

RESULTS: In a 12-week period, 98 women were seen in CF clinic. Of women 18 - 50 years old with CF and a documented DXA, 37 women were not taking estrogen supplement (mean age 30.8 ± 5.9 years) and 6 women were taking low-dose estrogen (mean age 30.4 ± 7.1 years). There were not statistically significant differences in other baseline characteristics known to modify CFBD. Women not taking estrogen had higher lumbar spine z-score: -0.04 ± 1.0 , compared to women taking low-dose estrogen, z-score: -0.7 ± 0.5 (p-value 0.01). Women not taking estrogen had higher BMD at the lumbar spine: 1.02 ± 0.1 g/cm², compared to women taking low-dose estrogen: 0.95 ± 0.1 g/cm² (p-value 0.03). Similar trends were seen at the total hip and femoral neck (p-values > 0.05).

DISCUSSION: In this retrospective single-center chart review, women not taking estrogen supplement compared to women taking low-dose estrogen supplement had higher BMD. This was statistically significant at the lumbar spine, the DXA site with mostly trabecular bone. Estrogen deficiency causes trabecular bone loss, which can be restored with estrogen supplementation. These findings raise concern that low-dose estrogen supplementation for women with CF is inadequate for optimal bone accrual and may be detrimental. The ideal route and dose of estrogen supplementation for skeletal health of premenopausal women with CF still needs to be clarified.

REFERENCES: CFF Patient Registry 2017; Aris *JCEM* 2005; Ackerman *JCEM* 2019; Anabtawi *JCF* 2019; Hughan *JCF* 2019

Tumor Biology

TUMOR BIOLOGY: GENERAL, TUMORIGENESIS, PROGRESSION, AND METASTASIS

Localization and Treatment of the Ectopic ACTH Syndrome Using Somatostatin Analogues

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Localization and Treatment of the Ectopic ACTH Syndrome using Somatostatin Analogues

Ectopic ACTH syndrome (EAS) is a rare disorder with a high morbidity and mortality due to the sequelae of severe hypercortisolism and possible underlying carcinoma. It is caused by various tumors, some originating from neuroendocrine cells. Optimal management includes localization and removal of the ectopic ACTH source. About 80% of these tumors have somatostatin (SS) receptors, so that SS analogues may be useful in the localization and treatment. This case demonstrates the use of SS analogues in localization and treatment of EAS.

A 49-year-old female presented with 7 months of worsening Cushingoid features including rounded plethoric face, full supraclavicular fat pads, facial hair growth, multiple bruises, violaceous abdominal striae, kyphoscoliosis, 4+ peripheral edema, weight gain, hypertension (190/110 mmHg) and thoracic compression fractures. AM plasma ACTH concentration was 333 pg/mL (nl = 6 - 58 pg/mL); serum concentration cortisol was 71.4 mcg/dL (nl = 7 - 23 mcg/dL) and serum potassium concentration was 1.2 mmol/L (nl = 3.6

- 5.1 mmol/L). A 24-hour urine cortisol could not accurately be obtained. High dose 8 mg overnight dexamethasone testing demonstrated suppression of serum cortisol concentration from 71.4 to 6.3 mcg/dL, suggesting pituitary Cushing disease. Pituitary MRI scan revealed a 2.5 mm disc shaped cystic focus suggesting a Rathke's cleft cyst. No central-to-peripheral ACTH gradient was present on bilateral inferior petrosal sinus sampling suggesting an ectopic ACTH source. There was a 1.2 x 1.0 cm nodule in the left lower lung lobe on CT chest. A gallium-68 dotatate PET/CT scan demonstrated enhancement of this same lung lesion and mild uptake in the left inferior hilum, suggesting a neuroendocrine lung tumor with possible metastases to lymph nodes. Biopsy and resection of the lesion was deferred until after control of her hypercortisolism. 30mg of Sandostatin LAR was started every 4 weeks to control the ectopic ACTH secretion and to confirm that the SS analogue positive lung lesion was the cause of the EAS. Sandostatin LAR therapy over the next 12 weeks resulted in a steady clinical and biochemical improvement with a decrease in serum cortisol to 9.7 mcg/dL, control of hypertension (108/64 mmHg), weight loss of 6 pounds, and resolution of supraclavicular fat pads, hypokalemia, and peripheral edema. This confirmed our impression that the neuroendocrine lung tumor was the ACTH source.

In summary, this patient with EAS had severe clinical manifestations of hypercortisolism and could not safely undergo surgical intervention. This case demonstrates the value of SS analogues (gallium-68 dotatate PET/CT and Sandostatin LAR) in localizing and confirming the source of ectopic ACTH production and markedly improving the clinical and biochemical features of the EAS.

Thyroid

THYROID DISORDERS CASE REPORTS I

Graves' Disease Newly Diagnosed in the Setting of Hypokalemic Periodic Paralysis in an HIV+ Patient.

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Abstract:

Relevance: A rare yet distinct cause of sudden onset paralysis is severe hypokalemia associated with thyrotoxicosis. This is thought to be associated with mutations in genes encoding cellular potassium channels. We report a case of acute onset paralysis with profound hypokalemia and a new diagnosis of Graves' thyrotoxicosis in a previously asymptomatic African American, HIV+ man on highly active antiretroviral therapy (HAART) for over 8 years.

