postmenopausal women and men with a mean age of 67.7 (range 51-85) years were enrolled in the study. In the OBS group 1, 2, 6, 1 and 0 patients fulfilled the CTX or BMD criteria for treatment 1, 2, 3, 4 and 5 months after baseline. The remaining 10 patients were treated at month 6. In the 9M group 2 patients fulfilled the CTX criteria for ZOL treatment at month 2. A total of 10, 5 and 5 patients in the 6M, 9M and OBS groups, respectively were re-retreated. In the 6M group CTX decreased initially, but increased rapidly thereafter, and 6 months after ZOL, CTX was 0.60±0.08 g/L (mean±SEM). CTX increased rapidly in the 9M and OBS Groups before ZOL, was suppressed by ZOL but increased again thereafter; CTX was 0.47±0.05 µg/L and 0.47±0.05 µg/L 6 months after ZOL in the 9M and the OBS groups, respectively. Mean CTX was within the premenopausal reference range 12 months after ZOL in all 3 groups. From study baseline to twelve months after ZOL BMD at the lumbar spine had decreased by 4.8±0.7%, 4.1±1.1%, and 4.7±1.2% in the 6M, 9M and OBS groups, respectively ($p \leq 0.002$ for all without differences between groups) and at the total hip by 2.6±0.5%, 3.2±0.8%, and 3.6±0.8% in the 6M, 9M and OBS groups, respectively ($p \leq 0.001$ for all without differences between groups). The decline in BMD was more pronounced in the months before ZOL in the 9M and OBS groups whereas the decline was steadier in the 6M group. **Conclusion:** Treatment with ZOL irrespective of the timing did not fully prevent loss of BMD in patients with osteopenia.

Adrenal

ADRENAL - TUMORS

Adrenocortical Carcinoma in Thailand: A 10-Year Retrospective Review in a Single Tertiary Center

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SAT-171

Background: Adrenocortical carcinoma (ACC) is a rare and fatal endocrine malignancy. This retrospective review aims to investigate treatment outcomes and clinical characteristics of 18 patients diagnosed with ACC at King Chulalongkorn Memorial Hospital from 2009 to 2018. Methods: We reviewed medical records regarding the presenting symptoms, hormonal investigations, imaging results, staging, modalities of treatment and outcomes. Results: Of the 18 patients, 14 patients were female (77%). The median age at diagnosis was 47.5 years [interquartile range (IQR) 39.5-58.2]. Mass effects and/or hormonal hypersecretion were the most common presentation, documented in 7 (38%) and 6 (33%) patients respectively. Autonomous adrenal hormone excess was found in 10 patients (56%). Cushing's syndrome and elevated dehydroepiandrosterone sulphate (DHEAS) were documented in 9 (50%) and 7 patients (41%) respectively. Mineralocorticoid excess was found in 1 patient (6%). At initial staging, 9 patients (50%) were in advance or metastatic stage. Surgery was performed in 17 patients (94%) and 13 patients (76%) were in remission. However, recurrence was observed in 6 patients (33%), with the median disease-free interval of 13.5 months (IQR 12.0-25.0 months). In patients with stage 2 disease, open surgery resulted in longer disease-free interval despite larger tumor size, compared with laparoscopic surgery. Final outcomes revealed that 8 patients (44%) had remission, 2 patients (11%) had persistent disease and 6 patients (33%) died. Combination therapy (adrenalectomy, radiation, medications and local control such as metastatectomy, radiofrequency ablation and transarterial chemoembolization) was documented in 11 patients (61%). All patients with remission received complete tumor resection and presented at early stages of cancer, with the majority of them having non-functioning tumors. The median follow-up time was 34 months (IQR 9-73). Conclusions: ACC is a rare and fatal disease with high mortality rates. Diagnosis is time-sensitive and requires multimodality approach.

Pediatric Endocrinology

PEDIATRIC GROWTH AND ADRENAL DISORDERS

Extrauterine Growth Restriction (EUGR) in Preterm Infants: Incidence, Risk Factors, Nutrition, Auxological and Neurological Outcome.A Retrospective Study from 2010 to 2016

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SAT-103

EUGR is still a serious problem in very low birth weight preterm infants. The gradual improvement in neonatal intensive care has allowed the survival of newborns with increasing low weight and gestational age, with a higher incidence of major nutritional problems and diseases (Goldenberg 2008). EUGR was defined as growth parameters ≤ 10° centile at discharge, compared to the expected intrauterine growth for post-menstrual age. Recently EUGR was defined, in a dynamic way, as the reduction in anthropometric parameters z-score between birth and discharge >1SD (Griffin 2016). Aims of our study were to evaluate: the incidence of EUGR, the nutritional intake, the main risk factors, the auxological and neurological outcome. We enrolled 346 newborns admitted to our NICU from 2010 to 2016 with gestational age (GA) at birth < 30 weeks and/or birth weight <1500 gr. Infants with malformations or syndromes were excluded. The incidence of EUGR was 73.1% for weight, 66.3% for length and 39.3% for head circumference. We observed a decrease in SD mainly during the first 14 days of life. From two weeks to discharge, no significant catch-up growth was observed. Risk factors for EUGR were: male gender, reduced GA (p=0.000), low birth weight (p=0.000), lower minimum weight achieved (p=0.000), more time to recover birth weight (p=0.000), lower growth rate per day (p=0.001), longer period of total parenteral nutrition (p=0.008), later onset of minimal enteral feeding (p=0.006), later achievement of the full enteral feeding (p=0.000), cesarean section (p=0.006), incomplete

