prevalence of SCH was 4.3% without sex-difference. The median UIC level was 606.2 (19.9-16409.7) μg/L, higher in boys (684 vs. 545 μg/L, $P = 0.021$) than in girls. Iodine was deficient in 19 (4.3%), adequate in 96 (21.9%), mild excessive in 170 (38.7%), and severe excessive in 145 (35.1%). After excluding 19 iodine deficient children, the relationship between iodine status and thyroid function was evaluated by multiple regression analysis after adjusting for age, sex, birth weight, gestational age, body mass index Z-score, and family history. As iodine status increased from adequate, mild excessive to severe excessive group, T3 levels decreased, and TSH levels increased with marginal significance (P for trend < 0.1 for T3 and TSH). When stratified by sex, similar association was found in only girls (P for trend = 0.043 for T3, and 0.062 for TSH) but not in boys, and mild excessive group showed lower free T4 levels ($\beta = -0.05$, $P = 0.013$) and severe excessive group had lower T3 levels ($\beta = -7.04$, $P = 0.035$) than iodine adequate group in only girls, but not in boys. **Conclusion:** Iodine was deficient in 4.3%, adequate in 21.9%, and excessive in 73.8% among preschool children residing in South Korea. As iodine status increased from adequate to excessive group, TSH levels increased with decreasing free T4 and T3 levels in girls.

Pediatric Endocrinology

PEDIATRIC ENDOCRINOLOGY: ADRENAL, THYROID, AND GENETIC DISORDERS

Risk of Complications in Children With Adrenal Insufficiency and Covid-19

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Background: Adrenal insufficiency may put a person at higher risk with infections due to a lack of normal stress response by the body. Limited data has been available in pediatric adrenal insufficiency with Covid-19 **Methods:** We used TriNetX, with a large COVID-19 database, collecting real-time electronic medical records data. We compared children (0-18 years) who were diagnosed with Covid-19 with and without Adrenal insufficiency. This database collected information from 54 health care organizations **Results:** Mortality rate in children with Covid-19 and Adrenal insufficiency was 2.246% (19/846). Mortality rate in children with Covid-19 without adrenal insufficiency was 0.097 % (244/252211). Relative risk of mortality for children with Covid-19 and Adrenal insufficiency was 23.2 with a p value of < 0.0001. Endotracheal intubation rate in children with Covid-19 and Adrenal insufficiency was 1.418% (12/846). Endotracheal intubation rate in children with Covid-19 without Adrenal insufficiency was 0.065% (165/252211). Relative risk of endotracheal intubation for children with Covid-19 and Adrenal insufficiency was 21.68 with a p value of < 0.0001. Sepsis rate in children with Covid-19 and Adrenal insufficiency was 6.974% (59/846). Sepsis rate in children with Covid-19 without Adrenal insufficiency was 0.274% (691/252211). Relative risk of sepsis for children with Covid-19 and Adrenal insufficiency was 25.45 with a p value of < 0.00001. **Conclusion:** Mortality rate, endotracheal and sepsis showed increased association in children with Adrenal insufficiency and Covid-19 versus children with Covid-19 and no Adrenal insufficiency. Further studies with larger sample size are needed to study complication rates of Covid-19 and Adrenal insufficiency.

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PEDIATRIC ENDOCRINOLOGY: ADRENAL, THYROID, AND GENETIC DISORDERS

The Association of Insulin-Like Growth Factor-1 With Bone Mineral Density in Survivors of Childhood Acute Leukemia

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Background: The purpose of the current study is to investigate bone mineral deficit of children in survivors of childhood acute leukemia and examine the association of insulin-like growth factor-1 (IGF-1) with bone mineral density (BMD) status and the presence of osteoporosis. **Methods:** In a cross-sectional study of children diagnosed with different types of acute leukemia at age between 6 months and 18 years, serum IGF-1 and IGFBP-3, were assessed in relation to lumbar spine BMD (LSBMD) by using dual-energy x-ray absorptiometry and non-traumatic vertebral fracture by lateral thoracolumbar spine radiographs. Standard deviation scores (SDS) were calculated based on the age- and gender-adjusted population mean. **Results:** Among 189 children after completion of acute leukemia treatment, 22 (11.6%) children had LSBMD SDS less than -2.0 while 80 (42.3 %) children were diagnosed with osteoporosis. Mean areal BMD and LSBMD SDS of the subjects were 0.862±0.197 g/cm^2 and -0.6±1.6, respectively. IGF-1 and IGFBP-3 were lower in children with LSBMD lower than -2.0 (P<0.05) and those with osteoporosis (P<0.05). LSBMD SDS showed linear correlation with serum IGF-1 (P=0.041). Low serum IGF-1 level (OR=0.724, P=0.042) and elder age of leukemia diagnosis (OR=1.089, P=0.023) were suggested risk factor of the occurrence of osteoporosis. **Conclusions:** Substantial number of survivors from childhood acute leukemia undergo bone mineral deficits, and serum IGF-1 status could be a prognostic factor associated with bone mass acquisition and future occurrence of osteoporosis.