Clinical case: A 49-year-old man with hypertension and HIV presented with acute paralysis of his bilateral upper and lower extremities. His initial potassium was 1.8 mEq/L (3.5-5.0). Prior to sudden onset loss of motor strength, he

denied any preceding palpitations, tremor, anxiety, diaphoresis, hyper-defecation, weight loss, heat or cold intolerance, neck pain, increase in neck girth or difficulty swallowing, proptosis or other ocular symptoms. He has no family history of thyroid disease. He had an enlarged palpable thyroid without nodules and no audible bruit. There was no periorbital edema or proptosis, and no signs of dermopathy. A thyroid ultrasound showed a hyperemic and diffusely enlarged thyroid gland without nodules. Labs included a TSH of 0.007 mCU/mL (0.43-3.8), Free T4 2.1 ng/dL (0.71-1.85), Total T3 229.6 ng/dL (58-194), and thyrotropin receptor antibody 2.6 IU/L (0-1.75). The CD4+ count was 146 in 2010 with a slow gradual rise to 673 in 2019, and HIV viral load was undetectable. There were no offending medications or supplements identified. With aggressive potassium repletion, the serum potassium improved to 4.6 mEq/L and he regained normal strength within several hours. He was started on Methimazole 10mg daily and propranolol 10mg TID. At one month, the thyroid function tests normalized. Methimazole 10mg daily was continued and propranolol was tapered off. He remains euthyroid. Genetic testing is pending.

Conclusions: Graves' disease is the most common thyroid disease triggered by immune reconstitution in HIV + individuals on HAART. The incidence of thyroid disease in HIV patients on HAART is higher in women and Africans with a 1.5-2 fold increase compared with the general population [Muller et. al, *Eur Thyroid J* 2019;8:173-185]. Despite a higher incidence of hyperthyroidism in women, over 95% of cases of hypokalemic periodic paralysis have been reported in men, with a 10-fold higher incidence among Asians compared to Westerners. There has been one prior case report of Thyrotoxic Periodic Paralysis in an HIV + patient and this was in a Polynesian male (Brown JD et al. *Hawaii Med J* 2007). To our knowledge, this is the first case report of an African American HIV+ patient with this disorder. An association with mutations in the Kir2.6 gene (encodes a potassium channel, is expressed in skeletal muscle, and is transcriptionally regulated by thyroid hormone) has been proposed [Ryan et. al, *Cell* 2010 January 8; 140(1):88-98].

Adipose Tissue, Appetite, and Obesity OBESITY TREATMENT: GUT HORMONES, DRUG THERAPY, BARIATRIC SURGERY AND DIET

Presence of Diabetes Diminishes the Ultimate Weight Loss After Bariatric Surgery

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MON-590

Background

Obesity and diabetes as well as their related complications result in both individual and global health burdens. Among

patients who present with both obesity and diabetes, bariatric surgery can lead to remission of both these diseases. However, the possible impact of diabetes on the magnitude of weight loss outcomes after bariatric surgery has not been quantified.

Methods

To address this question, we extracted data from Michigan Bariatric Surgery Cohort (MI-BASiC) to see whether diabetes at baseline could be a predictor of weight loss outcomes. Consecutive patients 18 years of age or older undergoing gastric bypass (GB) or sleeve gastrectomy (SG) for obesity at the University of Michigan between January 2008 and November 2013 were included in our retrospective cohort. All patients had either body mass index (BMI) > 40 kg/m² or BMI 35 – 39.9 kg/m² with comorbid condition. Firstly, we performed Generalized Linear Mixed Model (GLMM) analysis to compare the probability of achieving BMI under 30kg/m² or achieving excess body weight loss (EBWL) 50% or more for patients with or without diabetes. We then further tested the effect of presence of diabetes for the BMI outcomes across time using Linear Mixed Model (LMM) analysis. Finally, we conducted a LMM analysis to determine if diabetes is a predictor of the future weight loss, percentage of total weight loss or percentage of excess weight loss over 5 years of follow up.

Results

Based on our criteria, 380 patients were included for GB [female 305 (80.3%), mean age 43.6±0.6 years, mean BMI 47.3±0.4kg/m², diabetes 149 (39.2%), on insulin 45 (11.8%)] and 334 for SG [female 259 (77.5%), mean age 45.3±0.6 years, mean BMI 49.9±0.5kg/m², diabetes 108 (32.3%), on insulin 29(8.7%)]. From GLMM analysis, the presence of diabetes at baseline did not impact the probability of achieving BMI under 30kg/m² (p=0.0848), but substantially impacted the probability of achieving 50% or more EBWL (p=0.0021) with individuals without diabetes having a 1.6 (odds ratio 1.56, 95% CL [1.18-2.08]) times higher chance to achieve this threshold. We also showed that individuals with diabetes at baseline had a significant effect to modify BMI points lost, regardless of the surgery type (p=0.0178). The presence of diabetes at baseline diminished weight loss by 1.2 BMI points (95% CL [0.21- 2.20]) which is roughly 10 to 15% of the total BMI points to be lost. LMM analysis further confirmed that after adjusting the time, surgery type, age, gender and baseline weight, there was still a significant difference of absolute weight loss (p=0.0110), percentage of total weight loss (p=0.0089) and percentage of excess weight loss (p=0.0365) between individuals with diabetes versus individuals without diabetes.

Conclusion

In conclusion, our data demonstrate that diabetes diminishes the ultimate weight loss effect of bariatric surgery. Further research is needed to understand why this is the case.

Neuroendocrinology and Pituitary NEUROENDOCRINE & PITUITARY PATHOLOGIES

Improvement in Cardiovascular Risk Factors in Long Term Follow up of Hypopituitary Septagenarian and Octagenarian Patients

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