LDL-cholesterol and enhancing the LDL-cholesterol lowering ability of statins. PCSK9, a serine protease that binds to the LDL receptor promoting its degradation, is an important regulator of LDL metabolism. In addition, LDL-cholesterol is also controlled by TSH and thyroid hormones via PCSK9. TSH has received increasing attention as being closely associated with increased LDL-cholesterol level and higher atherosclerotic risks. In vitro study, the effects of TSH on hepatic PCSK9 expression in HepG2 cells were reported (1). I here report a case of transient hyperthyroidism secondary to PCSK9 inhibitor therapy. This case highlights the involvement of thyroid function in PCSK9 Inhibitor therapy.

CLINICAL CASE
A 65-year-old man had a weight loss of 6 kg (13 lbs.) in 4 months, accompanied with fatigue. He had a past history of myocardial infarction and his LDL was 83 mg/dL by 2.5mg of rosuvastatin and heart rate was controlled by 10mg of carvedilol. Six months ago, he started a PCSK9 Inhibitor therapy with 140mg of evolocumab every 2 weeks for 6 weeks. He had no preceding viral illness and denied anterior neck pain or tenderness. His height was 1.53 m, weight 52.6 kg (115 lbs.), and body mass index (BMI) 22.46 kg/m². His thyroid was not enlarged and non-tender without clear palpable thyroid nodules or neck lymph nodes. Hyperthyroidism was suspected and confirmed by thyroid function tests: TSH was less than 0.0005 μIU/mL (normal 0.35–4.94), and free T4 1.830 ng/dL (0.70–1.48). Graves’ disease was considered, and thyroid antibody tests performed. Thyroid peroxidase (TPO) antibody titer was less than 9 IU/mL (<9), and TSI 141% (<120%). To confirm the diagnosis of this hyperthyroid patient, Technetium-99m uptake and scan was done which showed uptake of 0.8% (0.5–7%). After careful observation for 2 months with 5mg of carvedilol, he turned asymptomatic and free T4 lowered to 1.480 ng/dL and TSH remained less than 0.0005 μIU/mL.

CLINICAL LESSONS
I here report a case of transient hyperthyroidism secondary to PCSK9 inhibitor therapy. There has been no report of hyperthyroidism induced by PCSK9 inhibitors. Immunological influence of anti-PCS9 therapy on thyroid is unknown. In this case, the decrease of TSH due to hyperthyroidism was considered to reduce hepatic PCSK9 expression, leading to additive effect to PCSK9 inhibitor. PCSK9 inhibitors may modify the effects of hyperlipidemia treatment by causing changes in thyroid function. When using PCSK9 inhibitors, follow-up of thyroid function should be considered. This case highlights the involvement of thyroid function in PCSK9 inhibitor therapy.

REFERENCE
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Bone and Mineral Metabolism
NEW FRONTIERS IN BONE AND MINERAL METABOLISM

A Novel Estimate of Creatinine Excretion to Determine Adequacy of 24-Hr Urine Collection
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Bone and Mineral Metabolism
OSTEOPOROSIS: DIAGNOSIS AND CLINICAL ASPECTS

Different Association of Dietary Fat Intake with Femoral Neck Strength According to Gender: A Nationwide Population-Based Study
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SUN-369

Purpose: Despite the general belief that higher fat intake may be harmful for bone health, its impact on bone strength has not been thoroughly studied. Methods: We conducted a population-based cross-sectional study derived from the Korea National Health and Nutrition Examination Surveys, including 2,590 participants. Composite indices of femoral neck strength, such as the compression strength index (CSI), bending strength index (BSI), and impact strength index (ISI), were generated by combining bone mineral density, body mass, and height with the femoral axis length and width. Results: Dietary fat intake (％) was inversely related to CSI and ISI in men, but not in women. Men in the highest three fat intake quintiles had lower CSI, ISI, and/or ISI than those in the lowest quintile (P=0.003–0.024). In women, compared with participants in the third fat intake quintile, those in the other four quintiles had lower CSI, BSI, and/or ISI (P=0.004–0.049). When the participants were allocated to three groups according to the dietary reference intake of fat in Koreans [low (<15%], moderate (15–30%), or high (≥30%)], men with a moderate or high fat intake had significantly lower ISIs than those with a low fat intake (P=0.046 and 0.039, respectively). By contrast, compared with women consuming a moderate amount of fat, those with a high intake had lower CSI, BSI, and ISI (P=0.025–0.047). Conclusion: These findings suggest that higher fat intake in men and low or high fat intake in women may contribute to deteriorations in bone strength.

Cardiovascular Endocrinology

PREVALENCE, DIAGNOSIS, AND MECHANISMS OF HYPERALDOSTERONISM

Efficiency of Adrenal Venous Sampling in the Treatment Choice of Primary Aldosteronism (AVSTAT Study)

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Background: Adrenal venous sampling (AVS) is strongly recommended for a subtype diagnosis of primary aldosteronism (PA) if adrenalectomy (ADX) is desired by the patient. Given various issues related to AVS such as technical demand, invasive nature, expensive cost and radiation exposure, AVS is expected to lead efficiently to the subtype diagnosis and ADX. Aim: Primary objective was to assess the performance of AVS to determine treatment of PA by investigating the ratio of unilateral disease and rate of ADX following AVS in patients with unilateral disease. Methods: Sixteen major referral centers in ENS@T (n=10) and Japan (n=6) participated in the study. Study period was from 2006 to 2018. Data on total number of PA patients, AVS (total number and number of successful procedures), number of patients with unilateral diseases, and number of patients that underwent ADX were collected by a questionnaire-based survey. In addition, reasons for not proceeding to ADX in patients with a unilateral diagnosis were investigated. The diagnosis of PA was based on the positive case detection and at least one positive result in confirmatory testing. Results: Total number of confirmed PA patients and conducted AVS showed a dramatic increase during the past decade (PA: 1061 pts/2006–2011 to 3718 pts/2012–2018; AVS: 720/2006–2011 to 2448/2012–2018). Success rate of AVS was improved from 79.0% (2006–2011) to 92.5% (2012–2018). Both rate of unilateral PA and ADX of successful procedures decreased from 42.7% (2006–2011) to 37.3% (2012–2018) and from 40.8% (2006–2011) to 34.9% (2012–2018), respectively. Of the patients with successful AVS, bilateral disease was diagnosed in 63.5% (1812/2854 pts). Of the unilateral PA patients, 11.9% (125/1054 pts) were not subjected to ADX. The rate of the patients not subjected to ADX was significantly higher in Japan than in ENS@T centers both in patients with successful AVS (75.8% vs. 53.4%) and with unilateral disease (19.9% vs. 8.6%). Clinical decision against ADX in unilateral disease was made by the physicians in 33.3%, the patients in 33.3%, and both in 33.3%. Medical factors for Dr’s decision against ADX in unilateral disease included good blood pressure control, normokalemia, comorbidities (e.g. DM, CKD), non-lateralized CT findings (e.g. no tumor, contralateral tumor), and discordant results among different criteria of AVS. Conclusions: High prevalence of bilateral disease and change of treatment policy after implementation affected the efficiency of AVS as an essential diagnostic procedure prior to ADX. Development of non-invasive procedures to