microvascular complications and worse measured cardiovascular markers. Also, T2D patients with vitamin D deficiency had significantly higher HbA1c which were non-significant when adjusted for related variables.

Reproductive Endocrinology

MALE REPRODUCTIVE HEALTH THROUGHOUT THE LIFESPAN

Gene Dosage Changes in RBFOX-2 Can Affect Upper and Lower Tract Genitourinary Development

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Searching for genetic and genomic alterations in patients with genitourinary (GU) birth defects can aid in the identification of genes that are important for normal GU development. Using data in DECIPHER, *RBFOX-2,* located at 22q12 was identified as one such candidate gene and the effect of haploinsufficiency in humans and a mouse model (*Rbfox-2*$^{\alpha/+}$) assessed. RBFOX2 is an RNA-binding protein regulating alternative splicing. It also impacts steroid receptor transcriptional activity. RBFOX family members are thought to affect different developmental programs via isoform-specific localization and splicing activities. RBFOX-2 plays a vital role in multiple developmental processes including heart, brain, muscle and testis development. "Non-syndromic" patients with congenital GU anomalies were more likely to harbor *RBFOX-2* CNVs (2.4%; hypospadias, 21% cryptorchidism, 29% vesicoureteral reflux and 29% ureteropelvic junction obstruction) relative to the general population (0.11%) indicating that 22q12 is a hotspot genetic locus for GU anomalies. CNVs (microdeletions and microduplications) spanning *RBFOX-2* were identified in twenty-seven humans with a wide range of birth defects(intellectual disability, CNS, cardiac, genitourinary, facial, hearing, vision, growth and stature anomalies) and the phenotype of the haploinsufficient *Rbfox-2*$^{\alpha/+}$mouse model closely correlated with the human phenotype, although *Rbfox-2*$^{\alpha/+ \text{ and }}$ *Rbfox-2*$^{\alpha/\alpha}$ are neonatal lethal. By E18.5 day of development 100% of the *Rbfox-2*$^{\alpha/+}$ and null fetuses exhibited hypospadias, megacystis (50%) and bilateral hydroureteronephrosis. RNA Seq was performed on genital tubercles from three *Rbfox2fl/fl, Gdf9 icre+* and three *Rbfox2fl/fl* P1 males. 377 genes were differentially expressed between the two groups including 212 genes which were upregulated and 165 genes which were downregulated. Hallmark gene set analysis revealed downregulation of Wnt/β-catenin signaling and hedgehog signaling, both pathways which are well defined in genital development. Gene ontology (GO) analysis further defined downregulation of pathways (fibroblast growth factor, retinoic, androgen, estrogen and G-protein receptor signaling) including those involving negative regulation of embryonic development, epithelial development, morphogenesis of epithelial tube, renal, ureter, limb and several other developmental pathways. These results support the hypothesis that loss of Rbfox2 during development leads to hypospadias through impaired development of the urethral epithelium.

Bone and Mineral Metabolism

OSTEOPOROSIS: DIAGNOSIS AND CLINICAL ASPECTS

Opportunistic Screening with Abdominal CT in Patients with Diabetes Can Identify Those at High Risk of Osteoporosis and Osteopenia

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SUN-380

Background: Diabetes mellitus (DM) increases the risk of fracture at any given bone mineral density (BMD). However, the optimal strategy for osteoporosis screening with DXA is unknown in those with DM. A previously described strategy in the general population known as "Opportunistic Osteoporosis Screening" uses computer tomography (CT) images done for other reasons to assess the attenuation (density) of L1 in Hounsfield units (HU)—this was found to correlate with DXA-derived T-score. However, neither the methodology nor the cut-points have been specifically validated in those with DM. Thus, the goal of this study was to examine the performance of this methodology and define thresholds corresponding with low BMD in those with DM.

Methods: This was retrospective study using electronic medical record data. Patients with DM were identified by ICD code. Those with both abdominal CT and DXA within a 6-month period were included, excluding patients with CKD stage 5, solid organ transplantation, bariatric surgery, or L1 hardware. L1 attenuation, measured by 2 readers on sagittal view, were averaged. A different reader assessed for vertebral fractures. Fractures of the hip, forearm, humerus, and pelvis were identified by ICD code. The lowest T-score of lumbar spine, femoral neck, total hip, or forearm (available in 11 subjects) was used to compare to L1 attenuation. ROC curves were derived from univariate logistic regression.

Results: 320 subjects met study criteria; 10 (3.2%) had vertebral fractures, 8 (2.6%) had prior major non-vertebral fracture, and 33 (10.3%) had osteoporosis by BMD.

The 18 subjects with major fractures had lower T-scores (-2.3 ± 1.4 vs. -0.8 ± 1.4, p<0.001) and lower L1 attenuation (104 ± 46 vs. 149 ± 47 HU, p<0.001). T-score and L1 attenuation had similar discrimination for prior fracture by area under the ROC curve (0.77 vs. 0.76, p=NS). Moderate osteopenia (T-score -1.5 or less) and L1 attenuation of 130 HU or less had identical sensitivities (72.2% for both) and similar specificities (69.2% vs. 62.5%, respectively) for prior fracture.

