

6 days prior. Past medical history included hypertension, type 2 diabetes, hyperlipidemia, traumatic brain injury, CSF leak with bacterial meningitis s/p sphenoid repair and palsy of the right III,

V and VI cranial nerves. Head CT showed a 1.9 x 2.1 x 1.5 cm soft tissue-density mass medial to the right cavernous carotid artery extending into the sphenoid sinus. There was expansile bony change to the floor and right dorsum of the sella. The mass showed mild contrast enhancement and abutted the superior orbital fissure. A brain MRI was not obtained due to history of a left cochlear implant. He did not have any cushingoid features on exam. Neuro-ophthalmology exam revealed, severe sixth cranial nerve palsy, bilateral optic disc pallor and a mild right superotemporal visual field defect. Pre-operative pituitary function tests revealed ACTH 103 pg/ml (7–63), cortisol 14 ug/dl (6.0–18.4), FSH 2.7 mIU/ml (1.5–12.4), LH 3.8 mIU/ml (1.7–8.6), prolactin 17.6 ng/ml (4–15.2), total testosterone 175 ng/dl (249–836), TSH 1.10 uIU/ml (0.27–4.20), free T4 0.67ng/dl (0.8–1.8) and IGF-1 208 ng/ml (69–224). He underwent successful endoscopic trans-sphenoidal resection of a 4.2 x 2.5 x 0.5 cm mass. Pathology revealed hyaline deposits in the cytoplasm and perinuclear cytokeratin in more than 50% of the adrenocorticotroph cells consistent with Crooke's cell adenoma. Post-operatively, his right eye pain and abduction deficit improved, and diplopia returned to baseline. He was placed on a short hydrocortisone taper. Due to high risk of recurrence, he received 54Gy in 30 fractions to the sella. Six and 12-month follow-up head CTs revealed stable residual enhancing tissue. Pituitary function tests done 9 months post-surgery were normal and no hormone replacement was needed. He was clinically stable 12 months after surgery.

Conclusion: We described a rare case of invasive Crooke's cell pituitary adenoma with visual disturbances that was managed with resection and radiotherapy. The patient remained free of recurrence 1 year later. However, lifetime surveillance is necessary due to high incidence of recurrence.

Reference:

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Reproductive Endocrinology

CLINICAL STUDIES IN FEMALE REPRODUCTION I

Effects of E2/P4 Oral Capsules on Bone Turnover in Women with Vasomotor Symptoms

Ginger Constantine, MD¹, Michael R. McClung, MD², Risa Kagan, MD³, Shelli Graham, PhD⁴, Brian Bernick, MD⁴, Sebastian Mirkin, MD⁴.

¹EndoRheum Consultants, LLC, Malvern, PA, USA, ²Oregon Osteoporosis Center, Portland, OR, USA, ³University of California and Sutter East Bay Medical Foundation, San Francisco/Berkeley, CA, USA, ⁴TherapeuticsMD, Boca Raton, FL, USA.

SAT-021

Menopausal hormone therapy slows bone turnover and reduces the risk of osteoporotic fractures. The objective of this post hoc analysis was to evaluate bone turnover

markers (BTM) in the phase 3 REPLENISH trial, which evaluated vasomotor symptoms (VMS) with an oral estradiol/progesterone (E2/P4) in postmenopausal women with a uterus.

Eligible women for this analysis had ≥ 50 moderate to severe VMS/week, < 5 years since last menstrual period, and BTM measurements at baseline, and months 6 and 12. Percent changes for 3 BTM (bone specific alkaline phosphatase [BSAP], C-terminal telopeptide of type I collagen [CTX-1], and N-terminal propeptide of type I procollagen [PINP]) assessed by immunoassay methods were evaluated from baseline to months 6 and 12 for the 1/100, 0.5/100 and placebo groups.

A total of 157 women (40–61 years, 69% White) were analyzed (56 for each 1/100 and 0.5/100; 45 for placebo). Mean baseline values ranged from 14.0–14.3 U/L for BSAP, 0.34–0.39 ng/mL for CTX-1, and 76.9–79.3 ng/mL for PINP. Mean differences in percent change from baseline versus placebo significantly decreased with both E2/P4 doses for all 3 BTM at months 6 and 12. Mean differences from placebo for E2/P4 at months 6/12 ranged from -8.1% to -17.8% for BSAP (all, $P \leq 0.02$), -30% to -41% for CTX-1 (all, $P \leq 0.001$), and -14% to -29% for PINP (all, $P \leq 0.007$).

REPLENISH data provide support for a potential skeletal benefit of E2/P4 when used for the treatment of moderate to severe VMS.

Bone and Mineral Metabolism

OSTEOPOROSIS: DIAGNOSIS AND CLINICAL ASPECTS

The Impact of Micronutrients on Cellular Metabolism and Healthy Aging

Arne Astrup, MD, DMSc¹, Hellas Cena, MD², Balz Frei, PhD³, Nahla C. Hwalla, PhD⁴.

¹University of Copenhagen, Copenhagen, Denmark, ²University of Pavia, Pavia, Italy, ³Oregon State University, Corvallis, OR, USA, ⁴American University of Beirut, Beirut, Lebanon.

