology p. 282).

## 70. Primary Hyperparathyroidism complicated with Bilateral Neck of Femur Fracture

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### Introduction

Primary hyperparathyroidism is rare disorder, majority are detected incidentally but has serious consequences on its merit, very rarely bilateral neck of femur fractures.<sup>3</sup>

### Case Report

A 49-year-old female was presented with bilateral neck of femur fracture following trivial fall and found to have asymptomatic hypercalcemia and on examination, had euthyroid multinodular goitre.

Investigations showed hypercalcemia, hypophosphatemia, and high parathyroid hormone. Skull X-ray revealed hypervascular lytic lesions (Brown's tumor) in the mandible with salt and pepper skull appearance. Tc99m tetrofosmin scan showed intense tracer uptake in upper pole of the left lobe of thyroid, suggestive of solitary parathyroid adenoma treated successfully by excision<sup>4</sup> with left hemithyroidectomy and meantime underwent bilateral hip replacement.

Post-operatively, her parathyroid hormone level improved to normal range, and had symptomatic hypocalcemia, that required replacement therapy with calcium and active vitamin D. She made a good recovery with improved biochemical indices on follow-up.

### Discussion

Primary hyperparathyroidism (PHPT) known for more than 100 years, with prevalence of 2-10/10000,<sup>2</sup> peak incidence in 30 to 50 years of age, female : male = 3 : 1, majority are solitary adenoma (80%), multinodular (10%) rarely malignant adenoma.

The clinical manifestation of PHPT ranges from asymptomatic (60%) to overt severe bone and stone diseases, very rarely pathological fractures,<sup>5</sup> thus the bilateral neck of femur fractures.

Parathyroidectomy offers the cure rate of 95 to 98% with complications, such as hypocalcemia (hungry bone syndrome).<sup>2</sup>

Early diagnosis of asymptomatic hypercalcemia with surveillance can prevent the overt manifestations of primary hyperparathyroidism.

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## 71. Analysis of Prognostic Factors associated with Central Neck Node Metastasis in Papillary Thyroid Cancer

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### Introduction

Papillary cancer is the most common type, which accounts for about 80 to 85% of thyroid cancer. This is known as frequent cervical lymph node metastasis. Especially central neck node (level VI) is the most common metastatic site. We performed this study to analyze the relationship between central neck node metastasis and known prognostic factors of thyroid cancer.

### Materials and Methods

Total 173 patients with papillary thyroid cancer were enrolled in this study. All patients underwent total thyroidectomy with central neck node dissection between January 2002 and December 2008. The correlation between gender, age, tumor size, extrathyroidal extension (ETE), multifocality, thyroiditis, and status of central neck node were evaluated.

### Results

Mean age of all patients was  $47.9 \pm 11.1$  years. Male to female ratio was 1 : 9.8, mean tumor size was  $1.2 \pm 0.8$  cm, and number of harvested lymph node was  $8.3 \pm 6.7$ . Among the various factors, male, absence of thyroiditis, tumor size, ETE, and multifocality were related with central neck node metastasis. Especially, in respect to tumor size, there was a tendency that the more large tumor were related with more numbers of metastatic lymph node ( $r = 0.326$ ,  $p < 0.001$ ). To determine the optimal tumor size which can predict nodal metastasis, we analyzed the tumor size by using receiver operating characteristics curve. According to this result, 0.9 cm was the optimal size to predict lymph node status (area under the curve = 0.758,  $p < 0.0001$ ).

### Discussion and Conclusion

Tumor size, male, ETE, absence of thyroiditis, and multifocality were related with central neck node metastasis. However, more cases of study are needed to clarify this result.

## 72. A Case of Follicular Thyroid Carcinoma found after Metastasis to Skull

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### Case Report

A 63-year-old female was referred to the department of neurosurgery, Naha City Hospital, with an immobile subcutaneous mass on her left lateral head. She was pointed out a thyroid tumor at the other hospital several years ago. Malignant finding was not seen by fine-needle aspiration cytology. Then, she had received annual follow-up by ultrasound examination. Magnetic resonance imaging study showed a 4 cm sized tumor which caused skull destruction in the epidural area. The skull tumor was diagnosed as a meningioma and was surgically removed. Histological examination showed a typical epithelial cells similar to thyroid follicular epithelial cells. Immunohistochemical examination showed positive staining for thyroglobulin and thyroid transcription factor-1. Then, the diagnosis of skull metastasis of follicular thyroid carcinoma was made. The patient was transferred to our department. Ultrasound examination revealed a  $3 \times 2$  cm-sized solid tumor in the right lobe of her thyroid. Computed tomography study and Thallium-201 scintigraphy showed multiple bone metastasis. The patient underwent total thyroidectomy and regional lymphnode dissection. Post-operatively, radioiodine therapy was done.

A case of follicular thyroid carcinoma found after the skull metastasis is rare. We report this rare case with some review of literatures.

## 73. Incidence of Hypocalcemia in Post-thyroidectomy Patients and its Relation to Parathyroid Hormone and Vitamin D Levels

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### Introduction

Thyroidectomy carries a significant risk of hypocalcemia which may lead to life-threatening complications; therefore, patients usually require in patient calcium monitoring. We aim to evaluate the factors that can predict the incidence of post-operative hypocalcemia particularly in regards to the intact parathyroid hormone (iPTH) and vitamin D level.

### Materials and Methods

We performed a prospectively study for patients undergoing total thyroidectomy for presumably benign goiters from June to December 2013 in Hospital Putrajaya. Serum calcium was measured at 8 pm on the day of surgery and then daily as necessary and on 6 weeks, 3 months, and

6 months follow-up. Vitamin D was taken preoperatively and serum iPTH at 8 pm on the day of surgery and 6 months follow-up. Other factors, such as thyroid status, weight of thyroid glands, presence of substernal extension, number of parathyroid glands identified, and final histology also were analyzed.

## Results

A total of 46 patients were accrued for this study. Initial results showed 18 patients (40%) had immediate hypocalcemia. And 27 patients (60%) had low preoperative vitamin D level and 12 patients (27%) had low post-operative iPTH level. Among hypocalcemia patients, majority had hyperthyroid (46%), substernal extension (44%), low Vitamin D (44%), and low iPTH level (66%). Incidence of permanent hypocalcemia will be further evaluated.

## Conclusion

Our incidence of immediate hypocalcemia is within range as reported worldwide. Presence of substernal extension, hyperthyroidism, low preoperative vitamin D and low post-operative iPTH level are factors that associated with incidence of hypocalcemia in post-thyroidectomy patients.

# 74. Factors determining the Outcome of Surgery for Primary Hyperaldosteronism

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## Introduction

Hypertension secondary to primary hyperaldosteronism (PA) is treatable by surgical intervention; however, some of the patients may require antihypertensive medications after adrenalectomy. The aim of this study is to review factors determining resolution of hypertension after surgical treatment in PA.

## Methods

We retrospectively reviewed 118 patients who underwent adrenalectomy for PA in Hospital Putrajaya from January 2001 to November 2013. Their demographic data, final histology, and factors that may influence the outcome, such as age at presentation, duration of symptoms before surgery, total number of medications prescribed, body mass index (BMI), renal function, and size of tumor were analyzed.

## Results

On final histology, all 118 patients reported as benign cortical adenoma. Post-operatively one patient (0.8%) died unexpectedly following cardiac event. All patients had normal potassium levels. A total of 77 patients (65.3%) were not on antihypertensive medications and considered as cured. Another 41 patients (34.7%) are still on antihypertensive medication. Of which at presentation, most of them were over 40 years old, having duration of symptoms more than 7 years and BMI of above 25 kg/m<sup>2</sup>; however, these were not statistically significant. Preoperative renal function shows a statistically significant correlation with PA cures.

## Conclusion

Our curative rate for PA by surgical intervention is slightly higher compared to other centers. Younger age and shorter duration of symptoms at presentation may contribute to this result.

# 75. Comparison of Swallowing Disorder following Gasless Transaxillary Endoscopic Thyroidectomy vs Conventional Open Thyroidectomy

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## Introduction

In conventional open thyroidectomy, it is necessary to create a subplatysmal muscle flap in front of the strap muscle to provide working space. Adhesion between flap and strap muscle can occur after operation, disrupting strap muscle movement, and causing a swallowing disorder. Gasless transaxillary endoscopic thyroidectomy (endoscopic thyroidectomy) approaches the thyroid through the posterior of the strap muscle and does not require a subplatysmal muscle flap. The present study compared flap/muscle adhesion and occurrence of swallowing disorder.

## Methods

A total of 47 patients were divided into two groups: group O (24 patients: open thyroidectomy) and group E (23 patients : endoscopic thyroidectomy). The subjective swallowing impairment index 6 (SIS-6) was used to evaluate the degree of post-operative swallowing disorder. Video recordings

of swallowing movement were used to determine the contraction/relaxation (C/R) ratio and evaluate adhesion, preoperation, 3 days, and 1 month post-operation. Barium videofluoroscopy was used to measure movement of the hyoid bone and strap muscle.

## Results

Group O had significantly higher post-operative SIS-6 scores than group E ( $P < 0.01$ ), indicating greater swallowing disorder. The CR ratio increased in group O after the operation and continued to increase during 1 month post-operation but decreased in group E ( $P < 0.001$ ). Video fluoroscopy showed that hyoid bone movement in group O decreased by 55.46 and 55.75% at 3 days and 1 month post-operation, respectively, while the corresponding decreases in group E were 85.83 and 85.83%.

## Conclusion

Conventional open thyroidectomy allowed adhesion of the strap muscle and subplatysma muscle flap, resulting in nonspecific dysphagia.

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## 76. Association of BRAF Mutation and RET Expression in Papillary Thyroid Carcinoma

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### Purpose

BRAF mutation and RET rearrangement are common in papillary thyroid cancer. Some researchers suggest that the reciprocal exclusion of BRAF and RET mutation. The aim of this study was to determine the prevalence of BRAF mutation and RET expression level in the same tumor tissue and its correlation with some clinicopathologic features.

### Materials and Methods

The incidence of BRAF mutation and RET expression was determined by means of pyrosequencing and immunohistochemistry in a series of 99 conventional papillary thyroid carcinomas (PTCs). In addition, the associations between clinicopathological features and BRAF and RET status were assessed.

### Results

BRAF mutation was present in 90 out of 99 PTCs (90.9%). RET expression was strong positive in 19 (24.1%), equivocal in 12 (15.2%), and negative in 48 (60.8%). BRAF and RET expression have no significant correlation in incidence. In addition, BRAF mutation and/or RET expression level have no correlation with clinicopathologic feature in this study.

### Discussion and Conclusion

The present study shows that coexistent BRAF mutation and high RET expression is a frequent event in PTC. However, their presence of BRAF mutation and RET expression has no clinical implication.

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## 77. Endocrine Surgeon-performed Ultrasonography in Parathyroid Surgery

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### Introduction

Office-based surgeon-performed parathyroid ultrasound is becoming a popular scenario in the management of parathyroid diseases. Real-time interpretation and knowledge on anatomy give the surgeons an extra advantage in interpreting the findings. We sought to determine the accuracy of parathyroid ultrasonography at our center by the two available endocrine surgeons.

### Methodology

Study was conducted in a tertiary referral center at University Kebangsaan Malaysia Medical Centre from January to November 2013. All patients who underwent bilateral neck exploration for renal hyperparathyroidism had a neck ultrasonography done 1 day prior to surgery. Size, location in relation to upper or lower pole of the thyroid gland, unidentified gland, and histopathological results were recorded.

