**Clinical Case**

**Case Reviewed by 2015 Clinical Pharmacy Challenge Examination Panel**

Vignette: A 46-year-old woman presents to the primary care clinic for evaluation. She complains of hot flashes 3–4 times a day. Her last menstrual cycle was about 4–5 months ago.

Past Medical History: Seasonal allergies; hypertension

Social History: Divorced; sexually active with one male partner; smokes ½ ppd

Current Medications: Benazepril 5 mg daily; Epi-pen – use as directed

Allergies: Peanuts (anaphylaxis); erythromycin (shortness of breath)

Vital Signs: Temp 38.5°C; heart rate 84 beats/minute; respiratory rate 16 breaths/minute; blood pressure 135/88 mm Hg; height 185.4 cm; weight 69 kg

Lab Values: Date: 3 days ago

Hemoglobin 12.2 g/dL (SI 122 g/L); platelets 321 x 103 microliter (SI 321 x 109/L); hematocrit 36.6% (SI 0.366); sodium 138 mEq/L (SI 138 mmol/L); potassium 3.9 mEq/L (SI 3.9 mmol/L); chloride 102 mEq/L (SI 102 mmol/L); bicarbonate 27 mEq/L (SI 27 mmol/L); calcium 9.5 mg/dL (2.4 mmol/L; BUN (blood urea nitrogen) 11 mg/dL (SI 3.93 mmol/L); serum creatinine 0.95 mg/dL (SI 83.98 micromol/L); FSH (follicle-stimulating hormone) 45 mIU/mL (SI 45 IU/L)

Chlamydia Polymerase Chain Reaction (PCR): Positive

Gonococcus PCR: Negative

Procedure Data: Pap 2 years ago – normal

Other: Contraceptive Method (condoms, admits to inconsistent use)

**Question 1**

What is the best categorization of the patient’s reproductive stage?

1. Late reproductive
2. Menopause transition
3. Menopause
4. Postmenopause

Answer: 2. Menopause transition

Rationale: The patient is experiencing menstrual irregularities and vasomotor symptoms, which are characteristic of menopause transition (option 2 is correct). She is currently experiencing symptoms and has had several months without menses (option 1 is incorrect). The patient has not yet experienced 12 months without menses, which is the accepted definition of menopause (option 3 is incorrect). By definition, she has not yet reached menopause and cannot be considered postmenopausal (option 4 is incorrect).

Citation: Harlow SD, Gass M, Hall JE, et al. Executive summary of the Stages of Reproductive Aging Workshop + 10: addressing the unfinished agenda of staging reproductive aging. J Clin Endocrinol Metab 2012;97:1159-68.

**Question 2**

Which laboratory test should be ordered prior to prescribing therapy for this patient’s menstrual irregularities and vasomotor symptoms?

1. Estradiol
2. Human chorionic gonadotropin (HCG)
3. Inhibin B
4. Luteinizing hormone (LH)

Answer: 2. HCG

Rationale: The possibility of pregnancy must always be considered in a sexually active woman who is not using reliable contraception (HCG option is correct). Inhibin B levels and LH are often used in evaluation of infertility, but they add little to the evaluation of amenorrhea in a 46-year-old woman complaining of hot flashes (options 3 and 4 are incorrect). Serum estradiol levels have not been shown to predict final menstrual period or to affect evaluation of menopausal symptoms (option 1 is incorrect).

Citations: Manson JE, Bassuk SS. The menopause transition and postmenopausal hormone therapy. In: Harrison’s Principles of Internal Medicine, 18e. New York: McGraw-Hill, 2012:chap 348. Available at http://accessmedicine.mhmedical.com/content.aspx?bookid=331&Sectionid=40727153. Accessed February 3, 2015.

Randolph JF Jr, Zheng H, Sowers MR, et al. Change in follicle-stimulating hormone and estradiol across the menopausal transition: effect of age at the final menstrual period. J Clin Endocrinol Metab 2011;96:746-54.

