62.5% [60.3 – 64.6]), and total BMD (1.11 [1.08 – 1.14] vs. 1.17 [1.14 – 1.20] g/cm²) compared to Controls. Women with PCOS also had decreased upper (0.72 [0.70 – 0.74] vs. 0.73 [0.71 – 0.76] g/cm²) and lower (1.13 [1.10 – 1.16] vs. 1.15 [1.12–1.18] g/cm²) limb BMD compared to the HA group. Insulin sensitivity evidenced by Matsuda index was declined in PCOS group compared to Controls, yet was positively associated with SMI% in all groups (All: P ≤ 0.05). The OA group exhibited exaggerated insulin-like-growth-factor-1 (IGF-1) compared to Controls (P = 0.01) that had negative associations with LEMSI% (r = –0.90; P < 0.01). Only Controls showed positive associations between IGF-1 and upper (r = 0.84) and lower (r = 0.72) limb BMD (All: P < 0.01). Unlike PCOS group, estradiol (r = 0.64) and the ratio of luteinizing hormone to follicle-stimulating hormone (r = 0.54) were positively associated with BMD (All: P < 0.05) in OA group. Also, unlike PCOS group, IGF binding protein-2 (IGFBP-2) was positively associated with muscle or bone mass in other groups. Specifically, IGFBP2 was associated with SMI% in Controls (r = 0.45) and HA (r = 0.67), with LEMSI% in OA (r = 0.91), and with upper limb BMD (r = 0.98) in HA groups (All: P < 0.05). Reproductive-aged women with PCOS exhibited early signs of osteosarcopenia likely owing to their unique metabolic and endocrine alterations. Perturbations in insulin signaling and function may drive muscle and bone loss in PCOS. Understanding the biological mechanisms and management strategies that may delay or prevent the development of osteosarcopenia is recommended to improve the musculoskeletal health and associated long-term comorbidities of PCOS.

Neuroendocrinology and Pituitary
PITUITARY TUMORS 1

Relationship Between Clinicopathological Aspects and MSH6/MSH2 and PD-L1 Expressions in Clinically Nonfunctioning Pituitary Adenomas
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SAT-301
Introduction: Mismatch repair (MMR) genes are associated with the MMR mechanism that corrects DNA polymerase misincorporation errors. We analyzed the aggressive pituitary adenomas (PAs) associated with Lynch syndrome due to germline mutation in the MMR gene. Reduced expression of MMR genes mutS homologs 6/2 (MSH6/2) directly promotes PA growth (1, 2). MMR gene expression and programmed cell death 1 ligand 1 (PD-L1) expression are involved in tumor immunity with immune checkpoint inhibitors, but the direct association in PAs is not fully understood. Hypothesis and Objectives: MSH6/2 and PD-L1 expression could affect PA proliferation and invasion by pathological classification of nonfunctioning (NF) PAs because the proliferation and invasiveness differ depending on the PA histological subtype. In this study, we therefore analyzed the correlation between MSH6/2 and PD-L1 mRNA expression levels and clinicopathological factors related to tumor proliferation using human NF-PAs. Experimental Design: We performed immunohistochemistry to classify the NF-PAs into gonadotroph adenomas (GAs), silent corticotroph adenomas (SCAs), null cell adenomas (NCAs) and pituitary transcription factor 1 (PIT1) lineage PAs according to 2017 WHO classifications. Quantitative analyses were by real-time PCR to detect MSH6/2 and PD-L1 mRNA expressions in NF-PAs (n = 89). We also performed statistical analyses of the expressions and clinicopathological factors such as KnoSp Grade and histological subtypes. We investigated the effect of MSH6 knockout on cell proliferation and PD-L1 expression in AtT-20ins cells. Major Results: MSH6/2 expression was positively associated with PD-L1 expression. MSH6/2 and PD-L1 expressions are significantly lower in invasive NF-PAs with KnoSp Grade 3–4 or recurrence than in non-invasive NF-PAs with KnoSp Grade 1–2. Their expression is significantly lower in SCAs and NCAs than in GAs. Although MSH6/2 expression also tends to be lower, the PD-L1 expression tends to be higher in PIT1 lineage PAs, which is unlike SCAs and NCAs. MSH6 knockout in AtT-20ins significantly decreased PD-L1 expression with cell proliferation promotion. Interpretation of results and Conclusion: MSH6/2 and PD-L1 expressions of SCAs, NCAs, and PIT1 lineage PAs compared to GAs were thought to contribute to their clinically aggressive behaviors. The molecular mechanism of the difference in clinical features of NF-PAs was partially elucidated. In particular, reduced expressions of MSH6/2 were thought to be useful for predicting the proliferation and invasiveness of NF-PAs.
References: (1) Uraki S et al., Endocr J. 2017;64(9):895–906 (2) Uraki S et al., J Clin Endocrinol Metab. 2018;103(3):1171–1179. Declarations of conflicts of Interest: No authors declare any conflicts of interest.