### Results

A total of 24 patients were included in this study. The sensitivity and specificity of surgeon-performed sonography was 84.9 and 60.6%, respectively. The positive predictive value for this procedure was 94.5% with an accuracy of 81.8%.

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## Conclusion

Preoperative parathyroid sonography performed by an endocrine surgeon serves as a good guide with acceptable accuracy. The low specificity was largely due to the presence of concomitant nodular goiters which can be improved by enhancing the surgeon's experience in performing this procedure.

## 78. Malignancy in Diffuse Chronic Lymphocytic Thyroiditis: A Diagnostic Dilemma

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### Introduction

Diffuse lymphocytic thyroiditis is a common condition occurring in elderly. Known as a predisposing factor for thyroid malignancy, thyroid lymphoma could arise from these type of condition. Diagnosing lymphoma in background of chronic thyroiditis remains difficult as suspicious tissue could easily be missed. We present a case report of thyroid lymphoma diagnosed after total thyroidectomy in patient who presented with diffuse chronic lymphocytic thyroiditis.

### Method

A 48-year-old lady presented with diffuse thyroid swelling over 2 months. Clinically, patient was euthyroid with no evidence of compressive symptoms. Ultrasound revealed diffuse thyroid enlargement of coarse echotexture, thyroid function test was normal. Fine-needle aspiration cytology showed features consistent with diffuse lymphocytic thyroiditis. The thyroid progressively become enlarged over 2 years but patient still remains asymptomatic. Total thyroidectomy was performed due to progressive enlargement. The HPE showed evidence of diffuse large B-cell lymphoma in preexisting chronic thyroiditis. Patient subsequently underwent chemotherapy and being followed-up in surgical clinic.

### DISCUSSION

Thyroid lymphoma is a rare malignancy occurring mostly in elderly. Identifying lymphoma or other malignancy in patient with diffuse chronic thyroiditis remains a dilemma as FNAC could miss the correct diagnosis. Role of trucut biopsy has been advocated to save patient from having thyroidectomy. Treatment of thyroid lymphoma requires chemotherapy with or without radiotherapy. The role of multidisciplinary team in managing patient with thyroid lymphoma remains crucial.

## 79. Predictors of Hungry Bone Syndrome Post-total Parathyroidectomy in ESRD Patients

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### Introduction

Renal hyperparathyroidism resulted from long-standing end-stage renal disease (ESRD). Surgery is indicated when the glands become autonomous or tertiary hyperparathyroidism. The hungry bone syndrome (HBS) represents an important cause of prolonged hypocalcemia after parathyroidectomy due to primary, secondary, or tertiary hyperparathyroidism. The sudden post-operative withdrawal of parathyroid hormone induces a stop in osteoclastic bone resorption without affecting the osteoblastic activity. Consequently, an increased bone uptake of calcium is observed causing hypocalcemia despite optimized calcium supplementation to control serum calcium after total parathyroidectomy. The aim of this study is to evaluate the incidence of HBS after total parathyroidectomy and delineate its predictive risk factors.

### Method

This is a retrospective observational study including all total parathyroidectomies planned for renal hyperparathyroidism in a single endocrine surgery centre (PPUKM).

### Results

During the 5 years from January 2009 to December 2013, there were 76 elective total parathyroidectomies performed for renal hyperparathyroidism in PPUKM. A total of 49 patients were analyzed after histopathology examination confirmed all four glands were removed. Biochemical markers preoperatively, such as intact parathyroid hormone, alkaline phosphatase, phosphate levels, and age were analyzed. Post-operative hypocalcemia and prolonged hospital stay with intravenous calcium infusion were used as markers for HBS.

### Conclusion

HBS is the most common post-operative complication after total parathyroidectomies. Monitoring will help institute early treatment. The study is to look for predictive factors for the condition.

## 80. To Evaluate whether Routine Preoperative Laryngoscopic Examination for Vocal Cord Mobility is Necessary before Thyroid Surgery

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### Aim and Objectives

To evaluate whether routine preoperative laryngoscopic examination for vocal cord mobility is necessary before thyroid surgery.

### Materials and Methods

The charts of 460 patients with documented preoperative laryngoscopic examination (PLE) prior to thyroid surgery were retrospectively analyzed. The factors associated with increased risk of pre- and post-operative vocal cord palsy were analyzed.

### Results

A total of 40 patients had preoperative voice change. Of these, 16 patients had vocal cord paralysis on laryngoscopic examination, 23 had mobile cords, and 1 patient was not assessed as she was not cooperative. Histopathology showed malignant disease in all the 16 patients. There was one patient with asymptomatic cord paresis, who was later found to have a benign thyroid swelling.

Post-operative voice change was seen in 20 patients. Laryngoscopic examination in 13 patients documented vocal cord dysfunction. All 13 were found to have vocal cord dysfunction. A total of 17 of the 20 patients with post-operative voice change were found to have thyroid cancer.

The sensitivity and specificity of various clinical factors, especially voice change, and clinical findings in predicting pre- and post-operative vocal cord paralysis was calculated.

### Conclusion

Routine PLE may not be necessary before thyroid surgery. No case of asymptomatic cord palsy was detected in this series of 460 patients. The factors associated with risk of operative injury and therefore possibly selected for PLE included malignant goitre, lymph nodal metastasis, hard and fixed nodules, and patients with prior neck surgery. We recommend that each center evaluate its own risk to rationalize practice of PLE.

## 81. Predictive Value of Fine-needle Aspiration Cytology in Thyroid Cancer: A Single-center Study in Sri Lanka

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### Background

Fine-needle aspiration cytology (FNAC) is a standard, simple, and cost-effective test used to evaluate patients with thyroid swellings. But, its ability to differentiate benign from malignant conditions is limited.

### Objective

To evaluate the accuracy of FNAC in detecting malignant conditions in patients with thyroid swellings.

### Materials and Methods

Retrospective analysis of FNAC and histopathology records was done on patients who underwent total thyroidectomy or hemithyroidectomy in a single university surgical unit of Sri Lanka, between November 2002 and September 2013.

### Results

The study included 281 cases. However, six cases were excluded due to unsatisfactory aspirates after two attempts. Female to male ratio was 7.9 : 1 and mean age was 46.6 years.

FNAC revealed 210 (76.36%) benign lesions, 18 (6.55%) follicular lesions, 14 (5.09%) follicular neoplasia, and 33 (12%) cases suspicious of malignancy or malignant.

When follicular lesions and follicular neoplasia were excluded the sensitivity is 60.98% and specificity is 96.04%. Positive predictive value, negative predictive value, and accuracy were 75.75, 92.38, and 90.12% respectively.

A total of 10 out of 14 cases (71.43%) of follicular neoplasia were found to be malignant in histopathology, whereas only 1 out of 18 cases (5.56%) of follicular lesions were malignant.

### Conclusion

FNAC is a specific and accurate test in differentiating malignant from benign lesions in thyroid swellings. Results of our study are similar to most of the currently published data worldwide. Therefore, FNAC is a reliable test in decision making in our patients with thyroid swellings.

## 82. Sutureless Thyroidectomy using Bipolar Diathermy: Single Unit Experience of 220 Consecutive Cases

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### Introduction

Conventional thyroidectomy is performed with meticulous ligation of vessels and dissection of the gland. Bipolar diathermy is being used widely to achieve hemostasis in many surgical procedures. We are presenting a series of 220 cases that was performed using the bipolar diathermy.

### Methods

All the patients admitted to a single surgical unit for thyroidectomy, from 1st, August 2012 to 30th, November 2013 were included in the study. Total excision of the gland by capsular dissection including the vascular pedicles of the thyroid was done using the bipolar diathermy without ligatures or clips. They were followed up to 1 year following the study at 2 weeks and thereafter monthly.

### Results

Among 220 of total patients, 208 (94.5%) underwent total thyroidectomies, 8 (3.7%) underwent hemi/completion thyroidectomies, and 4 (1.8%) underwent redo thyroidectomies. A total of 93.2% (205) were females. Majority were grade III multinodular goiters accounting for 80% (176), grade IV being 13.6% (30). 8.2% (18) were toxic goiters. Drains were inserted in 15 (6.8%) cases. Mean surgery time is 90 minutes.

During post-operative period hematomas were present in three cases (1.3%), one from anterior jugular vein, and two from skin flaps. No one had bleeding from the vascular pedicles of the thyroid gland. Seromas were present in 20 (9.09%), 4 needing aspiration.

### Conclusion

Bipolar electrothermal coagulation is a safe and successful method of achieving hemostasis in thyroidectomy, instead of conventional methods of hemostasis, without added complications. In addition, damage to external laryngeal nerve could be minimized as the branches of the superior thyroid artery are cauterized on the gland, instead of the main artery.

## 83. Locally advanced Follicular Carcinoma of the Thyroid Masquerading as an Atrial Myxoma

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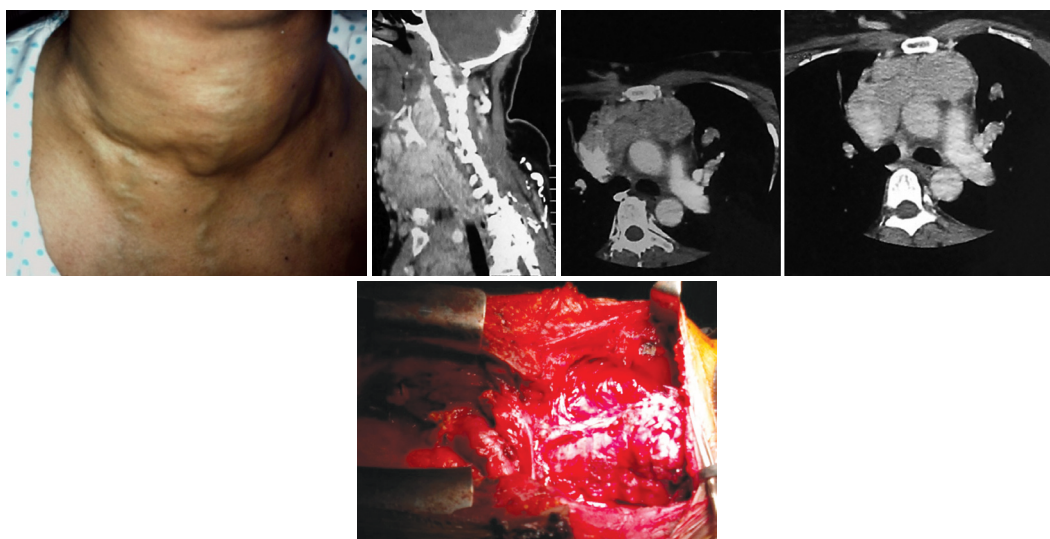
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### Introduction

Widely invasive follicular carcinoma with extensive venous and cardiac involvement is seldom described in the literature and is reported to have a grave prognosis. We report a case of a 52-year-old female with a locally advanced follicular carcinoma presenting as an atrial myxoma.

### Case

She presented with hemoptysis to medical ward and found to have an atrial myxoma during investigation. She was referred to cardiothoracic team for surgery, who referred to us, since she had a long-standing goitre.



It was a euthyroid grade IV multinodular goitre with evidence of pressure effects, malignancy, retrosternal extension (RSE), and grade I stridor. Her free T4 was 1.586 nmol/l, thyroid-stimulating hormone was 0.642 uIU/, and thyroglobulin was >6000 pg/ml. Contrast-enhanced computed tomography (CECT) revealed a malignant multinodular goitre with encasement of major arteries and extension into the great veins and to the right atrium, mimicking an atrial myxoma.

