Case Study

Mrs. D is a 50-year-old woman who presents with intermittent left-lower-quadrant pain over the past three to four months. She has been married for the past 26 years, has a 22-year-old son, and lives in a growing college community located between three large metropolitan cities with a population of approximately 190,000.

Review of Systems

Mrs. D was in her usual state of health until she developed the intermittent left-lower-quadrant pain. Her ear, nose, and throat; respiratory; and cardiovascular examinations are negative; her appetite is good; and her weight is stable. Mrs. D is not experiencing nausea, vomiting, or diarrhea but notes increased constipation over the past three weeks with intermittent abdominal bloating. She denies hematochezia. She has had mild stress incontinence since the delivery of her child and is otherwise unchanged. She does not have hematuria or dysuria. Mrs. D has regular menstrual cycles that last three to four days and are light flow with mild to moderate dysmenorrhea. She uses condoms for birth control. She has mild cramping-type pain to the left lower quadrant during and after sexual intercourse, which has occurred approximately in the past three to four months. Mrs. D has had two episodes of intramenstrual spotting. She has noticed some increased hot flashes and occasional night sweats. Her last pelvic examination, Pap smear, and mammogram eight months ago were negative. Mrs. D has had one pregnancy and one child, and her extremities are without pain or edema.

Personal: Mrs. D is active and walks daily. She recently joined Weight Watchers to improve her diet and “lose extra pounds.”

Social: Mrs. D consumes two to three glasses of wine weekly. She denies tobacco or drug use.

Physical examination: Her head is atraumatic and normocephalic and the results of her head, eyes, ears, nose, and throat examinations are within normal limits. Mrs. D’s neck examination is negative for lymphadenopathy or thyromegaly, and no palpable supraclavicular lymph nodes are present. Her chest is clear to auscultation bilaterally, and her heart rate and rhythm are regular with no audible murmurs. Mrs. D’s abdomen is soft, mildly distended, and tympanic to percussion; has active bowel sounds; and has mild tenderness to the left lower quadrant, without palpable masses or hepatosplenomegaly. Her groins are without palpable adenopathy. Mrs. D’s pelvic examination reveals normal external genitalia with pink, moist vaginal mucosa and no visible lesions. The cervix is grossly normal appearing. On bimanual and rectovaginal examination, the cervix is soft, mobile, and nontender. The uterus is approximately 8 cm and the cervix is soft, mobile, and nontender. The left adnexa has a palpable fullness approximately 4–5 cm and is slightly tender. No additional palpable masses or nodularity are noted in the cul-de-sac.

Differential Diagnosis

Mrs. D has an adnexal mass. Determining the type and cause of the mass can be difficult because of a number of conditions that can result in the development of adnexal masses. The determination will be dependent on the patient’s age, her menopausal state, the size of the mass, ultrasonographic findings, whether the patient is symptomatic, whether there are unilateral or bilateral findings, and laboratory results.

Risk Factors

Age and menopausal status are the two risk factors to be considered in a woman presenting with an adnexal mass.

Age: A patient’s age is a very important factor when determining the potential cause of an adnexal mass. An adnexal mass found in premenarchal girls or postmenopausal women is abnormal, warrants an immediate investigation, and should be considered malignant until proven otherwise (Drake, 1998). Neoplasms found in the premenarchal patient usually are of germ cell origin and warrant immediate surgical exploration (Drake).

After menarche, adnexal masses are most likely because of follicular and corpus luteal cysts of the ovary formed during the normal menstrual cycle. Patients of childbearing age who are still menstruating can have malignant and benign lesions; however, most of these are benign processes (DiSaia & Creasman, 2002). Other benign causes for adnexal and pelvic masses include endometrioma, polycystic ovaries, tubo-ovarian abscess, hydrosalpinx, fibroid tumor, ectopic pregnancy, and ovarian torsion. Malignant adnexal masses in a premenopausal patient usually include the low-malignant or borderline type (Drake).
Menopausal status: The incidence of malignancy is increased in a postmenopausal woman. The overall risk of a primary ovarian neoplasm being malignant increases from 13% in premenopausal women to 45% in postmenopausal women (Drake, 1998). Neoplasms found in a postmenopausal patient usually are stromal-, germ cell-, or epithelial-type tumors. Nonmalignant etiologies include ovarian fibromas, fibroid tumors, and diverticular disease.