Thyroid
THYROID NEOPLASIA AND CANCER
Quantitative Characteristics and Sonographic Patterns Before and After Thyroid Radiofrequency Ablation

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MON-505
Although most thyroid nodules (TNs) are benign and require only serial observation, some may need treatment for symptoms. Radiofrequency ablation (RFA) has been used and shown to be a promising and well-tolerated new approach. The efficacy of RFA is evaluated by using parameters such as volume reduction ratio (VRR), and cosmetic or symptomatic improvement. However, no index is now available to predict the therapeutic success before
RFA. And apart from size reduction, little is known about their ultrasonography (US) appearances after RFA. The purpose of this study was to 1) assess the effectiveness of single session RFA treatment on volume reduction 2) determine if quantitative US characteristics are correlated to the VRR 3) demonstrate the US characteristics from the baseline and during the follow-up. Quantification of characteristics was performed using commercial software. The CAD software classified nodules into the 2015 ATA sonographic patterns and TIRADS categories. All patients underwent a single treatment session and with significant improvement in cosmetic and pressure symptoms. It shows that there is a direct correlation between the initial tumor size/cyst component percentage and VRR. The US characteristics are significant different after RFA, and the tumors were categorized to more suspicious ATA patterns and had higher TIRAD scores. In conclusion, RFA is effective on volume reduction and US characteristics correlated with therapeutic success. Post RFA US features may potentially mislead and clinicians should always keep in mind.

Cardiovascular Endocrinology
ENOCRINE HYPERTENSION AND ALDOSTERONE EXCESS

Patients with Hyperaldosteronism Have Higher Prevalence of Obstructive Sleep Apnea. From the National Inpatient Sample.

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SAT-559

Introduction: Previous studies suggested that aldosterone excess may worsen obstructive sleep apnea (OSA) through causing peri-pharyngeal edema. Objective: In this study we sought to examine if hyperaldosteronism is associated with OSA. Methods: The National Inpatient Sample (NIS) data was queried for adults with diagnosis of primary and secondary hyperaldosteronism during the years 2012 - 2015. Patients with hyperaldosteronism were identified using the international classification of disease (ICD-9). Each patient who was diagnosed with hyperaldosteronism was matched to randomly selected controls at a 1:4 ratio by age, gender and year of hospitalization. A multivariable logistic regression model was used to estimate the adjusted odds ratio (aOR) of OSA among patients with hyperaldosteronism. We adjusted for patient demographics, socioeconomic factors, hospital factors and clinical comorbidities. Subgroup analysis was performed based on gender, race and age groups; young adults (aged 18–35 years), middle aged (> 35-<55 years) and older adults (aged > 55 years). Results: There were 23,465 patients diagnosed with hyperaldosteronism identified. The mean age was 59 (standard error of the mean) (SEM): 0.1. Females represented 48.5%. Compared to control, patients with hyperaldosteronism had higher prevalence of hypertension, CHF, stroke, obesity, diabetes, renal failure and lower prevalence of tobacco use and COPD. The proportions of African Americans were higher among patients with hyperaldosteronism compared to the control 30.1 vs 15.5, p<0.001. Patients with hyperaldosteronism had higher prevalence of OSA 16.4 vs 8.3, p<0.001. On multivariate analysis, hyperaldosteronism was independently associated with higher odds for OSA with aOR 2.01 (95%CI: 1.81–2.23) p<0.001. On subgroup analysis, similar findings were observed irrespective of gender, age group or race.

Conclusion: Prevalence of OSA is higher among patients with hyperaldosteronism. Physicians may need to consider a case detection of hyperaldosteronism in patients with OSA and hypertension. Similarly we suggest to evaluate patients with hyperaldosteronism for OSA.

Bone and Mineral Metabolism

BONE DISEASE FROM BENCH TO BEDSIDE

Abaloparatide Prevents Unloading-Induced Bone Loss in Adult Rats

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SUN-335

Disuse osteoporosis (bone loss resulted from a reduction in mechanical loading) occurs in patients due to prolonged bed rest, paralysis and application of braces. Abaloparatide (ABL) is a synthetic peptide analog of PThrP that has been shown to promote bone formation with limited bone resorption. ABL was approved by the FDA in 2017 to treat osteoporosis in postmenopausal women at high fracture risk. Yet, the ability of ABL to prevent bone loss in disuse is unknown. We hypothesized that ABL would prevent bone loss in the hindlimb unloading (HLU) rat model of disuse osteoporosis.

Adult male Wistar rats, 13–14 weeks of age, were assigned to 1 of 4 groups (10 rats/group): ambulatory + vehicle (CON-VEH), ambulatory + ABL (CON-ABL), HLU + vehicle (HLU-VEH) or HLU + ABL (HLU-ABL). The rats received a daily subcutaneous injection of ABL (25µg/kg/day) or vehicle for 28 days. Blood serum was collected on day 0, 7, 14 and 28 to examine the expression of bone markers such as osteocalcin (OCN) and TRAcP5b. pQCT scans were acquired at the proximal tibia at day 0 and 28 to measure changes in the total and trabecular vBMD. Following euthanasia, trabecular (Tb) and cortical (Ct) bone microarchitecture from femurs, tibias and L4 vertebrae were assessed using µCT. Femurs were mechanically tested to failure in 3-point bending to determine ultimate load (N) and stiffness (N/mm). Treatment effects were evaluated using 2-way ANOVA. Effects were considered significant at p < 0.05.

Data reported as mean±SD.

HLU led to loss of bone density and structure that were prevented by ABL. Longitudinal pQCT revealed significant increases in total vBMD in ABL-CON (52±17%) vs. VEH-CON (20±5%); and in HLU-ABL (24±6%) vs. HLU-VEH (-2±3%) (p<0.001 for both). Significant differences were observed in the µCT analysis of the distal femur: Tb.BV/TV, thickness and BMD were 43.7%, 12.9% and 27.4% lower, respectively, in HLU-VEH compared to CON-VEH.