

hypercalcemia and/or hypercalciuria as well as decreased bone density. Agents that decrease bone resorption are highly effective. Providers caring for children on this diet should be aware of such potential association. **Reference:** Hawkes CP, Levine MA. Ketotic hypercalcemia: a case series and description of a novel entity. *J Clin Endocrinol Metab.* 2014 May;99(5):1531-6.

Tumor Biology

TUMOR BIOLOGY: DIAGNOSTICS, THERAPIES, ENDOCRINE NEOPLASIAS, AND HORMONE DEPENDENT TUMORS

Altitude as the Second Hit on the Appearance of Paragangliomas

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Paragangliomas are rare neuroendocrine tumors with a high degree of inheritance. These neoplasms arise from the extra-adrenal autonomic paraganglion and can secrete catecholamines. Many patients debut with symptoms of hypertensive crisis, tachycardia, dyspnea, headache and intense sweating. However, many tumors that are derived from the parasympathetic system are asymptomatic. Supported on the genetic basis are classified into two conglomerates: conglomerate I are those that have mutations and alter the response to hypoxia. Cluster II has a more syndromatic component, with alteration in the function of complex signaling pathways. A study based on histopathological diagnoses was carried out between 2007 and 2017 at a hospital in Bogotá (Colombia) 2600 meters above sea level, which documented 108 cases of paragangliomas that were predominantly located at the carotid level (76%), with a 4.7:1 ratio between women and men. 93.2% of the patients came from geographical locations with heights above 2,500m above sea level. Most of the tumors were asymptomatic. We draw attention to the fact that paragangliomas are probably more frequent than clinically diagnosed and the influence of the environment on the development of these tumors is highlighted, with a special contribution of oxygen pressure as a second event that contributes to the formation of the tumor.

Diabetes Mellitus and Glucose Metabolism

CLINICAL AND TRANSLATIONAL STUDIES IN DIABETES

Prevalence of Non-Alcoholic Fatty Liver Disease and Liver Fibrosis in Patients with Type 2 Diabetes Mellitus

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Non-alcoholic fatty liver disease (NAFLD) is the most common chronic liver disease. The more severe form is non-alcoholic steatohepatitis (NASH) which can progress to liver fibrosis, cirrhosis, and hepatocellular carcinoma (HCC). NASH is more common in patients with type 2 diabetes mellitus (T2DM). However, its true prevalence in unselected patients with T2DM in the United States remains unknown. In 2019, the American Diabetes Association recommended screening for NASH and liver fibrosis in all patients with T2DM with steatosis and/or elevated ALT. Screening focuses on liver fibrosis as associated with increased risk of cirrhosis and HCC. Still, a liver biopsy remains the gold standard to accurately assess the severity of liver disease. The aim of this study was to determine the prevalence of liver fibrosis in unselected patients with T2DM presenting to primary care or endocrinology clinics at a university hospital in the US. Secondary outcomes were to assess the prevalence of steatosis controlled attenuation parameter (CAP) and performance of vibration-controlled transient elastography (VCTE) as a non-invasive tool to identify patients with significant liver fibrosis. Patients with T2DM between ages of 21-79 and without a history of alcohol intake or other causes secondary causes of NAFLD were recruited for the study. Participants underwent screening for NAFLD at the time of their clinic visit by means of point-of-care CAP and VCTE. Initial evaluation also included obtaining patient demographics, routine chemistries, and fasting samples (on visit #2 if not fasting initially) for metabolic measurements and fibrosis biomarkers. Liver biopsies were offered to patients with a liver stiffness measurement (LSM) ≥ 8.0 kPa (i.e., highly likely to have moderate-to-severe fibrosis or $\geq F2$), or those with ≥ 7 kPa if AST ≥ 20 and had an APRI and/or FIB-4 score suggestive of being at high-risk of liver fibrosis (i.e., at least mild-to-moderate fibrosis or $\geq F1$). A total of 469 patients were recruited (age 59 ± 12 ; 56% females; 60% non-Hispanic whites, 30% African Americans, 4% Asian; BMI 33 ± 6 Kg/m²; A1c $7.5 \pm 1.7\%$; FPG 143 ± 60 mg/dL; AST 22 ± 11 U/L; ALT 24 ± 17 U/L; triglycerides 156 ± 151 mg/dL; LDL-C 88 ± 37 mg/dL; HDL-C 47 ± 13 mg/dL). The prevalence of NAFLD by CAP (≥ 280) was 67% with a mean CAP of 305 ± 3 . The prevalence of any fibrosis was 24% patients. Among those with fibrosis, 15% had moderate-to-severe fibrosis or $\geq F2$. In those that underwent a liver biopsy, 61% had moderate-to-severe fibrosis (F2-3). Our ongoing study demonstrates the high prevalence of liver steatosis and fibrosis in patients with T2DM. NASH is a common but under-recognized complication of T2DM that requires greater awareness among clinicians taking care of patients with diabetes. While the optimal screening strategy remains unclear, an approach based on plasma biomarkers and CAP/VCTE deserves further exploration moving forward.

Reproductive Endocrinology

HYPERANDROGENISM

Developmental Programming: Prenatal Testosterone Treatment Induced Metabolic Defects May Involve Premature Cellular Senescence

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