corticosteroid prophylaxis (p=0.025), postnatal steroids use (p=0.000), mechanical ventilation (p=0.000), pulmonary bronchodysplasia (p= 0.000), leukomalacia (p=0.06), patent ductus arteriosus (p=0.000), retinopathy of prematurity (p= 0.008), late onset sepsis (p= 0.09). In 197 patients post-discharge clinical follow up at 1, 3 and 24 months of correct age (CA) was performed. Around 88% of all our sample showed normal neurological development. 12% at 1 and 3 months had abnormal general movements (both writhing and fidgety movements) or absent (p = 0.001). At 24 months CA patients with abnormal/absent fidgety movements had neurological disabilities and 83% were EUGR. At 24 months, 17% had weight <10th centile and all were EUGR. 25% showed an overgrowth (weight >75th centile) with a probably increased risk of metabolic disease later in life. The incidence of EUGR increased over the years due to the augmentation in preterm births with lower GA. The first 14 days of life were a critical period and nutrition is known to be mandatory to promote newborns' growth (Asbury 2019). The EUGR condition negatively affected the neurological (Chien 2018) and auxological (Takayanagi 2018, Wood 2018) outcome of preterm infants and the early recognition of this condition is extremely important in order to implement a careful and prolonged follow-up.

Neuroendocrinology and Pituitary

CASE REPORTS IN UNUSUAL PATHOLOGIES IN THE PITUITARY

Presence of Aberrant Adrenocorticotropic Hormone Precursors in Two Cases of McCune- Albright Syndrome

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SUN-291

Background: McCune-Albright syndrome (MAS) is a rare disorder. MAS is caused by an activating postzygotic somatic mutation in the *GNAS*, and, is classically defined by the occurrence of fibrous dysplasia (FD), café-au-lait skin macules, and precocious puberty. Autonomous GH and/or PRL production in MAS has been reported. However, there have been no reports of ACTH excess in MAS. **Method:** Plasma ACTH and serum cortisol (F) levels were assessed using electrochemiluminescence immunoassays (Eclusys ACTH^{TM} and Eclusys Cortisol II^{TM}, respectively; Roche Diagnostics K.K., Tokyo, Japan).**Clinical Cases:** Case1; 42-year-old man showed craniofacial deformities and suffered from multiple bone fractures. He was diagnosed with FD at the age of 23 years. Café-au-lait macules were found on his back. He had slightly acromegaloid features. He showed no cushingoid features. Pituitary adenoma or hyperplasia was not detected by MRI. The diagnosis of GH excess was confirmed by no suppression of serum GH levels by a 75-g oral glucose tolerance test (nadir GH: 2.34 ng/mL) and an elevated serum IGF-I level (307 ng/mL; normal range: 92-257 ng/mL). The patient was treated with monthly subcutaneous lanreotide injection and then GH excess was well controlled. Basal ACTH and F levels in blood were 40.6-63.4 pg/mL and 8.0-10.5 μg/dL, respectively. The urinary free cortisol (UFC) level was 53μg/day. Autonomous F excess was excluded by the level of midnight F (1.2 μg/dL) and the level of F (0.2 μg/dL) after a low-dose (1 mg) dexamethasone suppression test (DST). Case2; A 32-year-old man was diagnosed with MAS and gigantism at the Pediatrics Department at the age of 5 years. Treatment of GH excess was well controlled by monthly octreotide depot. He had no acromegaloid features and no cushingoid features. Café-au-lait macules were observed from the left flank to the back. Pituitary adenoma or hyperplasia was not detected by MRI. Basal ACTH and F levels in blood were 35.5-73.1 pg/mL and 7.0-11.7 μg/dL, respectively. The UFC level was 61μg/day. Autonomous F excess was excluded by the level of F (<0.2 μg/dL) after a low-dose (0.5 mg) DST.Possibility of primary adrenal insufficiency was excluded by ACTH stimulation test and/or insulin tolerance test in both cases. The involvement of 11β-HSD1 by GH excess and PC1/3 deficiency were also excluded. Gel exclusion chromatography was then performed. POMC and pro-ACTH were detected and the aberrant ACTH/normal ACTH ratio was 42% in both cases. **Conclusion:** This is the first report of the presence of aberrant ACTH precursors, particularly POMC, in MAS. A high ratio of circulating ACTH to F may suggest secretion of inactive ACTH precursors in MAS. Further investigations are required to determine whether *GNAS* mutations or other mechanisms are involved in the presence of aberrant ACTH precursors in MAS.

Genetics and Development (including Gene Regulation)

GENETICS AND DEVELOPMENT AND NON-STEROID HORMONE SIGNALING II

Crude Protein of Pyropia Yezoensis Protects Against Tumor Necrosis Factor-á-Induced Myotube Atrophy by Regulating the Mitogen-Activated Protein Kinase and Nuclear Factor-Kappab Signaling Pathways in C2C12 Myotubes

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MON-721

Proinflammatory cytokines induce ubiquitin-proteasome-dependent proteolysis by activating intracellular factors in skeletal muscle, leading to muscle atrophy. Therefore, we investigated the protective effect of *Pyropia yezoensis* crude protein (PYCP) on tumor necrosis factor (TNF)-α-induced muscle atrophy *in vitro*. Mouse skeletal muscle C2C12 myotubes were treated for 48 h with TNF-α (20 ng/mL) in the presence or absence of PYCP (25, 50, and 100 μg/mL). PYCP at concentrations up to 100 μg/mL did not affect cell viability. Exposure to TNF-α for 48 h significantly decreased the diameter of myotubes, which was increased by treatment with 25, 50, and 100 μg/mL PYCP. PYCP inhibited TNF-α-induced intracellular reactive oxygen species accumulation in C2C12 myotubes. In addition,