In regards to L1 attenuation corresponding to DXA diagnosis of osteoporosis, 160 HU was 94% sensitive, while 110 HU was 80% specific. This is similar to the 90% sensitivity

for 160 HU and 90% specificity for 110 HU previously reported in the general population. Given higher fracture risk in DM, moderate osteopenia (n=106) was also examined as an outcome: 130 HU was 61% sensitive and 71% specific. This threshold had similar or improved sensitivity and specificity among subgroups of insulin users, men, and women under age 65.

Conclusion: Our results validate the use of opportunistic osteoporosis screening in patients with DM, which could help clinicians decide on the need for screening DXA. Patients with diabetes and L1 attenuation below 130 HU on CT scan should be considered for DXA screening to formally assess the risk of fracture.

Bone and Mineral Metabolism

BONE AND MINERAL CASE REPORTS II

Early Diagnosis and Management of Bilateral Transient Osteoporosis of the Hip in Pregnancy

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MON-351

Introduction: Transient osteoporosis of the hip (TOH) in pregnancy is a rare and under-reported condition. It is clinically characterized by a sudden onset of hip pain in young females without any history of systemic disorders or traumatic injuries (1). Bilateral involvement of the hips, such as in this case report, is less common than unilateral involvement.

Clinical Case: A 33 year old G2P1 female presented to the hospital at 30 weeks gestation for described sharp, bilateral inguinal pain, greater on the left than right, worse with movement, and with progressive difficulty ambulating, of three weeks duration. She had no significant PMH, notably denying thyroid or calcium disorder, nephrolithiasis, osteoporosis, or steroid treatment. She denied tobacco, alcohol, or illicit substance usage. She only took prenatal vitamins. On physical examination, she had reduced active and passive range of motion of both hips, but normal muscle strength and no signs of infection or neurological deficits. Labs including CMP, LFTs, and TFTs were within normal range. 24 hour urine free cortisol was 54 mcg/24h (normal 3.5-45mcg/24h); repeat post-partum was 21 mcg/24h. 25OH-D was 18.3 ng/mL. MRI without contrast demonstrated "extensive abnormal marrow edema within the left femoral head and neck and small effusion, suspicious for transient osteoporosis of the hip. A subtle small focus of edema on the right was also noted. No discrete fracture line or subchondral collapse was noted."

The patient was managed conservatively with analgesics, thromboprophylaxis, and education regarding reduction of weight bearing activities, rest, and mobility aids with crutches. She was started on vitamin D. Her bilateral hip pain resolved by the 38th week. She had an uncomplicated cesarean delivery at 39 weeks to a healthy male neonate. At the one-month postpartum visit, she was ambulating independently without difficulty. She denied further pain, and passive and active ROM were intact without tenderness.

Conclusion: TOH in pregnancy is usually a self-limiting disorder with no obvious etiology (2). It can present unexpectedly in the third trimester or early postpartum period in a healthy female with an otherwise uneventful pregnancy. In rare instances where fractures of the affected hip occur, surgical intervention may be necessary. MRI has become the diagnostic tool of choice for early diagnosis of TOH. Early diagnosis and optimal management are essential to prevent major complications such as traumatic fractures and deep vein thrombosis, as well as to prevent stress for the mother during the course of pregnancy.

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Bone and Mineral Metabolism

CLINICAL ASPECTS OF OSTEOPOROSIS AND VITAMIN D ACTION

Potential Relationship Between Hypothyroidism and Bone Loss at Dental Implants

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MON-397

Introduction: Hypothyroidism (HT) is an endocrine condition with autoimmune and inflammatory etiologies. Studies have shown that both periodontal disease and peri-implant bone loss are bidirectionally influenced by systemic inflammatory conditions, such as diabetes, adverse pregnancy outcomes, cardiovascular disease, and osteoporosis.[1] There also is evidence that HT is associated with decreased bone metabolism, depressed bone turnover, and a prolonged bone remodeling cycle.[2] Consequently, the objective of this study was to determine if the severity of bone loss around dental implants is related to the presence of HT.

Methods: Following IRB approval, medical, dental, and radiographic records of patients who received dental implant placement at a university-based postgraduate program in periodontics from 2000–2017 were reviewed (1480 implants; 635 patients). Rate of bone loss in mm/year was calculated from surgical implant placement and subsequent re-evaluation radiographs, with correction for radiographic distortion. Presence of HT was confirmed by review of patient medical records, clinical diagnosis of HT, and history of thyroid hormone supplementation. Populations were adjusted for smoking, diabetes, use of systemic steroids, presence of autoimmune disease (other than HT), and systemic inflammatory conditions. Calculations were performed using IBM SPSS Statistics v25.

Results: Patients with HT had a decreased rate of crestal alveolar bone loss around dental implants. Specifically, patients with HT experienced peri-implant bone loss at a rate of 0.42 mm/year, while bone loss from patients without HT was 1.34 mm/year (68.7% decrease; mean difference = 0.92 mm/year, 95% confidence interval = 0.39–1.50 mm/year, $P<0.002$). There were no significant differences in patient oral hygiene, or in implant service time, among any of the groups studied ($P>0.05$).