Bronchoscopy revealed right vocal cord palsy, mucosal edema, and tracheal infiltration.

She underwent surgical clearance by combined general and cardiothoracic teams who performed total thyroidectomy along with bilateral cervical, mediastinal, pre- and paratracheal lymph node dissection.

The cardiac component of the surgery was abandoned considering the comorbidities (hypertension, bronchial asthma, and ischaemic heart disease), she had a smooth recovery apart from hypocalcemia and hoarseness of voice which improved with time. Histology revealed widely invasive follicular carcinoma with stage pT<sub>4</sub>N<sub>1</sub>M<sub>x</sub>. Subsequently, she underwent radioiodine treatment. Her follow-up two-dimensional-echo at 3 months showed no atrial myxoma.

## Conclusion

Despite extensive venous and cardiac involvement and comorbidities, attempt at surgical resection seems to be useful in differentiated thyroid carcinoma.

## 84. Clinical and Ultrasonographic Predictors of Malignancy in the Follicular Lesion of Thyroid of undetermined Significance

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## Introduction

Certain clinical features may increase the likelihood of malignancy of thyroid nodules and various ultrasonographic characteristics have been associated with a higher risk of malignancy. The objective of this study is to determine the rate of malignancy and clinical and ultrasonographic predictors of malignancy in the follicular lesion of undetermined significance (FLUS) category.

## Methods

All patients with FLUS on cytology and underwent thyroidectomy from January 2008 to December 2012 at Putrajaya Hospital were reviewed. The clinical and ultrasonographic findings were correlated with the final histopathological diagnosis.

## Results

A total of 120 patients were identified of which 41 (34%) patients had malignant lesions and 79 (66%) patients had benign histology. Out of 41 patients with malignancy, 34 (83%) patients were female and 7 (17%) patients were male. The rates of malignancy in patients with symptomatic nodules and positive family history of thyroid cancer were 46 and 5%, respectively. A total of 65% of cases with an ultrasonographic characteristics of indeterminate to suspicious lesions were malignant on surgical resection. Follicular lesion of undetermined significance nodules exhibiting ill defined or irregular margins and calcifications showed significantly higher risk of malignancy.

## Conclusion

A combination of clinical concerns with the presence of sonographic characteristics suspicious of malignancy have higher predictive value for malignancy in patients with a cytologic diagnosis of FLUS and hence influence the decision of surgical removal.

## 85. An Evaluation of Patients with Medullary Thyroid Microcarcinoma

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## Introduction

Medullary thyroid carcinoma (MTC) is a rare neuroendocrine tumor. Medullary thyroid microcarcinomas (MTMCs) are defined traditionally as MTC that measures ≤ 1 cm. The objective of the present study was to evaluate the incidence, characteristics, and clinical significance of MTMC.

## Methods

From 1990 to 2012, there were 128 patients who underwent thyroidectomy for treatment of MTC. Of the 41 MTMC (group 1) detected and 36 were MTCs (1 cm < tumor size ≤ 2 cm) (group 2), which are the subject of the present study.

## Results

The MTMC as a proportion of all MTCs was 32% and its incidence increased during the study period. The mean tumor size was  $0.63 \pm 0.21$  and  $1.58 \pm 0.30$  in groups 1 and 2. Multifocality of tumors was similar in two groups (31.7% in group 1 vs 36.1% in group 2,  $p = 0.810$ ). A total of 14% had extrathyroidal extension in group 1 and 36.1% in group 2 ( $p = 0.036$ ). Central and lateral lymph node metastases occurred in 12.2% and 2.4% in group 1 and 33.3% in group 2 ( $p = 0.025$  and  $0.000$ ). No one had post-operative recurrence in group 1 and 5 patients developed recurrence in group 2. The overall 10-year survival rates for all patients were 76.2%. There was no significant factor associated with disease-free survival of group 2.

## Conclusion

MMTC accounts for 32% of all MTC in our institution. Patients with MTMC have a generally favorable outcome, perhaps owing to recent advances in diagnosis and treatment. Nevertheless, no patients developed recurrent disease; active surgical treatment may be justified for MTMC.

# 86. Retrosternal Goiter: Thoracic Surgical Unit Experience

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## Background

Surgical removal is considered as the treatment of choice for substernal goiters. Comprehensive data are lacking on the subject by centers specialized on thoracic approach. We analyzed experience in National Thoracic Surgical Unit, Sri Lanka; tertiary care referral center.

## Methods

The medical records of patients with substernal goiters, who were referred nationally in need of thoracic surgical approach over last 3 years, were retrospectively reviewed.

## Results

In total of 23 patients, 6 females, 7 males (mean age: 58 years, range: 32-70), a sternotomy was necessary in nine patients (39%) and thoracotomy in two patients (8.7%). Cervical approach was sufficient in rest of 12 patients (52%). Decisions for thoracic approach were based on computerized tomography. Four patients had malignant pathology. Eight patients had thyrotoxicosis. A total of 30% of operations were performed for recurrent or persistent disease. Respiratory complaints were the most frequent presenting complaints (74%). Symptoms included shortness of breath (82%), hoarseness (22%), dysphagia (52%), and superior vena cava obstruction (13%). Majority of treated patients had complete resolution of symptoms following surgery. There was no perioperative mortality, permanent hypocalcemia, and tracheomalacia. Higher perioperative bleeding, longer hospital stay, and respiratory complaints were significant with patients needed extracervical approach. Recurrent laryngeal nerve palsy occurred in one patient, requiring tracheotomy.

## Conclusion

Thoracic approach is necessary in selected patients with a slightly higher complication rate. Overall, results in the present patient population have been good since morbidity has been minimal and mortality absent, and all patients are symptom free following surgery.

# 87. Surgical Approach of Substernal Goiters: Thoracic Surgeon's Perspective

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## Objective

Surgical removal of retrosternal goitre is a challenging procedure even in expert hands. Objective of this study was to identify predictive factors in need of thoracic approach in the management of mediastinal goiters in order to enable planning of surgery in a specialist center, with the assistance of a thoracic surgeon.

## Methods

We retrospectively analyzed medical records of all patients undergoing surgery for substernal goitre who required thoracic approach in our institution over the last 3 years.

## Results

During the study period, total of 23 patients underwent surgery for retrosternal goitre showed good results. A sternotomy was necessary in nine patients (39%), due to computerized tomographic (CT) findings of presence of goiters extending below the aortic arch/brachio cephalic vein level in six patients, posterior mediastinal goiters with retrotracheal extension in one patient, close proximity of malignant goiters with major

intrathoracic veins in two patients (8.7%). Thoracotomy was performed in two patients due to CT findings of large posterior mediastinal goiters with retrotracheal extension. Bronchoscopy findings did not show any predictive value.

### Conclusion

Need of thoracic approach for mediastinal goitre removal can be predicted with CT findings. In such cases, surgeons should not hesitate to perform it for minimizing complications and should plan surgery in a specialist center, with the help of a thoracic surgeon.

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## 88. Factors affecting Outcome of Laparoscopic Adrenal Surgery: A Single-center Experience

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### Aim

To study the factors affecting outcome of laparoscopic surgery in different adrenal pathologies and factors responsible for high laparoscopic to open conversion rates.

### Methods

We have analyzed data of all patients undergoing laparoscopic surgery for different adrenal pathologies in Department of Endocrine Surgery at Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow between 1998 and 2013.

### Results

Total 138 patients studied in which 63 were male and 75 were female (M : F = 9 : 10.7). Mean age was 36.26 yrs (range 9-67 yrs). Majority of tumors were right-sided (77), followed by left-sided (45) and 16 tumors were bilateral. Commonest diagnosis was pheochromocytoma (65) and others were Conn's syndrome 11, Cushing's syndrome 19, Cushing's disease 9, myelolipoma 16, adrenal cyst 11 and other nonfunctioning tumors 7. Most of the cases (88) operated successfully by laparoscopy including 8 cases by retroperitoneoscopic approach, 44 converted to open, 3 terminal hand-assisted and 3 b/ladrenalectomy (one side lap and lap->open). Mean tumor size 6.18 cm (range 1.6-12 cm). Majority of conversions was due to bleeding either tumor site or liver, spleen, kidney, and tumor bed. Conversion was more on right side than left side. Large size (59% conversion for >8 cm) and pheochromocytoma (46.15% conversion) were associated with more conversion rates.

### Conclusion

Laparoscopic adrenalectomy is feasible in different adrenal pathologies; however, conversion rate is high in large size, pheochromocytoma, and right-sided adrenal pathologies.

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## 89. Effectiveness of Neck Exploration for Total Parathyroidectomy in Renal Hyperparathyroidism

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### Introduction

Renal hyperparathyroidism is a common and serious complication in long-term hemodialysis patients. Despite the initiation of new therapeutic agents, several patients will still require parathyroidectomy (PTX) especially in developing countries where limited resources result in late presentation with severe bone disease. We report on the outcomes for bilateral neck exploration at our center.

### Methods

A total of 230 patients who underwent total PTX from February 2004 to September 2012 for renal hyperparathyroidism were retrospectively accrued. The patient's characteristics, operative outcomes, and laboratory indices were analyzed.

### Results

A total of 85 of our patient had total parathyroidectomy (TPTX) and the remaining underwent total parathyroidectomy and autotransplantation (TPTX + AT). All 4 glands were identified in 198 (86%) patients. Re-exploration was performed in 22 patients, of which 19 were missed glands from the initial operation, 2 were supernumerary glands, and 1 was hyperplasia of the autotransplanted gland.

The frequent most complication noted in 19 patients were prolonged hypocalcemia seen in both operative groups.

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## Conclusion

Our successful neck exploration rate is comparable with other centers. However, the number of missed glands may be reduced by sending the removed specimens for frozen section examination. This method may increase operative time but it may prove to reduce the missing gland rates and indirectly reduce reoperative rates. Both TPTX and TPXT + AT are safe surgeries to be performed in renal hyperparathyroidism.

## 90. Sentinel Lymph Node Biopsy in Thyroid Papillary and Medullary Microcarcinomas

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## Introduction

The aim of this study was to determine whether sentinel lymph node (SLN) biopsy of jugulo-carotid chain (JCC) in thyroid microcarcinomas (TMC) is an accurate technique to select patients with true positive, but clinically and ultrasonically N0 lymph nodes (LNs), for modified radical neck dissection (MRND).

## Materials and Methods

In total 199 patients with TMC underwent total thyroidectomy, central neck dissection and SLN mapping with 0.2 ml of 1% methyleneblue injected in thyroid gland. Sentinel LNs, identified in JCC, were examined by frozen section as a determination factor for additional MRND. All data were statistically analyzed.

## Results

In our study, 93% of patients had papillary TMC, 6% medullary TMC, while 1% had these two combined. Definitive pathohistology showed a 96.48% match with frozen-section analysis results—a total of 21 (10.55%) patients with papillary TMC had positive SLNs, with no false-positive findings. They were treated with MRND of the positive JCC, additionally to total thyroidectomy and central neck dissection. Analysis showed more frequent lateral metastases in patients with tumors 5 mm or less in diameter (12.88%) than in larger ones (7.46%). Method's accuracy is 95%.

