PMS and Nutritional Support for the Hypothalamic-Pituitary-Ovarian (HPO) Axis

Part I

Joseph Olejak, DC
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Overview of HPO Axis

- Pituitary
- Ovaries

Reference: Wikimedia Commons
Role of Hypothalamus

- The secretory part of the brain
- Responsible, among other things, for the release of gonadotropin-releasing hormone (GnRH), which acts on the pituitary
Role of Pituitary

GnRH stimulates release of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) from the pituitary and affects the ovaries.
Role of Ovaries

• FSH secretion by the anterior pituitary stimulates follicular growth of granulose cells, preparing the body for ovulation.

• LH surge triggers ovulation.
Graph of FSH LH

Reference: Wikimedia Commons
PMS Symptoms

Some emotional symptoms could be:

- Tension or anxiety
- Low mood
- Crying spells
- Mood swings
- Irritability
- Appetite changes or food cravings
- Difficulty falling asleep
- Social withdrawal
- Poor concentration

PMS Symptoms

Some physical symptoms could be:

- Minor joint or muscle pain
- Minor headache
- Fatigue
- Weight gain related to fluid retention
- Abdominal bloating
- Breast tenderness
- Acne flare-ups
- Temporary constipation or diarrhea

PMS Classifications

• PMS-A (anxiety type) high estrogen, low progesterone
• PMS-C (refined sugar craving) high insulin
• PMS-D (low estrogen and low serotonin) low mood
• PMS-H (hyperhydration) bloating and swelling

Theories of PMS

• **Cyclic changes in hormones**
  Chemical changes in the brain due to fluctuating sex hormones can affect the role of neurotransmitters (serotonin, gamma-aminobutyric acid, and glutamate). It is thought that these compounds play a crucial role in mood states. Changes in these could trigger PMS symptoms.

• **Stress**
  It is unclear if stress can cause PMS, but stress could aggravate symptoms.

• **Poor eating habits**
  Some PMS symptoms have been linked to high-carbohydrate diets (caffeine, sugar, and sodium); low levels of vitamins and minerals; too many salty foods, which may cause fluid retention; and drinking alcohol and caffeinated beverages, which may cause mood and energy-level disturbances.

Cyclic Changes in Hormones and PMS

Signs and symptoms of premenstrual syndrome change with hormonal fluctuations and disappear with pregnancy and menopause.

- As LH spikes and estradiol increases, symptoms get worse.
- Glutamate levels in rat studies have also been found to spike prior to menstruation.


Low Mood and PMS

Low circulating levels of serotonin are thought to be a factor in PMS.

http://europepmc.org/abstract/MED/3627623
Stress and PMS

HPA axis activation raises cortisol.

Poor Eating Habits and PMS

Two things:

• What are you going to remove from the diet?
• What are you going to add?

If people are married to their habits, you will have more success adding dietary elements.
Factors That Influence Normal Menstrual Function

• Stress
• Hormonal imbalances
• Inflammatory-response function
Stress

HPA axis activation leads to cortisol release, which depresses reproduction through the mechanism of pregnenolone steal.

Reference: Wikimedia Commons
Diet

• Standard American diet
• High-carbohydrate diet
Standard American Diet

Could include:

• Sugar
• Omega-6 fatty acids
• Trans fats
• Dairy products
• Gluten

• Refined-flour products
• Feed-lot raised animals
• Red meat and processed meat
• Alcohol
• Food additives
How does high carbohydrate intake affect hormone regulation?

• As insulin rises, sex hormone-binding globulin (SHBG) decreases. SHBG binds estrogen; without it, estrogen levels rise.

• Higher progesterone-to-estrogen ratios are linked to PMS.

Assessing Patient for Nutritional Support: 3 Areas

1. Detailed and focused history
2. Physical exam
3. Lab tests
History: Start With a Detailed Endocrine Questionnaire

- Ask specific and focused questions about diet.
- Ask about medication use (Rx and OTC).
- Ask about stress (in relationships, in the workplace, in finances).
- Ask about level of exercise.
- What supplements is the patient on?
- Ask about menstrual history, including:
  - Age at onset of menarchy
  - Regularity of periods
  - Length of menstrual bleeding
  - Type of bleeding (heavy, clotted, spotty, scant)
History: Probe for Type and Frequency of PMS Symptoms, and then Triage in Order of Importance

Emotional
• Dysphoria
• Anxiety
• Low mood
• Irritability

Altered Physiology
• Abdominal bloating
• Abdominal cramps (central abdomen or lower left/right quadrant)
• Temporary constipation
• Swelling or tenderness in the breasts
• Noncystic acne
• Minor joint and/or muscle pain
Physical Exam

• Palpate over left/right ovary and uterus.
• Check for lumbar subluxation—a sign of viscero-somatic involvement.
• Are lymphatic drainage points for the sex meridian, found on the pubic symphysis, tender?
Lab Tests

• Adrenal stress index test for high cortisol (salivary)
• Female endocrine panel for estrogen/progesterone balance
• Abdominal ultrasound