**Question 3**

Which additional medication should be recommended for this patient?

1. Calcium 500 mg twice daily
2. Doxycycline 100 mg twice daily for 7 days
3. Ferrous sulfate 325 mg twice daily
4. Azithromycin 1 g orally x 1 dose

Answer: 2. Doxycycline 100 mg twice daily for 7 days

Rationale: Her chlamydia PCR is positive, and she has an allergy to erythromycin (option 2 is correct; option 4 is incorrect). The U.S. Preventive Services Task Force does not recommend calcium to prevent osteoporosis in perimenopausal women (option 1 is incorrect). The patient is not anemic and has no other indication for ferrous sulfate (option 3 is incorrect).

Citations:

Centers for Disease Control and Prevention. Sexually Transmitted Diseases. Treatment Guidelines, 2010. Available at www.cdc.gov/std/treatment/2010/toc.htm. Accessed August 19, 2015.

U.S. Preventive Services Task Force. Available at www.uspreventiveservicestaskforce.org/. Accessed August 19, 2015.

**Question 4**

What is the most appropriate treatment for the patient’s hot flashes?

1. Estradiol 1 mg daily
2. Micronized progesterone 100 mg daily
3. Conjugated equine estrogens 0.3 mg daily and micronized progesterone 100 mg daily
4. Conjugated equine estrogens 0.3 mg daily and medroxyprogesterone acetate 1.5 mg daily

Answer: 4. Conjugated equine estrogens 0.3 mg daily and medroxyprogesterone acetate 1.5 mg daily

Rationale: The patient has vasomotor symptoms (hot flashes) most likely because of menopausal transition. The patient’s past medical history does not mention a hysterectomy, so she has an intact uterus. Hormone therapy with estrogen and progesterone will alleviate her symptoms. The patient has a reported peanut allergy, which is a contraindication to the use of micronized progesterone (option 4 is correct; option 3 is incorrect). Unopposed estrogen therapy would increase her risk of endometrial hyperplasia (option 1 is incorrect). Few data support the use of progesterone as monotherapy to treat vasomotor symptoms; also, micronized progesterone is contraindicated in this patient with a peanut allergy (option 2 is incorrect).

Citations: Borgelt LM, ed. Women’s Health Across the Lifespan. Bethesda, MD: American Society of Health-System Pharmacists, 2010.

Prometrium(R) oral capsules, progesterone oral capsules. North Chicago: Abbott Laboratories (per FDA), 2011.

**Question 5**

The patient expresses preference for bioidentical hormones. Which regimen should be recommended?

1. Compounded estradiol 0.25 mg/estriol 1 mg
2. Compounded estradiol 1 mg/progesterone 50-mg capsule
3. Compounded estradiol 2 mg/progesterone 25 mg/Dehydroepiandrosterone (DHEA) 10-mg capsule
4. Compounded estradiol 1 mg/progesterone 50 mg/DHEA 10-mg capsule

Answer: 2. Compounded estradiol 1 mg/progesterone 50-mg capsule

Rationale: The patient has vasomotor symptoms (hot flashes), most likely because of menopause transition. The patient’s past medical history does not mention a hysterectomy, so she has an intact uterus. Hormone therapy with estrogen and progesterone will alleviate her symptoms. Compounded estradiol 1 mg/progesterone 50 mg capsule option is correct). Unopposed estrogen therapy would increase her risk of endometrial hyperplasia (option 1 is incorrect). Few data support the addition of DHEA; also, the doses of estradiol 2 mg and progesterone 25 mg are incorrect (options 2 and 3 are incorrect). A practitioner should educate the patient about the risk-benefit of all hormone therapy, including the lack of evidence regarding any safety or efficacy difference with bioidentical hormones.

Citation: Borgelt LM, ed. Women’s Health Across the Lifespan. Bethesda, MD: American Society of Health-System Pharmacists, 2010.