## Discussion and Conclusion

Data showed that SLN biopsy precisely determines patients with lateral neck compartment metastases, even if clinically and ultrasonically staged N0. Tumor size cannot predict lateral metastases. There were no LN metastases in medullary TMC. Using SLN biopsy for intraoperative assessment of lateral LN, one can avoid unnecessary MRND. In addition, this method helps optimizing ablative radioiodine treatment.

## 91. Compliance in Patients on Thyroxine Replacement Therapy following Thyroid Surgery

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## Introduction

Total thyroidectomy is increasingly used to treat benign thyroid conditions. Lifelong treatment with thyroxine is then required. This study was conducted to assess patient's compliance on thyroxine therapy with the aim of optimizing thyroxine therapy and achieving normal thyroid function after surgery.

## Materials and Methods

The study was conducted in our surgical clinic in National Hospital of Sri Lanka. A total of 100 patients who underwent total thyroidectomy for benign disease were interviewed about their compliance and the difficulties encountered in maintaining compliance.

## Results

A total of 98% of patients were aware of the need to use thyroxine for life. Only 76% were on regular thyroxine therapy and were adhering to the correct regimen. The remaining 24% of patients stopped taking thyroxine for a mean duration of 3 weeks (range 1-4 weeks).

Main reasons for lack of compliance were difficulty to access drugs, improper dose regimen, and lack of health literacy. And 20% of patients had some symptoms of hypothyroidism, of which 50% had biochemical-proven hypothyroidism. Only 78% of patients had an annual biochemical assessment of thyroid functions performed.



## Conclusion

Availability of thyroxine should be ensured and proper counseling of patients' prior and following thyroidectomy is important. Regular follow-up by interviewing, clinical, and biochemical assessment with annual measurement of thyroid-stimulating hormone is valuable in assessing the adequacy of therapy and compliance.

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## 92. Endoscopic Thyroidectomy using Anterior Chest Approach: Local Experience of 81 Cases

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### Introduction

With the advances in endoscopic instruments and vessel sealing devices, endoscopic thyroid surgery via remote access can be achieved. Anterior chest approach is one of the popular methods. Total thyroidectomy can be performed in a similar fashion bilaterally like conventional surgery.

### Method

This is a prospective collection of consecutive series of patients who underwent endoscopic thyroidectomies via anterior chest approach.

### Results

From 2009 to November 2013, 81 patients had undergone endoscopic thyroidectomy in our department. Female predominance (85%) is noticed in this group of patients. A total of 62 cases of hemithyroidectomies and 19 cases of total thyroidectomies were performed. The median age of the patient was 52-year-old (range 20-79) and the median size of thyroid gland was 5 cm (range 2.5-10 cm). The median operating time was 135 minutes (55-382 mins) and the median blood loss was 3 ml (range 1-800 ml). The median post-operative stay of the patient was 1 day (range 1-10 days). Four patients had recurrent laryngeal nerve palsy (one case transient and three cases permanent). The final histologies of 14 patients were malignant (four papillary carcinomas, eight papillary microcarcinomas, and two minimally invasive follicular carcinomas).

### Conclusion

Endoscopic thyroidectomy using anterior chest approach is feasible for treating thyroid lesions in selected patients with good cosmetic outcome. Special caution should be made when using ultrasonic device to avoid injury to the recurrent laryngeal nerves.

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## 93. Endoscopic Thyroid Surgery via Abreast Approach: A Single Institution's Experiences

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### Background

Thyroid carcinoma in young women is rapidly increasing and cosmesis plays an important role in thyroid operations. Various endoscopic thyroid surgery approaches have been performed, and their application has recently been extended. We performed endoscopic thyroid surgeries via a breast approach since 1999. Herein, we evaluate the safety of this approach and identify the outcomes for differentiated thyroid carcinoma.

### Methods

A total of 452 consecutive patients with thyroid and parathyroid disease underwent endoscopic thyroidectomy via a breast approach at Uijeongbu St. Mary's Hospital between November 1999 and December 2012. The inclusion criteria for endoscopic thyroidectomy included a benign tumor less than 4 cm in diameter, malignant thyroid nodules less than 2 cm, and no evidence of lymph node metastasis or local invasion. We analyzed the clinicopathologic data and surgical factors of this approach.

### Results

The mean age of the patients was  $38.4 \pm 10.6$  years (range 11-73 years). The mean tumour size was  $2.12 \pm 1.17$  cm (range 0.1-4 cm). The final tumor pathologies included papillary carcinoma (n = 120), follicular carcinoma (n = 8), nodular hyperplasia (n = 266), follicular adenoma (n = 43), and Hürthle cell adenoma (n = 4). The mean post-operative hospital stay was  $3.8 \pm 1.3$  days (range 1-17 days). Temporary and permanent hypoparathyroidism requiring calcium and vitamin D supplementation developed in 32 (7.1%) and 4 (0.9%) patients, respectively. Transient vocal cord paresis occurred in 20 (4.4%) patients.

### Conclusion

For patients with benign and low-risk malignant thyroid disease, endoscopic thyroidectomy via a breast approach is a safe, feasible, and minimally invasive surgical method with minimal complications.

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## 94. Multiple Endocrine Neoplasia Type 1 associated with Breast Cancer

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### Introduction

Multiple endocrine neoplasia type 1 (MEN1) is a cancer predisposition syndrome that includes a combination of endocrine and nonendocrine tumors. We report here a rare case of MEN1 associated with breast cancer with MEN1 gene mutation.

### Materials and Methods

A 45-year-old woman was diagnosed with breast cancer after presenting with a right breast mass. Preoperative radiologic studies suggested right breast cancer with suspicious metastatic nodule of the lung. Further studies demonstrated bilateral thyroid nodules, neuroendocrine tumor of the pancreas, paraganglioma, left adrenal adenoma, gall stones, uterine subserosal myoma, and pituitary macroadenoma. Laboratory examinations revealed hypercalcemia, hypophosphatemia, and increased intact parathyroid hormone level. Workup for suspected MEN syndrome revealed increased basal plasma level of insulin-like growth factor-1, prolactin and calcitonin, and increased 24-hour urinary-free cortisol level. The patient underwent surgical removal of breast cancer as well as tumors of the pancreas, adrenal gland, thyroid and parathyroid gland, uterus, anterior mediastinum, and lung.

### Results

The pathologic diagnosis of the resected breast was invasive ductal carcinoma. Otherwise, the pathologic diagnosis was calcitonin-producing pancreatic endocrine carcinoma, adrenal cortical adenoma, bilateral papillary thyroid carcinomas, parathyroid adenomas, uterine leiomyoma with adenomyosis, thymic carcinoid tumor, and lung hamatoma. We performed gene analysis to determine the association between gene mutation and the development of tumors in this patient, and germ-line MEN1 gene mutation was detected.

### Discussion and Conclusion

We assume that MEN1 syndrome may possibly predispose to breast cancer in this patient. Additional observations and further studies are needed to demonstrate this association.

## 95. Computerized Quantification of Ultrasound Heterogeneity in Thyroid Nodules

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### Introduction

Several ultrasonographic features have been proposed to predict thyroid malignancy, except ultrasonographic heterogeneity (USH). In order to test whether the computerized quantification of USH can aid the diagnosis of thyroid malignancy, we evaluate USH by an objective and quantitative computerized method in a prospective setting.

### Materials and Methods

A total of 343 participants with 400 nodules were evaluated. Among them, the diagnosis of 314 nodules was verified by surgical pathology, and the diagnosis of 86 were based on fine-needle aspiration (FNA) biopsy results. There were 271 benign thyroid nodules and 129 malignant thyroid nodules. Patient clinical data were collected, and the grading of heterogeneity on conventional gray scale ultrasound images was retrospectively reviewed. Quantification of USH was performed by appropriately program implemented with methods proposed in this paper.

### Results

The human investigator (HI) between benign and malignant nodules diagnosed by combined FNA biopsy and surgical pathology results (total number, 400) showed a significant difference ( $p < 0.001$ , area under curve = 0.714). To learn whether our computer program increased our diagnostic capabilities, we compared HI to USH evaluated by human investigators. The marked heterogeneity of USH showed higher HI than homogeneous USH did. But, USH evaluated by human investigators did not show significant difference between benign and malignant thyroid nodules.

### Discussion and Conclusion

This new computer-aided diagnosis method to evaluate the sonographic heterogeneity of thyroid nodules is an objective and quantitative method. This new computerized heterogeneity index can aid in the diagnosis of thyroid malignancy better than traditional USH evaluated by HI.

## 96. Robotic Thyroidectomy using Bilateral Axillo-Breast Approaches: Comparison of Surgical Results with Open Conventional Thyroidectomy

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### Introduction

Thyroid disease is particularly prevalent in young women and the prognosis of thyroid cancer is favorable. Therefore, the need to improve post-operative quality of life including cosmesis has increased, many surgeons had developed various techniques for oncoplastic thyroidectomy, such as robotic thyroidectomy using bilateral axillo-breast approaches (BABA).

### Materials and Methods

We identified patients from our medical center underwent thyroidectomy from July 2008 to February 2013. Medical records were analyzed for comparison of clinicopathologic characteristics and surgical outcomes. A total of 229 patients underwent robotic thyroidectomy, whereas 805 patients underwent conventional open thyroidectomy.

### Results

Tumor size (cm) was larger in open group (0.95 vs 0.64;  $p < 0.001$ ). The mean number of retrieved lymph nodes in ipsilateral central compartment neck dissection was higher in open group (7.98 vs 5.60;  $p < 0.001$ ). The mean number of retrieved central lymph nodes in bisilateral central compartment neck dissection was also higher in open group (12.74 vs 9.08;  $p = 0.002$ ). More advanced N stage ( $p = 0.002$ ) and TNM stage ( $p < 0.001$ ) tumors occurred more frequently in open group. Total operation time for total thyroidectomy was longer in robot group (275.8 minutes vs 123.0 minutes,  $p < 0.001$ ). Total operation time for lobectomy was also shorter in open group (89.5 minutes vs 216.1 minutes,  $p < 0.001$ ). Parathyroidal incidental resection in lobectomy was similar in the two groups but was significantly higher in open group than robot group in total thyroidectomy (27.8% vs 9.3%,  $p < 0.001$ ). Mean number of incidentally resected parathyroid was also higher in open group than robot group (0.31 vs 0.13;  $p = 0.001$ ).

### Discussion and Conclusion

Robotic thyroidectomy using BABA is likely to be a technically feasible and safe procedure that are comparable to conventional open surgery. Surgeons could perform precise, sharp dissections around important structures, such as parathyroids technically by robot rather than in conventional open surgery.

## 97. Comparison of Endoscope vs Robotic-assisted Transaxillary Single-incision Thyroidectomy

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### Introduction

Gasless endoscopic and robotic thyroidectomy via axillary single-incision approach have been recently introduced into our hospital, we will compare the potential advantage of robotic vs endoscopic thyroidectomy.

### Materials and Methods

We analyzed 54 consecutive patients, including nine patients with early-stage primary thyroid malignancy, who underwent endoscopic (23 cases) or robotic (31 cases) thyroidectomy using unilateral or bilateral axillary single-incision approach.

### Results

There were 46 patients of unilateral lobectomy via unilateral axillary incision (robotic: 18, endoscopic: 28) and five patients of total thyroidectomy via bilateral axillary incisions (robotic: 4, endoscopic: 1), and three patients via unilateral axillary incision (robotic: 1, endoscopic: 2). Seven patients also underwent central compartment lymph node dissection. Both types of operation had similar surgical outcomes including estimated bleeding and drainage fluid amount and, operative time and complication (two patients suffered temporary hoarseness, one in robotic group due to spasmodichypophonia and the other in endoscopic group with subluxation of arytenoid). Endoscopic group need one addition personal for control of the operative instruments; however, the robotic patient group had longer hospital stay and higher total cost expenditure ( $p < 0.05$ ). The operative time of both study groups was longer than open thyroidectomy ( $p < 0.05$ ).