Diagnostic Evaluation

A complete history and physical examination, including a pelvic and rectal examination as well as a transvaginal ultrasound and CA-125 level, are crucial when evaluating a patient with a suspected adnexal mass.

Physical examination techniques: Detection of an adnexal mass is greatly facilitated by a rectovaginal examination, which allows more complete access to the cul-de-sac as well as to the more superficial areas of the pelvic basin (see Figure 1). The approach permits deeper penetration of the examiner’s fingers (DiSaia & Creasman, 2002). However, a pelvic mass may not be palpable on pelvic and rectovaginal examinations, especially if the patient’s body habitus is medium to large. The bimanual pelvic examination has long been thought the most essential component of the female physical examination (DiSaia & Creasman), but studies have shown that pelvic examination of the female pelvic organs is limited based on the examiner’s experience, patient’s body habitus, and patient’s level of anxiety during the examination (Padilla, Radoesovich, & Milad, 2005). Therefore, the need for additional testing should be based on the patient’s symptoms.

Diagnostic testing: The first step usually is to obtain a transvaginal ultrasound. Ultrasonographic evaluation currently is the diagnostic modality of choice for evaluating patients with adnexal masses. Ultrasound examination is relatively simple and inexpensive, provides multiplanar views, is widely available, and does not use ionizing radiation (Ascher, Izumi, & Hricak, 2000). The endovaginal probe allows close proximity to the structures of the fallopian tubes and ovaries while providing detailed information about size, components, and blood flow. Ultrasound also can evaluate the uterus with the same competence in determining normal versus irregular findings, such as fibroid tumors, thickened endometrial lining, and uterine enlargement. Ultrasound is limited, however, by the operator’s experience, the patient’s body habitus, and degraded images caused by the presence of bowel gas.

Magnetic resonance imaging (MRI) also is used to evaluate pelvic masses. MRI uses nonionizing radio frequency (RF) signals to acquire images and is best for noncalcified tissue. It generally is better than computed tomography (CT) for purposes of tumor detection and identification; however, CT scans usually are widely available, faster, and much less expensive (RadiologyInfo, 2008). Sohaib et al. (2005) determined MRI’s ability to characterize lesions as malignant as 96.6% sensitive, 83.7% specific, and 88.9% accurate when compared to ultrasound, which is 100% sensitive, 39.5% specific, and 63.9% accurate. MRI was overall more specific (p < 0.05) than ultrasound and Doppler assessment for characterizing adnexal masses. Sohaib et al. concluded that women who clinically have a relatively low risk of malignancy but who have complex sonographic features may benefit from MRI.

Doppler imaging scanning and pulsed Doppler spectral analysis also have been used to predict the nature of adnexal masses by determining the vascularity and blood flow in ovarian tumors. This examination evaluates the blood flow caused by neovascularization that occurs in malignant tumors, resulting in lower-resistive and pulsatile indexes. Although initial reports were encouraging, recent prospective studies showed that the
diagnostic accuracy of this tool remains inferior to the assessment of the tumor morphology by an experienced ultrasonographer (Hata, 2006). Others feel that the combination of color Doppler ultrasonography and tumor markers may improve the accuracy of the method of transvaginal ultrasonography in diagnosing of the type of adnexal mass (Murta & Nomelini, 2006).

Once an adnexal mass has been identified, determining whether the lesion is characteristic of a benign or malignant neoplasm often is difficult. Certain characteristics, such as size, contour, composition, and vascularity, can be indicators for suspicion. The size of a normal ovary in the premenopausal female averages at 3.5 cm by 2 cm by 1.5 cm then decreases to 1.5 cm by 0.7 cm by 0.5 cm in the postmenopausal female. An ovary found to be twice the size of the contralateral one in a postmenopausal female is considered a suspicious finding. Benign tumors tend to be smooth walled, cystic, mobile, unilateral, and smaller than 8 cm. Normal ovaries also should be smooth and without excrescences (bulging or outgrowths), internal septa, or papillae. Malignant tumors usually are solid, bilateral, irregular, fixed, and associated with nodules in the cul-de-sac (DiSaia & Creasman, 2002). In addition, complex masses containing both cystic and solid components and the presence of ascites also may indicate a malignant process (Drake, 1998). Studies have shown that experienced examiners using the ultrasound diagnostic method in conjunction with color Doppler can be effective in determining benign and malignant processes (Valentin et al., 2006). 

