can stimulate the growth of a thyrotroph adenoma. Long-term biochemical and radiological monitoring is therefore recommended until resolution. This case highlights the physiologic responses manifested in severe primary hypothyroidism and the fact that these changes improve with adequate replacement.

**Pediatric Endocrinology**

**PEDIATRIC PUBERTY, TRANSGENDER HEALTH, AND GENERAL ENDOCRINE**

**Endocrine and Metabolic Complications in 16 Taiwanese Patients with Thalassaemia Major**

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**SUN-058**

**Backgrounds:** Endocrine and metabolic abnormalities are quite common in patients with thalassaemia major, attributable, at least in part, to chronic iron overload. Endocrine and metabolic abnormalities are quite common in patients with thalassaemia major. Determining the prevalence of endocrine complications is difficult because of differences in the age of first exposure to chelation therapy, and the continuing improvement in survival in well-chelated patients. **Patients and Methods:** We performed a retrospective study of endocrine and metabolic data of 16 Taiwanese children (10 females and 6 males, 21.42±4.82 years) who attended in our patient clinics from Oct 2002 to Jan 2012. We analyzed height, weight, BMI, serum fasting glucose, thyroid function, growth hormone, adrenal, and gonadal functions. **Results:** These patients had very high serum ferritin levels with 4737.79±4572.03 ng/ml (482.8-12639). Auxological data show growth retardation (height SDS -1.05±1.34, weight SDS -0.67±0.52, BMI -0.37±0.49). Endocrine data reveal hypogonadism (n=11, 69%), hypothyroidism (n=8, 50%), growth hormone deficiency (n=3, 19%), and adrenal insufficiency (n=3, 19%). Metabolic data show impaired fasting glucose (n=4, 25%) and diabetes (n=6, 37%). **Conclusions:** Patients with thalassaemia major are at risk for a number of endocrine (growth hormone deficiency, hypothyroidism, adrenal insufficiency and hypogonadism) and metabolic problems (impaired fasting glucose and diabetes). It is necessary for endocrinologists to become skilled in these complications and provide long-term comprehensive care through the life of these patients.

**Reproductive Endocrinology**

**FEMALE REPRODUCTION: BASIC MECHANISMS**

**Dissecting the Interplay Between Diet and PCOS Pathology on Gut Microbiota in a Mouse Model**

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**MON-022**

The gut microbiome has been implicated in the development of metabolic disorders such as obesity and type-2 diabetes, and more recently polycystic ovary syndrome (PCOS). PCOS is a heterogeneous disorder with reproductive, endocrine and metabolic irregularities, and clinical and animal studies have reported that PCOS causes a decrease in microbial diversity and composition. Diet is an important regulator of the gut microbiome, and a recent study identified that alterations in macronutrient balance impact gut microbial communities which correlate with different metabolic health outcomes (1). We have identified that macronutrient balance impacts the development of PCOS traits. Therefore, to investigate the interplay between macronutrient balance and a PCOS environment on the gut microbiome, we analyzed the intestinal microbiome from fecal pellets of control and DHT-induced PCOS mice exposed to 10 different diets that varied systematically in protein (P), carbohydrate (C) and fat (F) content. The amount of dietary P, C and F consumed significantly altered alpha and beta diversity of the gut microbiota of pooled control and PCOS mice (P<0.0001). Alpha diversity between control and PCOS mice on the same diet did not differ significantly, and hence was only affected by diet composition. However, beta diversity was significantly altered between control and PCOS mice (P<0.05). We performed DESeq2 analysis and identified an operational taxonomic unit (OTU) within Bacteroides (OTU3) to be the most differentially abundant OTU between control and PCOS mice, with a significant decrease in PCOS mice compared to controls (control: 7.88 and PCOS: 5.38; fold change = 1.464; P<0.0001). The consensus sequence of Bacteroides OTU3 was found to share 99.2% similarity to Bacteroides acidifaciens. B. acidifaciens is associated with obesity with elevated levels reported to prevent the onset of obesity (2). Thus, we then investigated the influence of P, C and F on the relative abundance of Bacteroides OTU3 and revealed an association with C consumption, with increasing levels of C leading to increased levels of Bacteroides OTU3 (Carb: r = 0.22, p=0.0028, q=0.015). These findings demonstrate that diet exerts a stronger influence over the gut microbiome than PCOS pathology. However, the hyperandrogenic PCOS environment does lead to changes in gut microbiota beta diversity, with a specific decrease in an obesity-associated (2) Bacteroides species in PCOS mice that is also responsive to levels of C consumption. **Reference:** (1) Holmes et al., Cell Metabolism. 2017; 25(1): 140-151. (2) Yang et al., Mucosal Immunology. 2017, 10 (1), 104-116.

