Precocious puberty refers to the early onset of secondary sexual characteristics. 

Premature thelarche refers to isolated breast development before the age of three in females.

- Pathologic in up to 40-70% in boys and
- GnRH secretion

Evaluation:

**History**
- onset of symptoms
- age of puberty in family members
- headache
- vision changes
- behavior changes
- seizures
- abdominal pain
- previous CNS disease or trauma
- exposure to exogenous steroids

**Physical**
- height
- weight
- height velocity (cm/year)
- visual fields
- Gal- au- lait signs
- Tanner staging

**Labs**
- hormonal serum for the hypothalamic-gonadal axis

**Imaging**
- bone age
- bone age
- MRI
- ultrasound

- Basal luteinizing hormone
- follicle stimulating hormone
- either estradiol or testosterone
- if unclear, gonadotropin releasing hormone

Types of Precocious Puberty

- Benign
- Premature thelarche, rule out precocious puberty (central or peripheral)

- Benign/Non-progressive
- Puberty begins at the same time as all male and female peers

- Central
- Hypothalamic and pituitary axis

- Peripheral
- Testicular, ovarian, adrenal tumors

**Etiology:**
- Idiopathic
- Previous CNS lesion
- CNS lesion
- Exposure to exogenous steroids

**Diagnosis:**
- Follicle stimulating hormone
- 0-4 years: Not established 
- 5-9 years: 0.72-5.33 mIU/mL
- 10-11 years < or = 4.38 mIU/mL
- 8-9 years < or = 0.69 mIU/mL
- Reference Value

**Discussion**

Lavender is a common additive to many personal home and hygiene products for consumers of all ages. In primary care, we often recommend lavender to promote relaxation or combat anxiety. However, the literature reports that topical application of tea tree oil and lavender containing products can cause prepubertal gynecomastia in males and premature thelarche in females both in the setting of normal endogenous steroids. Studies have also demonstrated that these oils have estrogenic and anti-androgenic activities on human cell lines. It is important to understand the potential effects of such readily available products on our patients.

There is increasing evidence demonstrating endocrine disruption of estrogen effects related to common cosmetic and body products. As primary care providers, we must take careful histories and include these products in differential when appropriate. Overall, precocious puberty is uncommon so it may be reasonable to hold off on hormonal testing and imaging in girls and follow in a primary care clinic unless rate of tissue growth increases rapidly and/or associated with growth acceleration.

**Take Home Points:**
- Lavender and tea tree containing products have been associated with precocious puberty in males and females
- If no other concerning features on history/physical to suspect central or precocious puberty, can stop exposure and closely monitor symptoms

**References**


**Types of Precocious Puberty**

- Benign
- Premature thelarche, rule out precocious puberty (central or peripheral)

**Case**

A 2 year + 5 month-old female presented with her parents to clinic with premature breast development. Parents reported at that time bilateral breast growth slowly over the previous five months. On history, patient had no growth acceleration, no acne or pubic hair, no vaginal bleeding, developmental milestones and behavior appropriate. Derived breast size. Exam and vitals were unremarkable except for bilateral Tanner stage III breast development and normal stage I axillary hair, no acne present.

Past medical history:

The patient was born at term born via cesarean section for failure to progress and chorioamnionitis (for which she received intrapartum antibiotics). Pregnancy was complicated by mother with medication-controlled Graves’ disease. Patient was clinically asymptomatic and was evaluated after admission by pediatric endocrinology with both labs and in-person follow up and cleared.

Patient had brief NICU stay for moderately increased work of breathing, with negative infectious workup, etiology thought to be most likely due to retained fetal lung fluid. During admission, she was also noted to have low resting heart rate in the 70-80s with normal perfusion and level of alertness, which responded appropriately to stimuli. EKG showed sinus bradycardia and echocardiogram showed patent ductus arteriosus, bicuspid aortic valve, and patent foramen ovale. Patient was seen multiple times by pediatric cardiology and repeat echocardiogram at age 9 months showed small aortic communications including a patent foramen ovale size which per cardiologist was felt by pediatrics was unlikely to require future intervention.

At birth, Raddle fed well nonpalpable, bilateral breast tissue with no breast tissue noted on exam. Patient was seen multiple times by pediatric dermatology and diagnosed as infantile hemangioma with minimal or arrested growth which did not require further follow up or intervention.

Past Surgical History: none

Family History: Father has lupus and mother has Graves’ disease and hypertension.

Social History: Lives in San Diego with parents. No siblings. Father is high school teacher and mother is a pta/y chef. No smokers in the home.

Medications: None

Allergies: None

Initial diagnosis: premature thelarche, rule out precocious puberty (central or peripheral)

Workup:
- EKG
- Cardiologist
- Head ultrasound

Final diagnosis: premature thelarche, a form of benign/non-progressive precocious puberty, secondary to lavender exposure

**Treatment + Outcomes:**

Initially parents reported no known exposure to lavender, tea tree, or essential oils. Given she had growth without other signs of puberty, suspicion was for benign precocious puberty. However, parents noted possible slight persistent breast growth suggesting ongoing estrogen exposure. After visit, parents went home and examined the products they were using for patient and realized the lotion they had been using contained lavender. They stopped using this and other products and breast tissue resolved.

**Reproductive Endocrinology**

**Summary:**

- Lavender + Tea tree = Estrogen effects

**References:**


**Take Home Points:**

- Lavender and tea tree containing products have been associated with precocious puberty in males and females

- If no other concerning features on history/physical to suspect central or precocious puberty, can stop exposure and closely monitor symptoms

**References:**