**Blood work:** Female patients with an identified adnexal mass also should have laboratory studies performed. The most informative tests include serum beta-human chorionic gonadotropin (B-hCG) level, complete blood count (CBC) with differential, and, when indicated, serum tumor markers. B-hCG is used to rule out ectopic pregnancy in a premenopausal patient and for nongestational choriocarcinomas. CBC is helpful in identifying an infectious process, such as pelvic inflammatory disease or tubo-ovarian abscess. Tumor markers that can be helpful include alpha-feto protein for endodermal sinus tumors and lactate dehydrogenase for dysgerminomas. Mixed germ cell tumors and embryonal carcinomas may produce all three markers. Serum CA-125 is an antigenic determinant found in malignant and benign processes. Benign conditions that cause CA-125 to elevate include uterine fibroids, endometriosis, adenomyosis, pregnancy, liver disease, and other inflammatory conditions in the pelvic and abdominal cavity. CA-125 also can be elevated in several types of malignant processes, including ovarian, breast, lung, colon, pancreatic, and uterine cancers (Drake, 1998); these tests should be used in combination with other diagnostic testing to assist in reaching a conclusion on the diagnosis.

**Management**

Once an adnexal mass has been identified and evaluated by physical examination, imaging, and laboratory tests, a decision must be made about how to manage the patient. As mentioned before, an adnexal mass in a premenarchal girl is an abnormal finding; she should be referred to a gynecologist or gynecologic oncologist for further evaluation and possible surgical intervention.

Most ovarian or adnexal masses found in premenopausal patients are benign and can be followed if they meet certain criteria. If an adnexal mass is less than 10 cm, mobile, cystic, and unilateral and has no evidence of ascites, the patient can be observed in four to six weeks. A premenopausal patient often is given oral contraceptives with the presumption that the cyst is functional. Cysts will be suppressed by the oral contraceptive, resulting in involution of the cysts. If the mass disappears or becomes smaller, the patient can continue to be followed. If the mass persists or increases in size, referral to a physician for surgical intervention is indicated. If an adnexal mass is greater than 10 cm, solid, fixed, and bilateral or has ascites, the patient should immediately be referred for surgical evaluation (DiSaia & Creasman, 2002).

According to Van Nagell and DePriest (2005), a postmenopausal woman with unilocular cystic ovarian tumors less than 5 cm in diameter and a normal serum CA-125 is essentially at no risk for malignancy and can be monitored without surgery at six-month intervals or until resolution with repeat transvaginal ultrasound, CA-125, and tumor morphology indexing. More than half of such lesions will resolve spontaneously within two months. A postmenopausal woman with a complex adnexal mass less than 5 cm in diameter and a normal CA-125 should receive follow-up with repeat ultrasound, CA-125, and morphologic indexing in one month. If the lesion is increasing in size or the complexity is increasing, the mass should be removed surgically. If, however, the mass size decreases and CA-125 remains normal, the patient can be followed at three- to six-month intervals. A postmenopausal patient with an adnexal mass should be considered abnormal and referred to a gynecologic specialist for management.

**Conclusion**

Mrs. D underwent ultrasound evaluation, which identified a 5 cm heterogeneous mass with diffuse low-level echoes (indicating solid areas) interspersed with echogenic and anechoic areas. No evidence of ascites was present, and the right ovary and uterus appeared normal. Color Doppler was not available. The laboratory studies revealed a white blood cell count of 6.0, hemoglobin 12.3, hematocrit 38, and CA-125 50 u/ml. The patient was scheduled for a CT scan of the abdomen and pelvis to help further characterize the mass and evaluate surrounding structures. The CT scan identified a cystic 5 cm left adnexal mass. The uterus, right ovary, upper-abdominal organs, lymph nodes, and bowel appeared normal, and no ascites were identified. The patient was counseled about the findings; other than an elevated CA-125, the mass appeared benign, but definitive diagnosis required surgical intervention. The patient continued to be symptomatic and desired surgery. She underwent a laparoscopic left salpingo-oophorectomy. Final pathology revealed benign findings of endometrioma.

**Author Contact:** Nicki Webb, MSN, WHNP-BC, can be reached at nfwebb@mdanderson.org, with copy to editor at CJONEditor@ons.org

**References**