### Discussion and Conclusion

In our preliminary experience, single-incision robotic and endoscopic transaxillary thyroidectomy was feasible and safe for patients with thyroid goiter and early-stage primary thyroid malignancy. The cost-effectiveness of robotic thyroidectomy should be further assessed according to different disease status.

## 98. Efficacy of Different Models for explaining Thyroidectomy

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The acceptance of any operative or interventional procedures depends on the capability of the surgeon to explain the procedure in detail and also associated complications without undue fear to the patient. The aim of this prospective randomized study is to establish an ideal model for the surgeon to explain. We used three models for explaining the procedure of hemithyroidectomy (removal of diseased lobe plus the isthmus and a cuff of contralateral lobe and pyramidal lobe if present) for benign nodules using conventional diagram model, toy model, and using animation model. Each group had 10 patients each after randomization. Females predominated. The operative procedure was performed by a single endocrine surgeon using sutureless technique and no drain was inserted. Post-operatively, all patients discharged on the morning after surgery. The toy group and animation group had better idea of the procedure that was rated using an questionnaire. The explanation of the procedure was given by the same surgeon a week before the operation in the outpatient department. In the post-operative period, the animation group had no questions when compared with the other groups ( $p < 0.05$ ). To conclude, the animation model if available shall be the ideal model for explaining the operative procedure.

## 99. The Robotic Gasless Transaxillary Thyroidectomy for the Management of Graves' Disease: Comparison of Conventional Open vs Robotic Thyroidectomy

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### Purpose

The aim of this study was to report on our initial experiences with robotic gasless transaxillary thyroidectomy for the management of Grave's disease (GD).

### Methods

Among 664 patients with benign thyroid diseases who underwent thyroidectomy, 46 patients who underwent thyroidectomy for GD were analyzed from January 2007 to August 2013. These patients included 14 individuals who underwent robotic gasless transaxillary thyroidectomy (robot group; RG) and 32 who underwent conventional open thyroidectomy (open group; OG). The clinical characteristics and surgical outcomes of the two groups were compared.

### Results

Patients in the RG were significantly younger at the time of surgery compared with those in the OG ( $p = 0.015$ ). The mean operative time was  $175.07 \pm 41.95$  minutes for the RG and  $114.75 \pm 26.65$  minutes for the OG ( $p = 0.000$ ). The mean weight of the resected glands was  $79.95 \pm 46.18$  gm for the RG and  $114.23 \pm 78.43$  gm for the OG ( $p = 0.137$ ). The RG had a shorter mean hospitalization period of  $3.21 \pm 0.43$  days compared with  $3.81 \pm 1.06$  days of the OG ( $p = 0.048$ ). The mean number of time analgesics was used for pain control was  $1.29 \pm 1.32$  for the RG and  $2.38 \pm 3.70$  for the OG ( $p = 0.293$ ). No cases in the RG were converted to open thyroidectomy. During a mean follow-up period of  $18.14 \pm 16.77$  months for the RG, no patients continued antithyroid drugs or developed recurrent GD. In the OG, one patient had developed recurrent GD, she underwent completion total thyroidectomy.

### Conclusion

Robotic gasless transaxillary thyroidectomy is a technically feasible and safe procedure for the patients with GD that results in a scarless outcome on the neck. This procedure can be a promising alternative for endoscopic or conventional open thyroidectomy for the management of GD.

## 100. Learning Curve for Endoscopic Thyroid Surgery

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### Introduction

Thyroid swelling is commoner in women who regards cosmesis as an important aspect in life; thus, endoscopic thyroid surgery is becoming popular in this era even among the Asian population. The aim of this study is to ascertain the learning curve of performing this procedure.

## Methodology

All patients who underwent endoscopic thyroid surgery performed by two endocrine surgeons at University Kebangsaan Malaysia Medical Centre (UKMMC) were included in this study. Preoperative nodule size, operative time, conversion rate, and final histopathological results were analyzed between the surgeons.

## Results

A total of 41 cases were analyzed over a 2-year period. It means time taken to complete the procedure were 189.5 and 119.8 minutes, respectively. There was gradual reduction in time taken to complete the surgery with 50% reduction after 12 and 8 cases, respectively. There were three conversions to open surgery in which all the nodule size were bigger than 4 cm. Relationships between nodule size and operative time were statistically significant ( $p < 0.05$ ).

## Discussion and Conclusion

Endoscopic thyroid surgery is not a demanding procedure and accurate patients selection is important before embarking on it.

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# 101. Biological Behavior of Papillary Thyroid Microcarcinoma in Male Patients

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## Introduction

Male gender is one of the poor prognostic factors of papillary thyroid carcinoma (PTC). Papillary thyroid microcarcinoma (PTMC) is known to behave more indolent than PTC. We investigated biological behavior of PTMC in male patients to evaluate if male gender is a poor prognosis factor in PTMC.

## Materials and Methods

Patients who underwent primary operation due to PTC at Asan Medical Center were included from 1995 to 2008. We reviewed clinicopathological characteristics of the patients with medical records retrospectively.

## Results

A total of 2,684 were included, 2021 (75.3%) were female and 663 (24.7%) were male patients. Male patients were older than female patients ( $p < 0.0001$ ). Male patients have more frequent lymph node metastasis, lymphatic invasion, and multifocality ( $p = 0.018$ ,  $p = 0.023$ , and  $p < 0.0001$ , respectively). Five-year recurrence free survival rate was 91.3% in men and 92.4% in female ( $p = 0.057$ ). A total of 271 patients (27.5%) were male among 985 patients diagnosed to PTMC. Central and lateral neck lymph node metastasis was more often found in male than in female even in PTMC ( $p < 0.0001$ ) and underwent more CND and total thyroidectomy than female patients ( $p = 0.009$ ,  $p = 0.001$ , respectively). However, 5-year recurrence-free survival was not different between male and female patients (97.3% vs 95.6%,  $p = 0.899$ ). In multivariate analysis, male gender was not an independent risk factor of recurrence in PTMC ( $p = 0.535$ ).

## Conclusion

Male PTCs are more likely to have neck lymph node metastasis and have short event-free survival rate than female PTCs. However, male gender was not an independent risk factor of recurrence and distant metastasis in PTMC.

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# 102. Clinicopathologic Features and BRAF Mutation in Patients with Papillary Thyroid Carcinoma with and without Chronic Lymphocytic Thyroiditis

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## Background

The presence of chronic lymphocytic thyroiditis (CLT) in patients with papillary thyroid carcinoma (PTC) has been associated with less aggressive disease at the time of surgery. The BRAF mutation is a marker of aggressiveness of conventional PTC. This study assessed whether PTC with CLT has a different pattern of BRAF mutation and investigated the clinicopathological features of PTC with CLT.

## Methods

We retrospectively reviewed the medical records of 2,015 PTC patients who underwent thyroid surgery between January 2010 and December 2012. Of these patients, 670 (33.3%) had coexisting CLT. The clinicopathologic characteristics of the two groups, including BRAF mutations, were compared.

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## Results

Age, primary tumor size, and capsular invasion were similar in the two groups. The proportions of patients with central node (38.4% vs 34.3%;  $p = 0.04$ ) and lateral node (11.9% vs 9.0%;  $p = 0.026$ ) metastases were significantly lower in patients without than with CLT. Mean metastatic node ratio ( $0.25 \pm 0.34$  vs  $0.13 \pm 0.22$ ;  $p < 0.001$ ) and the proportion of patients with BRAF mutations (83.2% vs 70.0%;  $p < 0.001$ ) were significantly higher in patients without than with CLT.

## Conclusion

In patients with PTC, CLT is associated with lower frequencies of the BRAF mutation and of lymph node metastasis.

# 103. Effect of Celecoxib on Proliferation of TT Cell in Human Thyroid Medullary Carcinoma

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## Introduction

To discuss the effect of celecoxib on TT cell *in vitro* growth and cell cycle distribution of thyroid medullary carcinoma.

## Materials and Methods

Compared the depressive effect of celecoxib in different density on TT cell proliferation by <sup>3</sup>H-TdR incorporation method, the disposition of tumor cell cycle was detected by flow cytometry.

## Results

<sup>3</sup>H-TdR incorporation method showed that celecoxib of any density had obvious depressant effect on tumor cell proliferation and manifested concentration dependent when the density was under 80  $\mu\text{mol/l}$  ( $F = 93.83$ ,  $p < 0.05$ ). Continuous passive motion decreased with the extension of time and the density was above 80  $\mu\text{mol/l}$ , but it had no statistically significant ( $p > 0.05$ ). Flow cytometry manifested TT cell cycle block was happened in G<sub>0</sub>/G<sub>1</sub> stage with time and density dependence, cell population was decreased in G<sub>2</sub> and S stage with statistically significant in S stage ( $p < 0.05$ ), and no statistically significant in G<sub>2</sub> stage ( $p > 0.05$ ).

## Discussion and Conclusion

Celecoxib can inhibit TT cell proliferation and cell cycle by depressing COX-2's activity, the proliferation index is decreased obviously, which plays an important effect on apoptosis induction. COX-2 can be treated as an new therapeutic target in thyroid carcinoma.

# 104. Fusidic Acid inhibited the Growth of Thyroid Cancer Cell Lines 8505C and TPC1

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## Purpose

Thyroid cancer is the most common malignancy in Korean female and has good prognosis. However, some parts of thyroid cancer, such as poorly differentiated or anaplastic thyroid cancer, have aggressive clinical feature. In this regard, we analyzed the effects of fusidic acid on the human thyroid cancer cell lines to determine whether this compound is useful in the treatment of aggressive thyroid cancer.

## Materials and Methods

The two thyroid cancer cell lines 8505C and TPC1, under adherent culture conditions, were treated with fusidic acid and analyzed for changes in cell growth, cell cycle duration, fusidic acid, and degree of apoptosis.

## Results

After treatment with fusidic acid, both cell lines showed a dose-dependent reduction in growth rate. 8505C cells showed significantly increased levels of apoptosis following fusidic acid treatment, whereas both 8505C and TPC1 cells showed cell cycle arrest at G<sub>0</sub>/G<sub>1</sub> phase.

## Conclusion

These results suggest that fusidic acid treatment of thyroid cancer can inhibit proliferation through apoptosis and/or cell cycle arrest. Although fusidic acid has been known to possess severe toxicity in systemic usage, it may be a novel anticancer drug for the treatment of poorly differentiated or anaplastic thyroid cancer in appropriate application, such as topical use.

## 105. Clinical Experience with n-Butyl-2-cyanoacrylate in performing Lateral Neck Dissection for Metastatic Thyroid Carcinoma

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### Background

Chyle leakage following lateral neck dissection (LND) is rare but can induce metabolic disturbances, delay wound healing, and prolong hospitalization. n-butyl-2-cyanoacrylate (NBCA) has been used to achieve hemostasis and seal tissues in several surgical settings. We assessed whether application of NBCA to the thoracic duct area is effective in sealing chyle leakage.

### Methods

The medical records of 163 patients who underwent total thyroidectomy with unilateral LND between March 2011 and September 2012 were reviewed. NBCA was applied to 84 patients and not applied to 79. Drainage volume, duration of hospital stay, and incidence of complications were compared in the two groups.

