

HTG falsely lowers Na level, by affecting the percentage of water in plasma. Identifying this condition is important to prevent possible complications from aggressive treatment. This can be corrected either by using direct ion-specific electrodes or with the formula: Na change = TG \* 0.002. DKA is associated with mild-moderate HTG in 30–50% cases. This is due to insulin deficiency causing activation of lipolysis in adipocytes & decreased activity of lipoprotein lipase (LPL). However, severe HTG is a rare complication of DKA, increasing the risk of AP. Diagnosis of AP in DKA poses many challenges: the common presenting complaint of abdominal pain, non-specific hyperlipasemia in DKA. AP with DKA has also been associated with normal lipase levels. A high clinical index of suspicion is required to diagnose HTGP in patients with DKA.

## Reproductive Endocrinology

### FEMALE REPRODUCTION: BASIC MECHANISMS

#### *Activation of Endoplasmic Reticulum Stress Mediates Oxidative Stress-Induced Apoptosis of Granulosa Cells in Ovaries Affected by Endometrioma*

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#### MON-027

Endometriosis exerts detrimental effects on ovarian physiology and compromises follicular health. Granulosa cells of endometriosis patients are characterized by increased apoptosis, as well as high oxidative stress. Among several pathophysiologic factors associated with endometriosis, it is expected that oxidative stress contributes to the induction of apoptosis in granulosa cells, although the underlying mechanism remains unclear. Endoplasmic reticulum (ER) stress, a local factor closely associated with oxidative stress, has emerged as a critical regulator of ovarian function. We hypothesized that ER stress is activated by high oxidative stress in granulosa cells in ovaries with endometrioma and mediates oxidative stress-induced apoptosis. Ovaries from patients with endometrioma and control were collected to determine apoptosis, oxidative stress and ER stress by TUNEL, immunohistochemical staining of 8-OHdG and ER stress sensors, respectively. Human granulosa-lutein cells (GLCs) obtained from IVF patients were cultured with H<sub>2</sub>O<sub>2</sub> (an oxidative stress inducer) or tauroursodeoxycholic acid (TUDCA, an ER stress inhibitor in clinical use) to assess apoptosis and ER stress by quantitative PCR and FACS. Activity of pro-apoptotic factors was determined by caspase-8 activity assay and western blotting for cleaved caspase-3. Human GLCs from patients with endometrioma expressed up to two times higher level of mRNAs associated with the unfolded protein response (UPR), including ATF4, ATF6, the spliced form of XBP1, HSPA5, and CHOP. In addition, the levels of phosphorylated ER stress sensor proteins, IRE1 and PERK, were elevated. Given that ER stress results in phosphorylation of ER stress sensor proteins and induces UPR factors, these findings indicate that these cells were under ER stress. H<sub>2</sub>O<sub>2</sub> increased expression of UPR-associated mRNAs in cultured human GLCs, and this effect was abrogated by pre-treatment with TUDCA. Treatment with H<sub>2</sub>O<sub>2</sub> increased apoptosis and the

activity of pro-apoptotic factors caspase-8 and caspase-3, both of which were attenuated by TUDCA. Our findings suggest that activated ER stress induced by high oxidative stress in granulosa cells in ovaries with endometrioma mediates apoptosis of these cells, leading to ovarian dysfunction in endometriosis patients. Targeting ER stress with currently clinically available ER stress inhibitors, or with these agents in combination with antioxidants, may serve as a novel strategy for rescuing endometriosis-associated ovarian dysfunction.

## Pediatric Endocrinology

### PEDIATRIC OBESITY, THYROID, AND CANCER

#### *The Clinical and Endocrinologic Manifestations of Craniopharyngioma in Taiwanese Pediatric Population: One Medical Center Experience*

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#### MON-091

**Introduction:** Craniopharyngioma is a rare tumor located in the suprasellar region. Due to the unique tumor location, hypothalamic-pituitary axis dysfunction is usually presented in these patients. The major symptoms are headache, visual impairment, increased intracranial pressure, and endocrinologic abnormalities. However, diagnosis is often delayed because of slow growth of the tumor and subtle symptoms. Our aims are to describe the clinical and endocrinologic manifestations before the surgical resection of craniopharyngioma in Taiwanese pediatric population. **Method:** We retrospectively reviewed 42 pediatric patients of craniopharyngioma in a tertiary medical center between 1996 to 2019. The clinical parameter including the initial presentation, age at diagnosis, height, weight, pituitary gland function, tumor location, time to diagnosis, and pathology reports are collected and analyzed. **Results:** A total of 42 patients (24 boys and 18 girls) were included in the study. The mean age at diagnosis was 8.6 years, ranging from 1 to 16-year-old. The average time to diagnosis was 7.7 months and 15.9 months for the patients with and without neurological signs, respectively. The most common initial presentation is headache (25/42, 60%), followed by visual impairment (20/42, 48%) and short stature (13/38, 34%). If short stature was the only initial presentation, 4 (4/7, 57%) of them were diagnosed of craniopharyngioma because they developed subsequent neurological deficits during clinic follow-up. Pituitary function tests showed that 10 patients (10/25, 40%) had TSH deficiency and 8 patients (8/16, 50%) had central adrenal insufficiency. Image studies reported 26 patients with hypothalamic involvement and 4 patients without. All of 8 patients (8/37, 22%) with obesity had a tumor involving the hypothalamus. Pathology reports revealed 31 adamantinomatous type and only 1 papillary type. **Conclusion:** The study showed most (71 percent) of Taiwanese pediatric patients with craniopharyngioma presented with at least one endocrine dysfunction. Therefore, comprehensive pituitary evaluation for all patients with craniopharyngioma should be warranted. Furthermore, neurological signs and pituitary