

disrupt immune tolerance of the thyroid gland, resulting in autoantibody production. Because thyroid irAEs have been revealed to be a prognostic factor, these novel autoantibodies are candidate biomarkers for PD-1 pathway blockade therapy. **References:** 1. Yamauchi et al. Clinical Features of Nivolumab-Induced Thyroiditis: A Case Series Study. *Thyroid*. 2017; 27(7): 894–901. 2. Yamauchi et al. Incidence, features, and prognosis of immune-related adverse events involving the thyroid gland induced by nivolumab. *PLoS One*. 2019; 14(5): e0216954.

Neuroendocrinology and Pituitary NEUROENDOCRINE & PITUITARY PATHOLOGIES

Incidence Trends in Lung and Gastroenteropancreatic Neuroendocrine Neoplasms

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SUN-302

Abstract

Introduction

The incidence of neuroendocrine neoplasms (NENs) seems to increase worldwide. However, long-term, population-based data that consider differentiation levels are sparse.

Objective

To evaluate the incidence trend of lung and gastroenteropancreatic (GEP) NENs according to the latest International Agency for Research on Cancer/World Health Organization classification over a 41-year time period in two Swiss regions.

Methods

All cases of lung and GEP NENs recorded in the Vaud and Neuchâtel Cancer Registries from 1976–2016 were included. NENs were stratified into well-differentiated neuroendocrine tumors (NETs) and poorly differentiated neuroendocrine carcinomas (NECs). Changes in annual age-standardized incidence rates were calculated for lung and GEP NETs and NECs by sex.

Results

There were 4141 patients diagnosed with NENs, of which 65% were men. The incidence of lung NETs did not reveal any statistically significant trend in men, but increased in women by 4.9%/year between 1976–2016. The incidence of lung NECs in men decreased significantly by 2.6%/year from 1985–2016 whereas the incidence of lung NECs in women increased significantly between 1976–1998 by 6%/year. For GEP NETs, a steady annual increase in incidence occurred between 1976–2016 with

a magnitude of 1.7% in men and 1.3% in women. No trend in incidence of GEP NECs was found for both sexes.

Conclusions

The incidence trends of lung NECs in men and women parallel changes in smoking prevalence in the population whereas causes of the increase in incidence of GEP NETs

are not fully understood. Our study supports the importance of evaluating the epidemiology of NENs by their differentiation level.

Thyroid

BENIGN THYROID DISEASE AND HEALTH DISPARITIES IN THYROID II

Long Working Hours Are Associated with Hypothyroidism: A Cross-Sectional Study with Population-Representative Data

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SUN-417

Background: Studies have highlighted the adverse effects of long working hours on workers' health; however, the association of long working hours with thyroid function has not been studied. This study aimed to assess long working hours as a risk factor for thyroid dysfunction.

Methods: This cross-sectional study was based on data obtained from the Korea National Health and Nutrition Examination Survey conducted from 2013 to 2015. A total of 2,160 adults who worked 36–83 hours per week were included. Thyroid function was defined based on the population thyroid-stimulating hormone reference ranges, after excluding individuals with positive results for thyroid peroxidase antibody. The association between working hours and thyroid function was confirmed via multinomial logistic regression.

Results: Hypothyroidism was more prevalent among those with longer working hours (3.5% vs. 1.4% for 53–83 and 36–42 working hours per week, respectively). Individuals who worked longer hours had an increased odds for hypothyroidism (odds ratio 1.46, 95% confidence interval 1.12–1.90, per 10 hour increase in working hours per week), after adjustment for age, sex, body mass index, urine iodine concentration, smoking status, shift work, and socioeconomic characteristics such as occupation, income level, and educational attainment. The association between working hours and hypothyroidism was consistent in various subgroups stratified by sex or socioeconomic characteristics.

Conclusions: To our knowledge, this study is the first to show that long working hours are associated with hypothyroidism. Our findings suggest that appropriate monitoring and treatment of hypothyroidism are necessary among individuals who work long hours.

Cardiovascular Endocrinology

ENDOCRINE HYPERTENSION AND ALDOSTERONE EXCESS

Significance of Adrenal Vein Aldosterone Gradient in the Diagnosis of Unilateral Subtype of Primary Aldosteronism

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SAT-548

Context: Adrenal vein sampling (AVS) is the standard method for subtype diagnosis in primary aldosteronism (PA), while success rate of its procedures, especially in right adrenal vein (AV), has limited. However, unilateral subtype of PA can be completely cured by surgical treatment and hence diagnostic approach for PA should be established especially when patients with apparent adrenal disease on computed tomography (CT) lack complete AVS result. In recent years, segmental AVS demonstrates that apparent aldosterone gradient in each adrenal vein branch is specific finding in aldosterone producing adenoma. Since we have reported that plasma aldosterone concentrations different in the proximal and distal regions of the left AV in some of the patients with PA, we hypothesized that solo finding of adrenal aldosterone gradient in the left AV (left AV gradient) should be the clue for unilateral subtype of PA.