**Adrenal**

**ADRENAL CASE REPORTS II**

**A Case of Cushing’s Syndrome Caused by Epidural Corticosteroid Injection**

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**SUN-193**

**Introduction:** Cushing’s syndrome (CS) is a collection of signs and symptoms caused by hypercortisolism that results from endogenous or exogenous glucocorticoid excess. It is associated with increased morbidity and mortality from
musculoskeletal, metabolic, thrombotic, infectious and cardiovascular complications. The most common cause of CS today is the use of corticosteroid medications. It’s reported that more than 10 million American receive pharmacological doses of glucocorticoids each year. Case reports have shown that CS can be caused by non-systemic use of corticosteroids.

Clinical case: A 53-year-old patient with past medical history of osteoarthritis who presented to outpatient endocrinology office for new onset facial swelling of 2 months. His PCP had attributed it to adverse effect of recent neck glucocorticoid injections and treated him with prednisone for 7 days without any relief. Subsequently, he was referred to Endocrinology due to concern about Cushing’s syndrome. The patient reported associated easy bruising and decreased libido. On further questioning, patient mentioned he had been receiving several epidural steroid injections in the neck, shoulders and back in the past. Per record review, from June to November 2018, he had received multiple triamcinolone and dexamethasone injections as follows: 10mg dexamethasone in each C4-5, C5-6 and C6-7 facet joints; 5mg triamcinolone injections in the right C4-5, C6-C7, left C4-5, C6 and C7, and 40mg of triamcinolone in C7-T1. The patient also reported he had multiple injections in 2019, but these records were not available. Physical exam showed hypertension, facial plethora, and scattered bilateral arm ecchymosis. Laboratory study showed hyperglycemia. Given suspicion for CS, further workup, including morning serum cortisol, ACTH, and 24-hour urine cortisol were ordered, which were 0.5 ug/dl (6.2-19.4 ug/dl), 4.3 pg/ml (7.2-63.3 pg/ml) and <2 ug/24 hours (5-64 ug/24 hours) respectively, suggesting iatrogenic CS secondary to corticoid steroid injection. Also, given that the patient reported lightheadedness, and decreased libido, cosyntropin stimulation test and free testosterone, FSH and LH were ordered to rule out adrenal insufficiency, due to suppression of endogenous cortisol production from exogenous glucocorticoid use. Patient was started on hydrocortisone and dexamethasone injections as follows: 10mg dexamethasone in each C4-5, C5-6 and C6-7 facet joints; 5mg triamcinolone injections in the right C4-5, C6-C7, left C4-5, C6 and C7, and 40mg of triamcinolone in C7-T1. The patient reported associated easy bruising and decreased libido. On further questioning, patient mentioned he had been receiving several epidural steroid injections in the neck, shoulders and back in the past. Per record review, from June to November 2018, he had received multiple triamcinolone and dexamethasone injections as follows: 10mg dexamethasone in each C4-5, C5-6 and C6-7 facet joints; 5mg triamcinolone injections in the right C4-5, C6-C7, left C4-5, C6 and C7, and 40mg of triamcinolone in C7-T1. The patient also reported he had multiple injections in 2019, but these records were not available. Physical exam showed hypertension, facial plethora, and scattered bilateral arm ecchymosis. Laboratory study showed hyperglycemia. Given suspicion for CS, further workup, including morning serum cortisol, ACTH, and 24-hour urine cortisol were ordered, which were 0.5 ug/dl (6.2-19.4 ug/dl), 4.3 pg/ml (7.2-63.3 pg/ml) and <2 ug/24 hours (5-64 ug/24 hours) respectively, suggesting iatrogenic CS secondary to corticoid steroid injection. Also, given that the patient reported lightheadedness, and decreased libido, cosyntropin stimulation test and free testosterone, FSH and LH were ordered to rule out adrenal insufficiency and hypogonadism respectively. Hypogonadism was ruled out, however, cosyntropin stimulation test showed peak cortisol of 12 and 16 mcg/dL at 30 and 60 minutes (>18 mcg/dL), suggesting adrenal insufficiency, due to suppression of endogenous cortisol production from exogenous glucocorticoid use. Patient was started on hydrocortisone and all glucocorticoid injections were stopped. Conclusions: Many different non-systemic corticosteroid administrations can cause iatrogenic Cushing’s Syndrome, and therefore, physicians should be thoughtful when prescribing steroids regardless of administration form.

