Trichrome staining). The post burn scars formed in 11β-HSD1 knockout mice demonstrated different skin elastic properties compared to those formed in wildtype mice. In wildtype mice application of scaffolds loaded with inactive glucocorticoid (prednisone) significantly impacted wound healing demonstrating the feasibility of using enzyme substrates to improve wound outcomes.

The findings demonstrate the importance of skin 11β-HSD1 in wound healing and scarring after burn injury and indicate ways in which excessive scarring might be prevented.

Neuroendocrinology and Pituitary
PITUITARY AND NEUROENDOCRINE CLINICAL TRIALS AND STUDIES

Lower Oxytocin Levels Are Associated with Lower Bone Mineral Density and Less Favorable Hip Geometry in Hypopituitary Men

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Introduction: Hypopituitary patients are at risk for bone loss. Oxytocin (OT) and vasopressin (VP) are hypothalamic-posterior pituitary hormones with opposing actions on bone (anabolic and catabolic, respectively). Whether OT and/or VP contribute to impaired bone homeostasis in hypopituitarism is unknown.

Hypothesis: We hypothesized that lower plasma OT and higher VP levels would be associated with lower bone mineral density (BMD) and less favorable hip geometry and estimated strength in men with hypopituitarism.

Design: We performed a cross-sectional study of 37 men with hypopituitarism ages 20–60 (mean±SEM 45.8±1.9) years: 20 with anterior pituitary deficiencies only (APD) and 17 with central diabetes insipidus (CDI; marker of posterior pituitary dysfunction), of similar age, body mass index and number of adenohypophyseal deficiencies, on stable hormone replacement. Main outcome measures were fasting plasma OT and VP levels, and dual X-ray absorptiometry-derived BMD (lumbar spine, total hip, femoral neck, distal radius and subtotal body) and hip structural analysis (HSA; cortical thickness, section modulus, and buckling ratio at narrow neck, intertrochanteric region and femoral shaft). All analyses were adjusted for multiple comparisons using Holm-Bonferroni correction.

Results: Mean BMD Z-scores were lower at all sites and all HSA parameters at the intertrochanteric region as well as cortical thickness at the femoral shaft were less favorable in those participants who had fasting OT levels below the median than in those with higher levels ($P \leq 0.022$). There were no differences in any bone variables at any skeletal site in those with fasting VP levels below vs. above the median ($P \geq 0.232$). Lower fasting OT levels were positively associated with (1) lower BMD Z-scores at the lumbar spine, femoral neck, total hip and subtotal body ($P \leq 0.02$) and (2) less favorable hip geometry and strength variables (lower cortical thickness, lower section modulus and higher buckling ratio) at the intertrochanteric region in CDI ($P \leq 0.018$), but not APD participants ($P \geq 0.458$ and $P \geq 0.429$, respectively). The associations between OT and bone variables remained significant after adjusting for key determinants of BMD including lean body mass and IGF-1 levels. There were no relationships between plasma VP levels and bone variables in CDI or ADP groups ($P \geq 0.173$).

Conclusions: OT, but not VP levels, are positively associated with BMD at multiple sites as well as favorable hip geometry and estimated strength in men with hypopituitarism and CDI. Future studies will be important to determine whether OT could be used therapeutically to optimize bone health in patients with hypopituitarism.

Adrenal
ADRENAL - HYPERTENSION

Pheochromocytoma and Paraganglioma: An Emerging Cause of Secondary Osteoporosis

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Context: Many endocrine diseases are known to cause secondary osteoporosis, which is potentially reversible by treatment of the underlying disease itself. Pheochromocytoma (PHEO) and paraganglioma (PGL) (PHEO and PGL: PPGLs) are the rare catecholamine-producing neuroendocrine tumors, which are associated with low bone mineral density (BMD). However, PPGLs have not been recognized as a cause of secondary osteoporosis. Indeed, even the prevalence of osteoporotic fracture in patients with PPGLs is currently unknown. Furthermore, whether surgical resection contributes to the improvement of BMD has never been addressed. **Objective:** This study was designed to evaluate 1) whether PPGLs increase the risk of vertebral fracture (VF), which is the most common type of osteoporotic fracture and 2) whether surgical resection of PPGLs contributes to the improvement of BMD. **Design and Settings:** A retrospective cross-sectional study in a single referral center. **Participants:** Among 443 patients with adrenal tumor (AT), we included 62 patients with histologically confirmed PPGLs and 61 patients with non-functional AT. **Intervention:** The prevalence of VF was examined in 49 out of 62 patients with PPGLs and 61 patients with non-functional AT. In 23 out of 62 patients with PPGLs, BMD was evaluated at baseline and after