Objective: The aim was to investigate whether left AV gradient indicate the left unilateral subtype of PA.

Design and Setting This study was a part of the Kyushu Adrenal Network Database for Advanced medicine (Q-AND-A) study, a cross-sectional and retrospective study in a single referral center.

Participants and AVS procedure: Of 194 PA patients who underwent AVS with cosyntropin stimulation between January 2007 and April 2019, 111 patients had available and successful AVS data. Blood samples in left adrenal veins were obtained from following two positions; the common trunk and the central adrenal vein. We calculated left AV gradient by the ratio of aldosterone-to-cortisol ratio on the higher position in left AV to that on the lower position. We determined the presence of left AV gradient if it was greater than four.

Main outcome measures: Prevalence of unilateral subtype in patients with left AV gradient who had unilateral disease on CT.

Results: Of 111 patients with complete AVS data, 43 who had left unilateral disease on CT were analyzed in present study. Twenty-nine patients were diagnosed as left unilateral subtype on AVS and 14 were bilateral subtype. Aldosterone gradient was observed only in patients with unilateral subtype (41% [12/29]), not in patients with bilateral subtype (0% [0/14]). Of 29 patients with unilateral subtype on AVS, clinical parameters, including plasma aldosterone concentrations, plasma renin activity, and serum potassium levels, were not different in those with and without left AV gradient. The receiver operative curve analysis for the diagnosis of unilateral subtype on AVS showed that the optimal cutoff value of left AV gradient was 3.3 with a sensitivity of 45% and specificity of 100%.

Conclusion: The presence of left AV gradient is the reliable finding for the diagnosis of

left unilateral subtype in patients with PA who have unilateral disease on CT. However, further study in a larger number of cases is required to validate this finding.

Tumor Biology**ENDOCRINE NEOPLASIA CASE REPORTS I*****A Brain Metastasis in Malignant Paraganglioma Treated with Multidisciplinary Strategy.***

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SUN-918

Introduction: The most common sites of metastatic pheochromocytoma/paraganglioma (PPGL) are regional lymph nodes, bone, liver, and lung. Metastatic PPGL to the brain is very rare. Herein we describe a case of malignant paraganglioma (PGL) with a brain metastasis in the 27th year of his clinical history. **Clinical Case:** A 57-year-old Japanese man presented with sudden onset of headaches, speech disturbance, and mild cognitive impairment. His medical history was significant for surgery to resect a left peri-adrenal PGL at 30 years of age. At 35 years of age small lung metastases were treated with 5 cycles of chemotherapy without demonstrable response. Hypertension was diagnosed at age 44 years and diabetes mellitus at 49 years of age. The some lung metastases gradually increased in size and he underwent video-assisted thoracic surgery (VATS) at age 50 years. Plasma norepinephrine (pNE) and urine normetanephrine (uNM) levels, which were 3-fold elevated above the upper limit of the reference ranges, normalized after VATS. Subsequently, hypertension was well controlled and pNE and uNM levels remained within the reference ranges. Then, at 57-years of age, he developed central nervous symptoms and a mass with broad peritumoral edema was found in his left parietal lobe on head MRI. The 1.6 cm mass was hypervascular and isointense on T1-weighted imaging and was an inhomogeneous high-intensity in T2-weighted imaging. Both 123-I-MIBG SPECT and 18F-FDG-PET/CT imaging showed strong uptake in the brain metastasis. Although pNE and uNM levels were within their respective reference ranges, the 123-I-MIBG was diagnostic of metastatic PGL. Dexamethasone (DEX) was started to improve the brain edema. The brain metastasis was treated with linear accelerator stereotactic radiosurgery (LINAC-SRS) which was tolerated well without any adverse effects. However, the tumor volume and peritumoral edema area had not decreased one year after LINAC-SRS. Because high dose of DEX needed to continue, and his drug-induced psychiatric symptoms had worsened, we decided to move to surgical option. A craniotomy and total tumor removal was performed without any perioperative event. His condition rapidly improved and the DEX treatment was discontinued after surgery. Although he had slight hemiplegia and aphasia, and small lung metastases, he maintained a stable disease three years after surgery. **Conclusion:** Because PPGLs are slow growing neoplasms, multidisciplinary treatment should be considered even though there are multiple metastases. SRS has been used to treat skull base and neck PGLs with local control rates >90%. However, although SRS could suppress tumor growth, dramatic tumor volume reduction is not expected. Therefore surgical approach should be considered for brain metastasis as the next strategy for intracranial decompression.

Thyroid**THYROID DISORDERS CASE REPORTS II*****Myxedema Coma Presenting as Large Pericardial Effusion with Cardiac Tamponade***

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