### Results

There were no between group differences in age, body weight, gender, primary tumor histology, and number of harvested lateral neck nodes. Mean hospital stay was significantly shorter ( $4.3 \pm 1.8$  vs  $5.7 \pm 3.0$  days,  $p < 0.001$ ), median total drainage volume was significantly smaller [270 ml (97-931 ml) vs 328 ml (113-2, 636 ml),  $p < 0.001$ ], and rate of chyle leakage was significantly lower (0% vs 6.3%,  $p = 0.025$ ) in the NBCA than in the non-NBCA group.

### Conclusion

NBCA application to the dissected area of the thoracic duct posterior to its angle of junction with the internal jugular and subclavian veins is safe and effective in reducing surgical complications related to chyle leakage during LND.

## 106. Optimal Surgical Management for Papillary Thyroid Microcarcinoma in Endemic Zone—An Experience from a Thyroid Surgery Center of North India

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### Introduction

The incidence of papillary thyroid microcarcinoma (<10 mm in diameter) is increasing because of frequent use of ultrasound-guided fine needle aspiration cytology. Majority are still diagnosed after surgery. The risk of local or distant metastasis or recurrence of this microcarcinoma is inadequate in literature. Therefore, the extent of thyroid surgery is controversial.

### Aims

To evaluate an optimal extent of surgery for an apparently solitary papillary thyroid microcarcinoma in an endemic zone.

### Methods

This is a retrospective study from a single specialized thyroid surgery center in north India. All patients with apparently solitary papillary thyroid cancer who underwent primarily total thyroidectomy at our institute between 1996 and 2010 were included in present study. Demographic characteristics, tumor characteristics, TNM stage, and histopathological characteristics were studied. Exclusion = patients with preoperative bilateral disease, or underwent less than total thyroidectomy or completion thyroidectomy.

### RESULTS

A total of 101 patients were found suitable for this study; they were divided into two groups: group A—papillary thyroid microcarcinoma ( $n = 16$ ) and group B—papillary thyroid cancer with tumor size  $>1$  cm ( $n = 85$ ). The result was analyzed for the risk factors of aggressiveness. Multivariate analysis of multicentricity ( $p = 0.65$ ); bilaterality ( $p = 0.98$ ); extrathyroidal invasion ( $p = 0.58$ ), and cervical lymph node metastasis ( $p = 0.77$ ) were not significant.



## CONCLUSION

Our result indicates that the microscopically evident of multicentricity, bilaterality, extrathyroidal invasion, and cervical lymph node metastasis are comparable in papillary thyroid microcarcinoma group is lower; therefore, the total thyroidectomy is not necessary for apparently solitary papillary thyroid microcarcinoma in endemic zone.

## 107. Observational Study of Central Metastases following Thyroid Lobectomy without a Completion Thyroidectomy for Papillary Carcinoma

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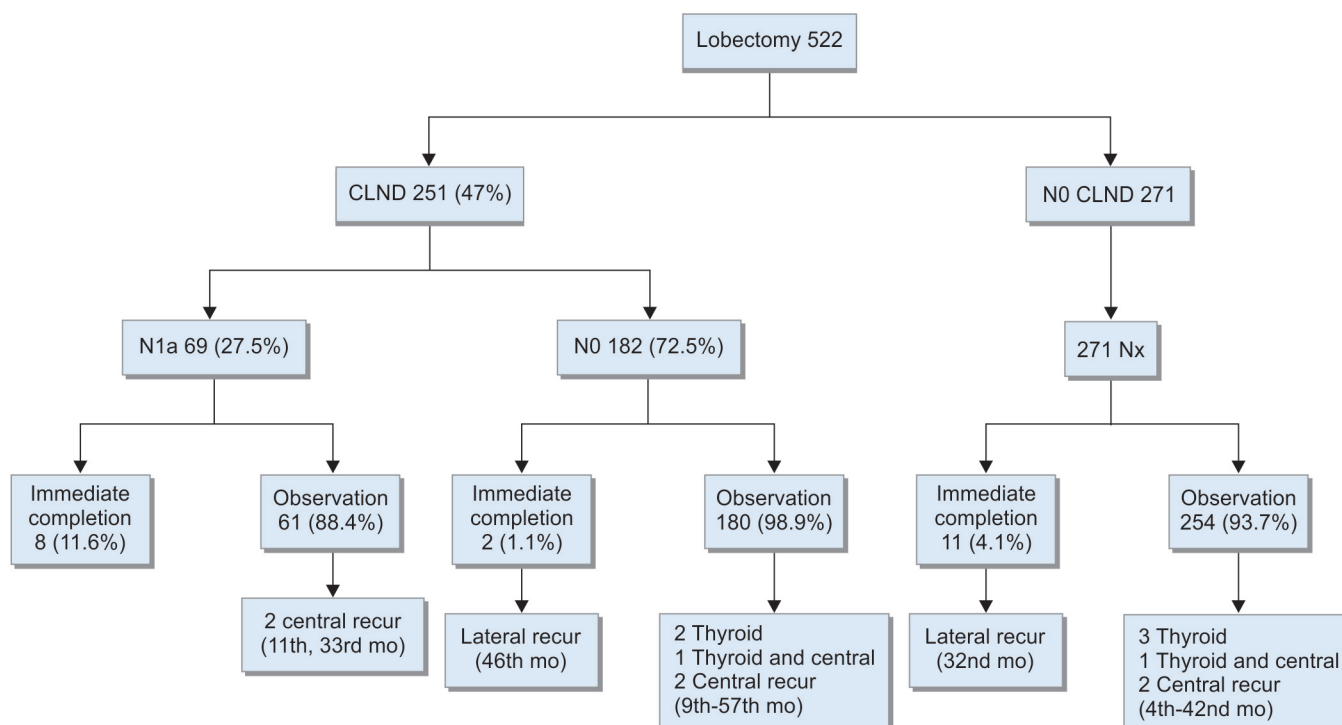
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### Introduction

There are no guidelines for the optimal timing of the decision of when to perform completion thyroidectomy and controversy exists regarding how the timing of completion thyroidectomy impacts survival patterns of papillary thyroid cancer (PTC).

### Materials and Methods

We retrospectively evaluated 522 patients who underwent thyroid lobectomy. Of the 69 patients with central metastasis, 61 patients (88.4%) were included in an observational study under cautious evaluation with informed consent by the patients, and compared with observation arm of 180 post-lobectomy N0 patients.



**Fig. 1:** Follow-up of 522 patients underwent lobectomy due to papillary thyroid cancer (CLND: Central lymph node dissection)  
mo: Month; recur: Recurrences

### Results

Of the 522 patients (Fig. 1), six (1.1%) thyroids, five (0.9%) central, and two (0.4%) lateral recurrences were observed. Lateral recurrences occurred in the immediate completion N0 and Nx groups but not in the N1a observation arms. There were two (3.3%) central recurrences without thyroid or lateral recurrence on observation arm of N1a observation patients. But, two (1.1%) thyroid and three (1.7%) central recurrences were on observation arm of N0 patients. In Kaplan-Meier survival curves between observation arms for the N1a and N0 groups, no significant difference was found between the N1a and N0 observation arms ( $p = 0.365$ ).

### Discussion and Conclusion

Follow-up without completion thyroidectomy would be performed carefully in central metastases-proven patients after lobectomy with PTC.

**Note:** This study results were presented at the 63rd annual meeting of the Korean Surgical Society in 2011 and published at the Journal of the Korean Surgical Society in 2012.

## 108. Papillary Thyroid Carcinoma with Negative Frozen Sections in Lateral Neck Nodes but Positive Permanent Sections does not require Additional Lateral Neck Dissection

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### Background

Some patients may be preoperatively or intraoperatively misdiagnosed with and treated for papillary thyroid carcinoma (PTC) without lateral neck metastasis, because fine-needle aspiration biopsy or frozen sectioning of lymph nodes did not provide sufficient evidence of lateral neck metastasis (LNM). This study investigated the clinical outcomes of patients with PTC with occult LNM who did not undergo lateral neck dissection (LND).

### Methods

Between September 2009 and December 2011, 575 patients underwent frozen sectioning of suspicious lateral neck nodes. Occult LNM in 16 of these patients was confirmed by permanent pathologic examination of intraoperative frozen sections of lymph nodes that had been negative on intraoperative examination. The clinical outcomes of these 16 patients with occult LNM who underwent thyroidectomy without LND were investigated.

### Results

None of the patients underwent additional surgery, such as LND. The mean follow-up period was  $24.8 \pm 8.4$  months. The mean diameter of metastatic foci was  $0.12 \pm 0.06$  cm (range, 0.06–0.3 cm). Fifteen patients underwent radioactive iodine treatment, with the remaining patient undergoing less than total thyroidectomy. Serum thyroglobulin concentrations were  $<1$  ng/ml in all patients, except for the one who underwent less than total thyroidectomy. None of the patients developed recurrence or has died of thyroid carcinoma to date.

### Conclusion

PTC patients negative for metastasis on frozen sections, but positive for lateral neck node metastasis on permanent pathologic examination, do not require additional LND.

## 109. Prevalence of Malignancy in Solid Cold Thyroid Nodule in an Endocrine Teaching Institution—A Nonrandomized Prospective Study

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### Introduction

To evaluate the prevalence of malignancy in solitary thyroid nodules which are sonologically solid and scintigraphically cold to determine their diagnostic significance.

### Materials and Methods

#### Setting

Tertiary care hospital performing 350 total thyroidectomies per year.

#### Inclusion Criteria

Solitary and multinodular goiter, nodules without nodes.

#### Exclusion Criteria

Diffuse toxic goiter, nodal metastasis, recurrent nodules, nodular goiter in pregnancy and toxic nodules.

#### Design

Prospective nonrandomized controlled study.

#### Study Period

2011 to 2013 (2 years) and 6 months follow-up.

### Methodology

Sonologically solid tumor is plotted along with  $\pm$  calcification. Scintigraphy detected cold areas in the corresponding zone. Nodules were correlated cytologically and compared with histopathology in the corresponding zones.

### Results

In 426 patients, ultrasound detected 264/426 (61.97%) solid nodules out of which 168/264 were solitary nodules observed on ultrasonography and 96/264 were multinodular goiter. Ultrasound identified 264/426 (61.97%) patients with a concomitant solid lesion, while scintigraphy detected only 168/426 (39.43%) 'cold' nodules. Solid cold nodules were 168 and malignancy proven by histopathology was in 74/168 (44.047%) cases. The estimated minimal risk of thyroid cancer was 44.047% (74/168) that was significant. Malignancy was higher in solid cold group than the mixed cold nodules.

### Discussion and Conclusion

The incidence of malignancy in solid cold nodule is significant (44%). Due to the risk of occult malignancy, combined evaluation by functional scintigraphy and structural ultrasound improves diagnostic accuracy.

## 110. The Evaluation of peaking of Serum Thyroglobulin Level after the Administration of Recombinant Human Thyroid-stimulating Hormone

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### Introduction

Recombinant human thyroid-stimulating hormone (rhTSH) is useful especially for testing post-thyroid ablated patients. The protocol recommends the evaluation of serum thyroglobulin (Tg) level and iodine 131 radioiodine scintigraphy at 5th day. Also, the recommendation, we could not find any literature evidence that showed Tg level will peak at the 5th day. The aim of this study is to have a retrospective evaluation of Tg levels after rhTSH administration.