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PEDIATRIC ENDOCRINOLOGY: ADRENAL, THYROID, AND GENETIC DISORDERS

The Effects of Conditioning Regimen on Thyroid Function After Hematopoietic Stem Cell Transplantation in Children: 2-Year Short Term Follow Up

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Background: Long term effect of conditioning regimen such as Total body irradiation (TBI) and chemotherapy has been studied. However short term effect of conditioning regimen on endocrinologic system was not well known. Purpose. Our study aimed to evaluate the effect of conditioning regimen on thyroid function in children who had HSCT after 2 years. **Methods:**. Date was obtained from retrospective review of medical records who treated malignant hematologic disease and transplanted hematopoietic stem cell in Seoul St. Mary's hospital from January 1, 2010 to August 31, 2018. Among 563 patients who underwent HSCT for about 9 years, we studied 150 patients who conforming to inclusion criteria of this study. Thyroid function was tested before HSCT and follow 12 and 24 months. Anthropometric date, duration of chemotherapy, history of relapse, graft versus host disease (GVHD) were also analyzed. **Results:** In patient's characteristics, median age at HSCT was 10.49 (0.89 - 19.29) years. Out of 150 patients, male was 92 and female was 58. Acute lymphoid leukemia (ALL) was 74, acute myeloid leukemia (AML) was 76. Among them, busulfan based conditioning was done in 53 patients, TBI based conditioning regimen used in 72 and 25 patients had done TBI with busulfan based conditioning regimen. Fifteen patients (12.5%) had thyroid dysfunction after 2 years of HSCT (4 euthyroid sick syndrome, 11 subclinical hypothyroidism and 1 high T4 syndrome). Incidence of thyroid dysfunction by conditioning regimen was different at 2 years after HSCT, higher in TBI with busulfan based group (p = 0.033). In univariate regression analysis, using conditioning regimen, by TBI with busulfan was risk factor of thyroid dysfunction at 2 years after HSCT. **Conclusions:** TBI with busulfan based group showed higher incidence of thyroid dysfunction and conditioning regimen was risk factor of thyroid dysfunction at 2 years after HSCT.

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PEDIATRIC ENDOCRINOLOGY: ADRENAL, THYROID, AND GENETIC DISORDERS

The Relationship Between Iodine Status and Thyroid Function in Congenital Hypothyroidism With Eutopic Thyroid Gland

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Background: We investigated the relationship between iodine status and thyroid function in children with congenital hypothyroidism (CH) with eutopic gland. We also evaluated whether the presence of iodine organification defect (IOD) or pathogenic genetic variants affects the association between iodine status and thyroid function. **Methods:** A total of 31 children (14 boys) with CH participated in the study, who repeatedly underwent thyroid function test and urine iodine concentration (UIC) without levothyroxine (LT4) medication after 3 years of age (1-5 times per patient). After confirming eutopic gland, IOD was demonstrated by the positive perchlorate discharge test with a discharge rate >10%. Genetic analysis was performed using targeted gene sequencing including 23 genes. **Results:** We identified likely pathogenic or pathogenic variants in 14 cases (45.2%): 1 case with triallelic (digenic) variants (*DUOX2* and *TSHR*), 4 cases with biallelic variants (3 *DUOX2* and 1 *TSHR*), and 9 cases with monoallelic variants (7 *DUOX2*, 1 *DUOXA2*, and 1 *TSHR*). Among 26 cases treated with LT4 from neonatal period, thyroid function after LT4 discontinuation was euthyroid (n = 7), subclinically hypothyroid (n=15), and overtly hypothyroid requiring LT4 (n = 3). The other 5 cases without LT4 treatment remained subclinical hypothyroid. After excluding 2 cases with *TSHR*, 29 cases (with 72 samples) were included to analyze the relationship between iodine status and log-transformed TSH (log-TSH) using generalized estimating equation models. The positive IOD (n = 17) was not associated with presence of *DUOX2/DUOXA2* variants (n = 12). Iodine status of urine samples was categorized into adequate (UIC < 300 μg/L, n = 25), mild excessive (UIC = 300-599 μg/L, n = 14), and severe excessive (UIC ≥ 600 μg/L, n = 33) groups. When stratified by the presence of IOD, log-TSH significantly increased in severe excessive group (β = 0.52, P = 0.014 *vs.* iodine adequate group) among negative IOD group, but rather decreased in mild excessive group (β = -0.84, P < 0.001 *vs.* iodine adequate group) among positive IOD group. Meanwhile, when stratified by the presence of *DUOX2/DUOXA2* variants, no significant association was found between iodine status and log-TSH levels. **Conclusion:** *DUOX2* mutation was most common in CH patients with eutopic gland. The relationship of iodine status with thyroid function differed by presence of IOD.

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PEDIATRIC ENDOCRINOLOGY: ADRENAL, THYROID, AND GENETIC DISORDERS

The Relationship of Early Adiposity Rebound With Accelerated Bone Age and Breast Development in Girls: A Prospective Cohort Study

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Introduction: Adiposity rebound (AR) refers to the increase in body mass index (BMI) that follows the BMI nadir in childhood. Earlier AR increases the likelihood of being overweight/obese and may lead to early pubertal advancement, especially in girls. We aimed to evaluate the longitudinal changes in anthropometrics, bone age (BA), and breast development in relation to AR timing in girls.