

with wild type (WT) mice, AT-EOS numbers were markedly increased in multiple fat depots from hEo2Tg mice, including subcutaneous white adipose tissue (sWAT). After 12 weeks of high-fat diet (HFD), hEo2Tg mice showed significantly less body weight gain and fat mass compared with WT littermates. These changes were associated with an improvement in glucose tolerance. We also found increased oxygen consumption and heat production in hEo2Tg mice under room temperature conditions. The increased thermogenesis was accompanied with an increased expression of browning genes such as Ucp1, Prdm16, Dio2 in sWAT from hEo2Tg HFD mice. So far, our data suggest that AT-resident EOS promote browning of sWAT. This, in turn, protects our animals against development of HFD-induced obesity and insulin resistance. Next, whole transcriptome mRNA sequencing and bioinformatic analyses were performed and showed a significant increase of myogenic differentiation 1 (Myod1) gene expression in hEo2Tg sWAT mice. This was confirmed by qRT-PCR. Myod1 is a key regulator of skeletal muscle differentiation. Given the shared features between brown fat and skeletal muscle, we speculate that by increasing Myod1 gene expression, (AT)-resident EOS mediate sWAT browning. Additional studies are needed to determine the molecular mechanism(s) underlying the regulation of Myod1 gene expression by AT-resident EOS and its effect on sWAT browning.

Reproductive Endocrinology

MALE REPRODUCTIVE HEALTH THROUGHOUT THE LIFESPAN

Effect of Testosterone Replacement Therapy Added to Intensive Lifestyle Intervention on Cognitive Functions in Frail, Older Veterans with Hypogonadism and Obesity: A Randomized Clinical Trial

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Background: Both hypogonadism and obesity are common in older men which might additively exacerbate their age-related decline in cognitive functions. We tested the hypothesis that the addition of testosterone replacement therapy to intensive lifestyle intervention would enhance the benefits of intensive lifestyle intervention on cognition in older men with hypogonadism and obesity.

Methods: Eighty-three older (age \geq 65 years) male veterans with obesity (BMI \geq 30 kg/m²) and evidence of persistently low AM testosterone (<300 ng/dl) associated with frailty (modified Physical Performance Test score <31) were randomized to six months of: 1) lifestyle therapy (diet-induced weight loss and supervised aerobic and resistance exercise training) + testosterone replacement therapy (LT+Test) or 2) lifestyle therapy + placebo (LT+Pbo). In this secondary analyses, outcomes were changes in cognition as assessed through comprehensive cognitive test battery (Modified Mini-Mental State Exam, Word Fluency Test, Trail Making Test Parts A and B Rey Auditory Verbal Learning Test, Stroop Color and Word Test, and Symbol

Digit Modalities Test). We used z scores of changes in the cognitive tests to assess changes in attention, memory, executive function, language, global, and composite cognitive functions in response to the lifestyle and hormonal interventions.

Results: After 6 months, body weight decreased similarly in the LT+Test group and LT+Pbo group (decrease of 9.7 kg vs. 10.3 kg, respectively; P=0.91) whereas testosterone levels increased more in the LT+Test than in the LT+Pbo group (increase of 324 ng/dl vs 88 ng/dl, respectively; P<0.001). Memory z-score increased more in the LT+Test group than in the LT+Pbo group (0.73 vs. 0.39, respectively; P=0.03). Moreover, attention z-score increased more in the LT+Test group than in the LT+Pbo group (0.89 vs. 0.38, respectively; P=0.01). On the other hand, changes in executive function z-score, language z-score, and global z-score did not significantly differ between the LT+Test group and LT+Pbo group (0.45 vs 0.37, 0.34 vs 0.07, and 0.55 vs 0.29, respectively; P=0.13 to 0.56). More importantly, the composite cognitive z-score obtained by averaging all z-scores from each domain increased more in the LT+Test group than in the LT+Pbo group (0.56 vs 0.27; P=0.003).

Conclusion: These findings suggest that in the specific population of older men with hypogonadism and obesity associated with frailty, testosterone replacement therapy can augment the positive effects on cognition from intensive lifestyle intervention by diet-induced weight loss and combined aerobic and resistance exercise.