SUN-393

Micronutrients are involved in nearly all cellular processes, inadequacies or deficiencies may accelerate cellular aging and increase risk for chronic diseases later in life.¹ Optimizing micronutrient intake may help reduce the risk for developing certain age-related conditions/diseases, including osteopenia/osteoporosis,² sarcopenia,³ falls,⁴ mild cognitive impairment,⁵ immunosenescence,⁶ impaired resilience,⁷ hypertension,⁸ cataracts,⁹ and age-related macular degeneration.¹⁰ The importance of calcium and vitamin D for maintaining bone health has been established,² but these micronutrients may also be involved with muscle health and reducing the risk for falls and consequent bone fractures in later life.¹¹ Vitamin D may also be involved in stress management and resilience.¹² Vitamins C, D, and E, zinc, selenium, and other micronutrients are necessary for healthy immune system function,^{13,14} and vitamin E is important for cognition,¹⁵ immune competence,¹⁶ and eye health.¹⁰ Although these micronutrients are individually involved with these processes by acting as antioxidants, hormonal regulators of gene expression, or cofactors in enzymatic reactions, there are also important interactions between micronutrients to consider (eg,

calcium/vitamin D in musculoskeletal health). Importantly, a significant proportion of the aging population does not meet the recommended intake of many micronutrients.¹⁷ Clinical trials on the benefits of micronutrient supplementation have not been conclusive, but adequate intake should be considered an essential component of comprehensive healthcare for older adults.

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Reproductive Endocrinology

REPRODUCTIVE ENDOCRINOLOGY: REPRODUCTIVE FUNCTION AND DYSFUNCTION ON DEVELOPMENT

A Gene Expression Profile of the Adolescent Breast and the Impact of Obesity

Dennis Y. Akrobetu, BS¹, Adam B. Burkholder, MS¹,
Thai-Vu T. Tbn, BS¹, Susan Kim, BS¹, Arun Pandiri, PhD,
DACVP, DABT¹, Brian I. Labow, MD², Laura C. Nuzzi, BA²,
Joseph M. Firriolo, MD², Sallie S. Schneider, PhD³,
Suzanne E. Fenton, PhD¹, Natalie D. Shaw, MD¹.

¹NIEHS, Durham, NC, USA, ²Boston Children's Hospital, Boston, MA, USA, ³Baystate Medical Center, Springfield, MA, USA.

MON-031

Environmental exposures that occur early in life affect breast development and breast cancer (BC) risk in adulthood. Puberty is one such developmental 'window of susceptibility' when estrogen (E) stimulates breast adipocytes and stromal and epithelial cells to proliferate at an exponential rate, making them vulnerable to carcinogens. Excess adiposity during adulthood may increase BC risk through obesity-associated inflammation and/or aromatase activity, which increases local E levels. While obesity during puberty might be expected to also increase future BC risk, epidemiological studies suggest that pediatric obesity may actually be protective. The current studies investigated the gene expression profile of the normal adolescent breast and how early life factors such as obesity may influence these profiles.

We performed RNA-seq in 62 histologically-normal breast tissue samples from adolescent girls and young women (mean age 17.8 yrs) who underwent breast reduction surgery. Twenty-nine patients were normal weight (NW; mean BMI 23.2 kg/m²) and 33 were overweight/obese (OB; BMI 31.7). Comparison of our adolescent dataset with published mammary RNAseq datasets from pubertal mice, rats, macaques, and adult women (mean age 38 yrs) revealed relatively poor (~30%) overlap with other species, but 88% overlap with adults for the 500 most highly expressed genes in each dataset. The small gene set (n=43) common to all groups was enriched for extracellular matrix components. We used DESeq2 to identify differentially-expressed (DE) genes in NW vs OB samples. To avoid confounding due to differences in the cellular composition of NW and OB samples, we first used CIBERSORT to computationally estimate the adipocyte fraction of each sample and included this estimate as a covariate. We identified 74 up-regulated and 73 down-regulated genes in NW vs. OB ($p_{\text{adj}} < 0.05$). We used Ingenuity Pathway Analysis (IPA) to determine whether the DE genes might reflect activation or inhibition of upstream transcriptional regulators in OB samples. IPA identified the cytokines CSF1 and CSF2 and the chemokine receptor CCR2 as the most highly activated upstream regulators, suggesting a signature of increased inflammation in OB samples. While classical E receptor (ER) targets (e.g., PR, AREG) were not DE'd, IPA identified ESR1, 17- α -ethinyl estradiol, genistein, and PR, as well as growth factors/receptors (EGF, IGF-1, HGF, HER3) and kinases (AKT1, ERK) involved in hormone-independent ER activation, as activated upstream regulators in OB samples. These studies represent the first investigation of the human breast transcriptome during late puberty and demonstrate that in adolescents, as in adults, OB is associated with increased inflammation which may augment E action in the breast microenvironment.

Pediatric Endocrinology

PEDIATRIC SEXUAL DIFFERENTIATION, PUBERTY, AND BONE BIOLOGY

Seasonal Variations of 25-Hydroxy Vitamin D3, Parathyroid Hormone, and Alkaline Phosphatase in School-Aged Children

Gonzalo Alfonso Dominguez Menendez, Medical Doctor¹,
Helena Poggi Mayorga, Biochemistry Degree¹, Rosario Moore,
MD¹, Ivonne D'Apremont, MD¹, Monica Arancibia, MD²,
Hernan Garcia Bruce, MD³, Dafne Segall Kohen, Medical
Student¹, Fidel Allende, BS³, Sandra Solari, MD¹,
Alejandro Martinez, MD³.

¹PONTIFICIA UNIV CATOLICA CHILE, Santiago, Chile,

²Hospital Higuera, Talcahuano, Chile, ³Pontificia Universidad Catolica de Chile, Santiago, Chile.

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Background: The central role of Vitamin D is the homeostasis of calcium and phosphorus, affecting bone metabolism directly. The principal source of Vitamin D is the synthesis by the skin in response to its exposure to ultraviolet B radiation.

The synthesis of vitamin D by the skin is affected by different factors such as age, pigmentation, use of sunscreen, and clothing. The low sun exposure, especially in extreme