Diabetes Mellitus and Glucose Metabolism

LIPIDS, OBESITY AND METABOLIC DISEASE

Exploring the Role of Brown Adipokines on Hepatic Insulin Resistance Using a Microfluidic Organ-On-Chip

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SAT-653

The development of insulin resistance (IR) in liver is a key of pathophysiologic response in type 2 diabetes. Although insulin resistance impairs its ability to suppress hepatic glucose production, insulin regulation of lipogenesis is maintained (1). Currently available insulin sensitizers are effective at lowering glucose levels, but have significant adverse effect on weight gain due to triglyceride accumulation, which highlights a need to develop new therapeutic treatment options for type 2 diabetes. Brown adipose tissue (BAT) has been studied as a new target for anti-obesity and type 2 diabetes as BAT stimulation increases energy expenditure, reduces adiposity, and improves insulin sensitivity (2). However, the underlying mechanisms are not completely understood. To identify the role of BAT adipokines on hepatic insulin resistance, we developed an insulin resistant liver organ-on-chip model and then perfused primary mouse brown adipocyte conditioned media through the hepatocytes. Our results demonstrate that IR hepatocytes treated with brown adipocyte - conditioned media restores insulin sensitivity and improves glucose metabolism. This was verified by significantly increased expression of Phospho-Akt (Ser473) and glucose production gene markers (G6pc and PEPCK), lowered glucose production, increased glucose uptake, and increased glycogen synthesis in treated hepatocytes over IR group (p < 0.05). Our results also indicate that brown adipocyte - conditioned media treatment has the potential to suppress lipogenesis in hepatic insulin resistance. This was confirmed by significantly reduced expression of a lipogenesis gene marker (SREPB1) and fatty acid uptake in treated hepatocytes over IR group (p < 0.05). Current efforts are focused towards identifying the BAT adipokine via mass spectrometry. We conclude that BAT-derived endocrine factors could be a potential target for new drug discovery for obesity and type 2 diabetes treatment.

Reference: (1) Langlet et al. Cell. 2017 Nov;171(4):824-835. (2) Subhadraw et al. Am J Physiol Endocrinol Metab. 2015 Jun;308(12):E1043-E1055.

Nothing to Disclose: NT, CL, AT, FZ, KK, JM, RC, AB

Pediatric Endocrinology

PEDIATRIC SEXUAL DIFFERENTIATION, PUBERTY, AND BONE BIOLOGY

Long-Term Safety and Efficacy of Leuprolin in Treating Central Precocious Puberty: A Large, Open-Label, Multicenter, Phase IV Study in China

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