### Materials and Methods

A total of 12 cases, 10 females and 2 males with the average age of 48.8 had undergone rhTSH test after thyroid ablation in our hospital. In each case, rhTSH test was performed at least 6 months after the last radioiodine therapy. Thyroid-stimulating hormone (TSH) levels and Tg values were measured every day for 7 to 8 days after rhTSH administration.

### Results

There were three cases without increase of Tg level. In the remaining nine cases with increase of Tg level, only two cases had peaked in the 5th day. In the remaining seven cases, one case peaked in days 3, 4 in days 6 and 2 in day 7.

### Discussion and Conclusion

In spite of the fact that it is recommended to measure Tg level in the 5th day post-administration, only two out of nine cases peaked in day 5. This result could suggest that the recommendation might need some discussion. However, the number of cases is small in this study, and future evaluation should be made with a larger group.

## 111. Ablation with Low-dose Radioiodine in Japanese Patients with High Iodine Intake

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### Introduction

Japanese iodine intake is among the highest in the world, mainly from seaweeds. Remnant ablation after total thyroidectomy was seldom carried out in Japan before November 2010 because of legal regulation. This study aimed to review the effectiveness of thyroid remnant ablation in patients with differentiated thyroid carcinoma after total thyroidectomy in iodine-rich areas.

## Materials and Methods

We retrospectively reviewed 35 patients who had undergone total thyroidectomy followed by remnant thyroid ablation (1,110 MBq I-131) for differentiated thyroid carcinoma between March 2011 and August 2013. Ablation was performed following thyroxine withdrawal or recombinant human thyroid-stimulating hormone therapy. F18-fluorodeoxy glucose positron emission tomography (FDG-PET) was performed 3 to 4 days prior to ablation in order to detect lymph node metastases in which radioiodine does not accumulate and which may influence the management and treatment options for the patients. Thyroid ablation was assessed by 185 MBq I-131 whole body scan in a thyroid-stimulating hormone (TSH)-stimulated state, 6 to 12 months after ablation.

## Results

The success rate of I-131 ablation was 85.7% (30/35) by whole body scan. FDG-PET was performed in all patients. Of the 35 patients, one had lesion that was PET-positive and I-131 scan negative. Five patients were positive for TgAb, except this five, TSH-stimulated serum thyroglobulin levels were below 1.0 in 12 patients. All cases are without recurrence to date, but those patients with PET-positive lesions have been followed carefully.

## Discussion and Conclusion

Outpatient-based remnant thyroid ablation with 1,110 MBq I-131 after total thyroidectomy in patients with differentiated thyroid carcinoma is effective even in iodine rich areas.

# 112. Changes in Serum Tg and Thyroglobulin Antibody Levels of Pre- and Post-total Thyroidectomy in Thyroglobulin Antibody-Positive Papillary Thyroid Carcinoma Patients

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## Introduction

Although postoperative serum thyroglobulin (Tg) is a prognostic indicator for papillary thyroid carcinoma (PTC), it is unreliable when Tg antibody (TgAb) is positive. We evaluated the prognostic significance of changes in serum TgAb levels of pre- and post-surgery in TgAb-positive PTC patients.

## Materials and Methods

We reviewed our medical charts of 225 TgAb-positive PTC patients in whom TgAb and Tg levels were measured before and 1 to 2 years after definitive total thyroidectomy.

## Results

Tg was detectable in 15 patients (6.7%) after surgery (group 1). In Tg-negative group, post-operative serum TgAb levels increased or decreased by <50% in 40 patients (17.8%) (group 2) and decreased by  $\geq 50\%$  in 170 patients (75.5%) (group 3). Patients were followed for a mean of 7.7 years. Four patients who died of PTC were seen in groups 1 and 2. Nine had distant metastases, 15 patients had lymph node (LN) recurrences and seven had both. Distant metastases were seen 2 (13.3%), 5 (12.5%), 2 (1.2%) patients of groups 1, 2, and 3, respectively. Lymph node recurrences were noted 5 (33.3%), 7 (17.5%), 3 (1.8%). The 5 years distant recurrence-free survival was 86.2, 92.2, and, 99.4% respectively. The 5 years LN recurrence-free survival was 73.3, 92.3 and 98.8% respectively. Group 3 had significantly better prognosis than groups 1 and 2. Tg-positive patients had poorer outcome than patients with undetectable Tg.

## Discussion and Conclusion

Changes in serum Tg and TgAb concentrations post-operatively is a very potent dynamic factor for predicting recurrence in TgAb-positive patients with PTC after total thyroidectomy.

# 113. Does Age influence Surgical Approach in Primary Hyperparathyroidism?

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## Introduction

Primary hyperparathyroidism (PHPT) is diverse in its age of presentation. Single gland disease is more common in elderly but higher proportion of multiglandular disease in younger age.

## Materials and Methods

A total of 33 PHPT patients undergoing consecutive parathyroidectomy by a single endocrine surgeon from 2011 to 2013 were prospectively evaluated. Group A (age <40 years) underwent bilateral neck exploration (BNE) and group B (> 40 years) underwent BNE or selective parathyroidectomy (SP) on sestamibi and ultrasonography concordance.

## Results

Group A (n = 18) includes genetically proven three cases of MEN1 syndrome and two cases of neonatal severe primary hyperparathyroidism. The mean age of group B (n = 15) was  $57 \pm 9.5$  years (42-76) and group A was  $26 \pm 10.5$  (0.2-40) years,  $p = 0.001$ . BNE was performed in all 18 patients in group A and 40% in group B ( $p = 0.01$ ). Sestamibi scan and ultrasonography were concordant in 55.6 and 50% in group A, while 73.3 and 73.3% in group B ( $p < 0.05$ ). Transcervical thymectomy was performed in 44% (n = 9) in group A, whereas none in group B ( $p < 0.05$ ). The mean number of parathyroids in group A was  $2.67 \pm 1.53$  (1-5) significantly higher ( $p = 0.003$ ) than group B [ $(1.2 \pm 0.8$  (0-4)]. The mean largest size in group B was  $3.2 \pm 1.5$  cm (1.8-7.2) higher than group A,  $2.3 \pm 0.9$  cm (0.8-4.8)  $p = 0.04$ . In group A, 50% were adenomas and 50% hyperplasia, whereas 92.9% in group B were adenomas,  $p = 0.01$ . Parameters like presenting complaints, preoperative calcium, PTH, vitamin D, weight, post-operative PTH, and calcium were not statistically significant ( $p < 0.05$ ).

## Conclusion

Younger age may benefit from BNE than SP. Imaging may not accurately help in localizing the offending gland in younger age group.

# 114. Significance of Lateral Lymph Node Metastasis in front of Carotid Artery Bifurcation in Papillary Thyroid Carcinoma

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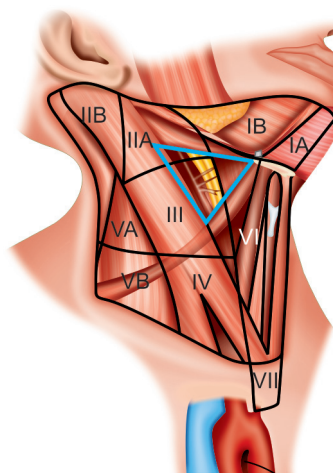
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## Introduction

There have been few reports on metastasis of lymph node (LN) located in front of carotid artery bifurcation (level III anterior LN) in papillary thyroid carcinoma (PTC) with pathologically proven lateral cervical LN metastasis (pN1b). This study aimed to investigate the significance of level III anterior LN metastasis.

## Materials and Methods

Between January 2012 and April 2013, a total of 150 patients underwent 162 lateral neck dissections with total thyroidectomy for previously untreated pN1bPTC. All patients underwent lateral neck dissections with Level III anterior LN, as a separate pathologic specimen to be analyzed for the correlation between Level III anterior LN and sex, age, tumor size, tumor site, lateral cervical LNs, and central compartment metastasis.



## Results

The positive rate of level III anterior LN was 54.9%. Level III anterior LN metastasis was correlated with a primary site in the upper pole ( $p = 0.018$ ), and level II nodal metastasis ( $p = 0.004$ ), but not with other clinical parameters.

## Discussion and Conclusion

In cN1bPTC, especially a primary site in the upper pole, and level II metastasis, attention should be given to resection of the nodal metastasis in level III anterior LN.

## 115. Minimally Invasive Follicular Thyroid Carcinoma: Prognosis and Appropriate Treatment

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### Introduction

Minimally invasive follicular thyroid carcinoma (MIFTC) was known as a tumor of low malignant potential so thyroid lobectomy alone might be considered adequate treatment. However, someone insisted that MIFTC patients should be performed total thyroidectomy and radioactive iodine treatment. The object of this study was to investigate the clinicopathologic features and prognostic factors affecting disease-free survival (DFS) and found out appropriate methods of surgical treatment for MIFTC.

### Materials and Methods

A total of 151 patients were undergone thyroidectomy due to FTC between July 1994 and September 2011 in Ajou University Hospital and Gangnam Severance Hospital. We investigated clinicopathologic features including age, gender, extent of surgery, size, lymphovascular invasion, multifocality, and radioactive iodine therapy. Difference of DFS rate was compared in each factors. Statistical significance was defined as  $p < 0.05$ .

### Results

A total of 146 patients were included in this study. Recurrence was occurred in eight patients. Locoregional recurrence were three cases and distant metastasis were 5. Lymphovascular invasion was occurred in 29 cases. Significant prognostic factors of FTC were size over 3 cm ( $p = 0.014$ ), pathologic type ( $p < 0.005$ ), and lymphovascular invasion ( $p = 0.015$ ) in univariate analysis. Size over 3 cm ( $p = 0.022$ ) and pathologic type ( $p = 0.001$ ) were important prognostic factors in multivariate analysis. In MIFTC, tumor size over 3 cm was only significant prognostic factor in univariate analysis ( $p = 0.012$ ).

### Discussion and Conclusion

Tumor size and pathology type were important prognostic factor for FTC recurrence. Minimally invasive follicular thyroid carcinoma has good prognosis, but further treatment might be considered in case of over 3 cm.

## 116. Does Status of Hashimoto's Thyroiditis and BRAFV600E Mutation influence Aggressiveness in Papillary Thyroid Cancer?

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### Background

It has been reported that Hashimoto's thyroiditis (HT) is associated with a higher risk for papillary thyroid cancer (PTC) and less aggressive disease at presentation. The BRAF<sup>V600E</sup> mutation is the most common genetic alteration and known to be associated with aggressive clinicopathologic features in PTC. The present study was conducted to evaluate the association of HT and BRAF<sup>V600E</sup> mutation status and clinicopathologic features in PTC patients.

### Patients and Methods

From February 2009 to December 2011, 1779 PTC patients who underwent surgery in Seoul National University Hospital were enrolled in the study. HT was diagnosed on the basis of finding on histologic examination. Polymerase chain reaction was used to amplify exon 15 of the BRAF gene from paraffin-embedded thyroid tumor specimens, followed by direct sequencing to detect the BRAF<sup>V600E</sup> mutation.

