height gain, if caregivers or patient strongly request the medical intervention in end stage of the puberty or growth.

Diabetes Mellitus and Glucose Metabolism

CLINICAL AND TRANSLATIONAL GLUCOSE METABOLISM AND DIABETES

Rapid Improvement in Glycated Albumin Before Educational Admission Predicts Fair Glycemic Control One Year After the Discharge of Patients with Type 2 Diabetes Mellitus

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MON-622

Background and Aim: Glycated albumin (GA) reflects a short-term glycemic control (about 2 weeks) in comparison to glycated hemoglobin (HbA1c) which reflects a long-term glycemic control. Thus, if the dietary, exercise, or medication therapy before the educational admission is effective, a rapid improvement in GA can be observed. However, the impact of the improvement in GA on the subsequent glycemic control is not well understood. This retrospective study analyzed the association between the change of GA before educational admission and glycemic control one year after the discharge of patients with type 2 diabetes mellitus (T2DM). Method: We analyzed data from 114 T2DM patients who were admitted to our hospital from 2011 to 2016. The GA data within 30 days before admission and on the day of admission were available for all patients. The change of GA per day (ΔGA/day) was calculated as [(GA on admission) - (GA before admission)/number of days between the two measurements of GA]. Patients with renal dysfunction (eGFR < 30 mL/min/1.73 m^2) or insulin deficiency [fasting C-peptide (CPR) < 0.5 ng/mL or two-hour postprandial CPR < 1.0 ng/mL] were excluded. Patients achieving an HbA1c of < 7.0 % at one year after discharge were defined as achievers, and the rest were defined as non-achievers. Multiple baseline factors including the ΔGA/day between the two groups were compared. Results: Of the 114 patients, 68 were achievers and 46 were non-achievers. GA significantly declined during before and just after the admission to hospital (median [interquartile range]: 26.0 [22.2 - 32.7] to 25.0 [21.4 - 29.8] %, p < 0.001). The range of the ΔGA/day was between -1.14 and 0.28, with a median value of -0.08 [-0.26 - 0.002]. The age, body mass index, and HbA1c levels at admission were not significantly different between the two groups. The increase in CPR after the glucagon loading test was higher in the achievers than in the non-achievers (1.85 [1.32 - 2.87] vs 1.21 [0.53 - 1.92] ng/ml, p = 0.004). The ΔGA/day was lower in the achievers than in the non-achievers (-0.14 [-0.39 - -0.006] vs -0.04 [-0.13 - 0.03], p = 0.002). A logistic regression analysis demonstrated that the ΔGA/day was the factor associated with achieving an HbA1c of < 7.0% at one year after discharge (Odds ratio: 0.037, 95 % confidence interval: 0.004 - 0.267, p < 0.001). In the receiver operating characteristic curve analysis, the ΔGA/day had an area under the curve of 0.67 in the achievement group and the cutoff value was set as -0.146 for predicting the achievement, with a sensitivity of 0.50 and a specificity of 0.85.
Conclusion: Our results suggest that the change in GA before the educational admission can predict the glycemic control one year after the discharge of T2DM patients.

Thyroid

BENIGN THYROID DISEASE AND HEALTH DISPARITIES IN THYROID I

Novel Autoantibodies for Thyroid-Specific Transcriptional Factors in Patients with Immune-Related Adverse Events Involving the Thyroid Gland

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SAT-416

Background: Immune-related adverse events by immune checkpoint inhibitors often involve several endocrine-related organs. PD-1 pathway blockade therapy by anti-PD-1 antibodies including nivolumab frequently causes thyroid dysfunction (thyroid irAE). Thyroid irAE seems to be distinctive compared to conventional painless thyroiditis in terms of a clinical course: transient thyrotoxicosis and subsequent persistent hypothyroidism [1]. Our retrospective cohort study regarding nivolumab provided several suggestions [2]. The thyroid irAE (+) group had a longer median overall survival than the thyroid irAE (−) group in patients with lung cancer, but this observation was not seen in patients with malignant melanoma: In addition, 5 of 17 patients tested at the point of thyroid dysfunction development were double negative for TPOAbs and TgAbs, known thyroid autoantibodies. From these findings, we set a hypothesis that antibodies for unknown antigens mediate prognostic effects of thyroid irAEs if tumor tissues express the same antigens. **Methods:** We performed co-immunoprecipitation using Protein G beads, sera of three patients with thyroid irAEs, and lysates of HEK293T cells overexpressing candidate proteins tagged with FLAG and HiBit (NKX2-1, PAX8, FOXE1, and HHEX). The pellets were analyzed by western blot. **Results:** FOXE1 bands were augmented in patient 1 with lung cancer, a PAX8 band in patient 2 with malignant melanoma, and bands of FOXE1, PAX8, and HHEX in patient 3 with renal cell carcinoma, compared to a control sample of a normal subject. We performed subcutaneous injections of purified IgG fraction from the serum of patient 3 to C57BL/6 mice every 2 weeks. The mice were sacrificed after 4 weeks, but no significant changes were observed in their thyroid glands and thyroid function. **Conclusions:** We identified novel autoantibodies for FOXE1, PAX8, and HHEX, thyroid-specific transcriptional factors. In our experiments, the pathogenicity of antibodies were not suggested. Considering our previous observation that the thyroid gland expresses both PD-L1 and PD-L2, ligands of PD-1 receptor [1], PD-1 pathway blockade may particularly

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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