Thyroid

BENIGN THYROID DISEASE AND HEALTH DISPARITIES IN THYROID II

Utilizing Patient Online Forums to Capture Experiences and Perceptions Associated with the Use of Desiccated Thyroid Extract

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Background: It is estimated that 10-25% of patients with hypothyroidism use desiccated thyroid extract (DTE) as their primary thyroid hormone replacement medication, despite concerns about the risk of thyrotoxicosis associated with DTE use. It is unclear why many patients prefer the use of DTE as a thyroid hormone replacement formulation

over guideline-concordant therapies such as levothyroxine (LT4). **Methods:** We conducted a mixed-methods study by analyzing patient-reported information from patient online forums to better understand patient preferences for and attitudes toward the use of DTE to treat hypothyroidism. We searched the 10 most popular patient forums based on number of users (*WebMD, Topix, Health questions, Patients like me, Drugs.com, Endocrine Web, Everyday Health, Talk Health Partnership, Spark People and Patients.info*) using the key terms: desiccated thyroid extract, desiccated thyroid treatment, thyroid USP, commercial names of DTE (Armour Thyroid® or Natural Thyroid®), thyroid extract, AND hypothyroidism. Unique posts were retrieved from those websites between each forum's inception to March 2018. From these posts, we extracted descriptive information on patient demographics and clinical characteristics and qualitatively analyzed posts' content to further explore patient perceptions on DTE and other thyroid hormone replacement therapies. **Results:** Unique 1,235 posts were initially retrieved from the included patient forums. After the initial screening, we selected data from three of these forums (*WebMD, Patients Like Me, and Drugs.com*) based on the completeness of the available information (673 posts). Nearly half (45%) of patients reported that a clinician initially drove their interest in trying DTE. Patients described many reasons for switching from a previous therapeutic approach to DTE, including lack of improvement in symptoms (58%) and the development of side effects (22%). Among a majority of patients, DTE was described as moderately-to-majorly effective overall (81%) and more effective than the previous therapy (77%). The most frequently described benefits associated with DTE use were an improvement in clinical symptoms (56%) as well as a change in overall well-being (34%). One-fifth of patients described side effects related to the use of DTE. Qualitative analysis of posts' content supported these findings and raised additional issues around the need for individualizing therapy approaches for hypothyroidism as well as difficulties obtaining DTE. **Conclusions:** Among patients with hypothyroidism, a subset may prefer DTE over guideline-concordant therapies for many reasons, including perceived effectiveness, despite the risks associated with DTE. Future work should incorporate patient-reported outcomes to better elucidate the mechanisms responsible for therapy preferences in this subset of patients.

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

A Case of Pseudoglucagonoma Syndrome Post Bariatric Surgery

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Introduction

Necrotizing migratory erythema (NME) is hallmark clinical finding of Glucagonoma, an islet cell tumor of the pancreas. NME can sometimes be seen in the absence of Glucagonoma, a condition referred to as

Pseudo-glucagonoma syndrome (PGS). We report a case of NME associated with severe nutritional deficiency.

Case

48 y/o female presented to dermatology clinic with diffuse itchy rash of 6 months duration. The rash started on the arms and spread to involve lower abdomen, legs and perioral area. It was unresponsive to both topical and high dose PO steroids. Biopsy of the rash showed confluent parakeratosis and mild spongiosis secondary to nutritional deficiencies vs NME. Her medical history was significant for Nissen fundoplication 20 years ago with a revision to Roux-en Y gastric by-pass, 6 years ago. She did not have a history of Diabetes or Inflammatory Bowel Disease. She was not on any vitamin supplementation, as she did not follow up for post bariatric care. On admission to the hospital for sepsis from secondary infection of the rash, diffuse erythematous, eczematous papules and plaques were noted on bilateral forearms, thighs, calves, buttocks and ankles. She also had perioral erythema and fissuring. Laboratory evaluation showed low prealbumin and multiple nutritional deficiencies including copper, zinc, vitamin B6, Vitamin D, ferritin. Her HbA1c was 5.8 % and fasting glucagon levels were normal. Her liver function was initially normal but later developed transaminitis from septic shock. She was started on enteral feeds with nutritional supplementation. This resulted in significant improvement of her rash with correction of underlying nutritional deficiencies.

Discussion

NME in the absence of Glucagonoma is extremely rare and is seen in hepatic cirrhosis, malabsorption disorders, inflammatory bowel disease and nutritional deficiencies including zinc deficiency, Pellagra, Kwashiorkor. Though the exact mechanism for NME in these conditions is unclear. It is postulated that unabsorbed nutrients in the gut lumen are potent stimulators of enteroglucagon which in turn mediates the development of NME. The treatment of NME associated with PGS is to correct the underlying cause. Our patient had history of gastric bypass surgery and did not get routine post bariatric care. She presented with multiple nutritional deficiencies which likely caused NME. It is important to recognize that post bariatric surgery, patients are at risk for both macro and micronutrient deficiencies and hence need frequent nutrition assessment, supplementation and monitoring.

References

Tierney EP, Badger J. Etiology and pathogenesis of necrotic migratory erythema: review of the literature. *MedGenMed* 2004

Neuroendocrinology and Pituitary NEUROENDOCRINE & PITUITARY PATHOLOGIES

Partial Secondary Adrenal Insufficiency and Growth Hormone Deficiency in Fibromyalgia

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Introduction: Low or borderline cortisol concentrations and impaired response to dynamic testing have been