### Results

HT was found in 203/1779 (11.4%) patients with PTC. Hashimoto's thyroiditis was associated with age, gender, extra- thyroidal extension, tumor stage, and BRAF<sup>V600E</sup> mutation ( $p < 0.05$ ). Multiple logistic regression showed that female gender [Odds ratio (OR) = 7.131; 95% Confidence interval (CI), 3.402-18.311], and BRAF<sup>V600E</sup> mutation (OR = 0.499; 95% CI, 0.364-0.686) were independent factors associated with HT. We found that BRAF<sup>V600E</sup> mutation positive PTC group without HT was associated with aggressive disease (OR = 3.072; 95% CI, 1.656-5.921) among the subgroups classified by BRAF<sup>V600E</sup> mutation and HT status.

## Conclusion

These results showed that presence of HT was associated with female gender and less frequent BRAF<sup>V600E</sup> mutation. The subgroup classified by BRAF<sup>V600E</sup> mutation and HT status may improve to predict clinical outcome in PTC patients.

# 117. Radiofrequency Ablation for Aldosterone-producing Adenoma in Primary Aldosteronism: Long-term Results

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## Introduction

We previously reported 95.8% short-term success rate of image-guided percutaneous adrenal radiofrequency ablation (RFA) in treating aldosterone-producing adenoma (APA) for primary aldosteronism (PA) in literature first largest prospective series. This study aims to evaluate the long-term outcomes and success rate of such treatment.

## Methods

Computed tomography (CT)-guided adrenal RFA was prospectively performed on consecutive patients with APA  $\leq 4$  cm. During follow-up, blood pressure control, aldosterone-to-renin ratio, serum potassium level, and CT scan were performed to evaluate treatment success. Radiofrequency ablation was repeated if CT showed persistent adenoma. Salvage adrenalectomy was offered if PA failed to resolve with two successive RFA.

## Results

Between 2004 and 2012, we managed 59 patients with APA. A total of 23 patients were excluded for concomitant endocrine illnesses (N = 4), refusal to RFA (N = 10) and inaccessibility for RFA (N = 9). Thirty-six patients (age  $52.1 \pm 10.4$  years, 19 males) received RFA for 17 right and 19 left APA of size  $15.5 \pm 5.0$  mm. All except two patients received one RFA session. Two patients received two RFA sessions because of residual adenoma on follow-up CT. There was no mortality or major morbidity. Minor morbidities occurred in seven patients (19.4%), including retroperitoneal hematoma (N = 3), self-limiting pneumothorax (N = 3), and hypertensive crisis (N = 1). In follow-up of  $5.7 \pm 2.2$  years, PA was normalized in 34 patients (94.4%). Two patients with persistent PA refused repeat RFA or adrenalectomy. Hypokalemia was normalized in 35 (97.2%) patients ( $K = 4.0 \pm 0.3$  mmol/l). Hypertension was resolved in 14 patients (38.9%). In 22 persistently hypertensive patients, blood pressure control was improved, static and worsened in 36.3, 40.9, and 22.7%, respectively.

## Conclusion

Percutaneous RFA is safe and efficacious in treating APA with high long-term treatment success rate of 94.4%.

## REFERENCE

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# 118. Molecular Characteristics of Parathyroid Carcinoma

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## Background

It is frequently clinically and histologically difficult to determine the malignant potential of parathyroid tumors. The authors sought to define the molecular characteristics of parathyroid carcinomas taking adenomas without atypical features as control.

## Methods

We report results from parafibromin, galectin-3 expression, and APC expression analysis by immunohistochemistry in 10 cases of parathyroid carcinoma, 34 cases of benign adenomas without atypical features.

## Results

Complete loss of parafibromin expression was seen in 7 of 10 (70%) carcinomas and only 5 of 34 (14%) benign adenomas. Galectin-3 stained strongly positive in 4 of 10 (40%) carcinomas and 11 of 34 (32%) benign adenomas. Loss of APC expression was seen in 7 of 10 (70%) carcinomas and only 7 of 34 (20%) benign adenomas. Mean parathyroid hormone and mean peak calcium of carcinoma patient was  $1127$  pg/ml  $\pm 856$  and  $14$  mg%  $\pm 0.32$ . On combining all the three markers, the overall sensitivity is 60% and specificity is 100%.



## Conclusion

Sensitivity of individual markers for detecting parathyroid malignancy is low. However, overall sensitivity and specificity for predicting malignancy increases considerably if all the three immunohistochemical markers are used.

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## 119. Recovery of Parathyroid Hormone Function in Patients with Hypoparathyroidism after Total Thyroidectomy

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### Background

Post-operative permanent hypoparathyroidism is a major and sometimes severe complication after total thyroidectomy. Recovery from hypoparathyroidism through 1 year after thyroidectomy has been described in rare cases. This study investigated rates of long-term recovery from hypoparathyroidism following total thyroidectomy.

### Methods

Between January 2011 and December 2011, 1,467 patients underwent total thyroidectomy with central compartment dissection with or without lateral neck dissection. Of these, 22 patients experienced post-operative hypoparathyroidism persisting for at least 6 months. Patients were followed-up for at least 2 years. Recovery from hypoparathyroidism was assessed by measuring serum calcium and parathyroid hormone levels without calcium or vitamin D supplements.

### Results

Of the 22 patients who experienced post-operative hypoparathyroidism persisting for at least 6 months after total thyroidectomy, five recovered parathyroid function. The mean duration of hypoparathyroidism following total thyroidectomy in these patients was  $17.4 \pm 3.6$  months.

### Conclusion

Although recovery from hypoparathyroidism persisting for at least 6 months remains relatively rare, some patients can recover from long-term post-operative hypoparathyroidism many months after the initial diagnosis.

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## 120. Kidney Function of Patients with Primary Aldosteronism after Adrenalectomy

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### Introduction

Primary aldosteronism (PA) often masks the actual kidney dysfunction by the hyperfiltration.

### Materials and Methods

From 9, 2005 to 6, 2011, a retrospective study was performed on 38 patients with PA (15 M, 24 F; age 26-75 years) with PA who underwent adrenalectomy (ADX) in our institution. To elucidate the change of kidney function after ADX, pre- and post-operative epidermal growth factor receptor (eGFR) were reviewed.

### Results

PRA and PAC were normalized after laparoscopic ADX in all of them. The eGFR on average was decreased from 73.3 to 62.3 ml/min/1.73 m<sup>2</sup> post-operatively ( $p < 0.05$ ). In nine (23.7%) of 38 patients, eGFR had already been decreased below 60 ml/min/1.73 m<sup>2</sup> (>stage 3 of the eGFR classification of the KDIGO 2012) preoperatively and in four of the nine cases the eGFR classification stayed at stage 3a after ADX. In two and three out of the remaining five patients the eGFR classification developed from stage 3a to 3b and stage 3b to 4, respectively, after ADX. In 21 of the 29 patients (76.3%) in whom the preoperative eGFR was above 60 ml/min/1.73 m<sup>2</sup>, the eGFR classification stayed at stages 1 or 2 in the eGFR classification, in six and two out of the eight remaining cases, it decreased to stage 3a and to 3b, respectively. Consequently, the eGFR classifications of 13 (34.2%) of the 38 patients developed.

### Discussion and Conclusion

Renal function should be carefully monitored after ADX for patients with PA, especially in those whose eGFR is low even before ADX.

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## 121. Presence of Paratracheal Fatty Tissue, does it predict the Incidence of Post-thyroidectomy Hypocalcemia? Early Results of an Observational Study

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### Introduction

Hypocalcemia due to permanent or transient hypoparathyroidism is not an uncommon complication following total thyroidectomy. The aim of the study is to find out the association of paratracheal fatty tissue with the incidence of hypocalcemia in patients undergoing total thyroidectomy.

### Setting and Duration

Wards 27 and 38 National Hospital of Sri Lanka from 1st July 2013 to 1st December 2013.

### Methods

All the patients underwent total thyroidectomy were included in the study. Patients with recurrent goiters were excluded. Presence or absence of paratracheal fatty tissue is observed intraoperatively. Patients were monitored clinically as well as biochemically for the development of hypocalcemia in the 1st and 2nd post-operative days and followed-up in the clinic.

### Results

Out of 42 patients (7 males and 35 females) who underwent total thyroidectomy, 18 patients had paratracheal fatty tissue (42%). Out of these 18 patients, only three (16.6%) ( $p < 0.05$ ) developed hypocalcemia. Whereas 11 of them developed hypocalcemia (45.8%) out of 24 patients who did not have fatty tissue.

### Conclusion

Presence of paratracheal fatty tissue appears to be associated with of post-thyroidectomy hypocalcemia. So, it can be used as a predictor of post-thyroidectomy hypocalcemia. So, the decision to replace calcium can be made early and early discharge from hospital may be possible.

## 122. Transient Hypocalcemia is the most Common Complication after Total Thyroidectomy: We evaluated whether Vitamin D Deficiency could predict Post-operative Transient Hypocalcemia after Total Thyroidectomy

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### Introduction

Transient hypocalcemia is the most common complication after total thyroidectomy. We evaluated whether vitamin D deficiency (VDD) could predict post-operative transient hypocalcemia (PTH) after total thyroidectomy (TT).

### Materials and Methods

Data were collected retrospectively between September 2012 and May 2013, we examined 267 consecutive thyroid cancer patients underwent TT with central compartment neck dissection at the Yonsei University Health System by single experienced surgeon. A total 267 patient was divided into two groups according to preoperative vitamin D levels. We evaluated the prevalence of preoperative VDD and the relationship between preoperative vitamin D and post-operative calcium levels. The clinicopathological features of both groups were compared to identify predictive factors for transient hypocalcemia.

### Results

There was a difference in post-operative hypocalcemia between VDD and non-VDD group. Post-operative hypocalcemia was classified by biochemical hypocalcemia and symptomatic hypocalcemia (requiring IV calcium). The prevalence of preoperative VDD patients was 25.4%. With logistic regression analysis, predictive factors for post-operative symptomatic hypocalcemia included a preoperative vitamin D level less than 10 ng/ml ( $p = 0.007$ ; odds ratio = 3.00) and a post-operative serum PTH level less than 15 pg/ml ( $p < 0.001$ ; odds ratio = 102.41). Especially in cases of postoperative serum, PTH level less than 15 pg/ml, VDD could predict symptomatic hypocalcemia (77.5% vs 53.2%,  $p = 0.008$ ).

### Conclusion

Vitamin D deficiency is significantly associated with postoperative transient hypocalcemia. Especially in cases of preoperative VDD group with postoperative serum PTH level less than 15 pg/ml, we can suggest that the oral vitamin D supplements should be administered to avoid postoperative transient hypocalcemia.

## 123. Tubercle of Zuckerkandl: A Landmark in Thyroid Surgery

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### Introduction

Its close proximity to the recurrent laryngeal nerve (RLN) makes tubercle of zuckerkandl (TZ) an important landmark in thyroid surgery. TZ is an extension of the lateral lobes of thyroid and points toward the tracheoesophageal groove. The objective of this study is to analyze and highlight the importance of TZ in thyroidectomy.

### Materials and Methods

This is a prospective study of 160 consecutive thyroidectomies done in our department. The anatomical relationships between TZ, RLN, and vascular structures were noted.

### Results

In majority of the patients TZ was identified (62.5%). It was more common on the right side (70%) and very rarely seen on the left side (2%). Most of them were either grade I (46%) or grade II (48%) with mean size of 8 mm. When TZ is present the RLN courses beneath and medial to the TZ in 82% of patients. Recurrent laryngeal nerve passes deep to the inferior thyroid artery in most of these patients (85%).

### Conclusion

Although TZ is a well-known anatomical structure during thyroidectomy causes surgical difficulty, it is very helpful to identify the RLN. Hence, TZ is an important landmark for safe thyroidectomy.

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