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Management of Adnexal Masses

A suspected ovarian neoplasm is a common clinical problem that affects women of all ages. In the United States, a woman has a 5–10% lifetime risk of undergoing surgery for a suspected ovarian neoplasm and, within that group, an estimated 13–21% chance of receiving a diagnosis of ovarian cancer (1). Although most adnexal masses are benign, the goal of the diagnostic evaluation is to exclude malignancy. Management decisions often are influenced by the age and family history of the patient. The purpose of this document is to review the most recent data on imaging modalities, operative assessment of the adnexal mass, and preoperative models to predict the probability of ovarian malignancy.

This Practice Bulletin was developed by the ACOG Committee on Practice Bulletins—Gynecology with the assistance of Michael Berman, MD, and Leslie Randall-Whitis, MD. The information is designed to aid practitioners in making decisions about appropriate obstetric and gynecologic care. These guidelines should not be construed as dictating an exclusive course of treatment or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to the institution or type of practice.

Reaffirmed 2009

Background

Adnexal masses are commonly encountered in gynecologic practice and often present both diagnostic and management dilemmas. Whereas some women present with acute torsion or rupture of a mass requiring immediate surgical intervention, most masses are detected incidentally. In these situations, the physician must try to differentiate masses likely to be benign from those likely to be malignant. Masses with a low likelihood of malignancy often can be managed conservatively. Conversely, those that are more likely to be malignant are best managed with prompt surgery by a physician with advanced training and expertise in the management of ovarian cancer, such as a gynecologic oncologist. Masses that are less clearly benign or malignant usually require surgery; however, many can be managed laparoscopically, with ovarian preservation. This document includes a review of the patient factors, physical findings, imaging results, and serum markers that help separate masses into the categories of probably benign, uncertain, and likely malignant, helping to guide appropriate management.

The differential diagnosis of the adnexal mass includes both gynecologic and nongynecologic sources and, when arising from the ovary, may be benign,

malignant, or of low malignant potential (Box 1). The most important factor in narrowing the possibilities is the stage of the woman's reproductive life. For example, masses in menstruating women are almost always gynecologic, and most are functional cysts. In contrast, the most common masses in postmenopausal women are benign neoplasms, such as cystadenomas, but the risk of malignancy is much greater than in premenopausal women (2). Even metastatic cancers, especially those from the breast, colon, or stomach, may first present as adnexal masses.

Ovarian Cancer Incidence, Morbidity, and Mortality

A woman's lifetime risk of developing ovarian cancer is approximately 1 in 70 (3). It is estimated that in the United States 22,430 new ovarian cancer cases will be diagnosed, and 15,280 women will die of disease annually (4). The 5-year survival rate in women in whom Stage I ovarian cancer has been diagnosed exceeds 90%; however, only 20% of cancers are detected at this stage (5). Indeed, 65–70% are diagnosed at an advanced stage, when the 5-year survival rate is 30–55% (6). Despite the poor prognosis for women with advanced cancers, the figures reflect modest survival improvements achieved over the past two decades, attributable to advances in cytoreductive surgery and more effective first- and second-line chemotherapeutic agents.

Risk Factors

Age is the most important independent risk factor for ovarian cancer in the general population, with the incidence increasing sharply after the onset of menopause (4). According to data reported by the Surveillance, Epidemiology, and End Results program, from 2000 to 2003, the median age at ovarian cancer diagnosis was 63 years, and ovarian cancer was diagnosed in 68.6% of patients after the age of 55 years (3). Thus, adnexal masses in postmenopausal women are more likely to be malignant than those in premenopausal women.

A family history of breast or ovarian cancer increases the lifetime risk for ovarian cancer, but the magnitude of that increase in women without identifiable genetic risk factors is unknown. The Hereditary Ovarian Cancer Clinical Study Group reported that *BRCA1* carriers have a 60-fold increased risk and *BRCA2* carriers have a 30-fold increased risk of developing ovarian cancer by the age of 60 years compared with the general population (7). Additionally, women affected with hereditary nonpolyposis colorectal cancer or Lynch II syndrome have approximately a 13-fold greater risk of developing ovarian cancer than the general population (8). Additional factors that increase ovarian cancer risk include nulliparity, primary infertility, and endometriosis (9).

Aside from prophylactic oophorectomy, use of combined oral contraceptives is the only strategy consistently shown to decrease the risk of epithelial ovarian cancer. The magnitude of protection is a function of duration of use. A large cohort study following 103,551 women for up to 9 years reported a 40% reduction in ovarian cancer risk in women who have ever used oral contraceptives (relative risk [RR], 0.6; 95% confidence interval [CI], 0.5–0.7) and a 90% reduction for women who were long-term users (15 years or longer) of oral contraceptives (RR, 0.1; 95% CI, 0.01–0.6) (10). Protection was observed to a

Box 1. Differential Diagnosis of Adnexal Mass

Gynecologic

- Benign
  - –Functional cyst
  - –Leiomyomata
  - –Endometrioma
  - –Tuboovarian abscess
  - –Ectopic pregnancy
  - –Mature teratoma
  - –Serous cystadenoma
  - –Mucinous cystadenoma
  - –Breast cancer
  - –Hydrosalpinx
- Malignant
  - –Germ cell tumor
  - –Sex-cord or stromal tumor
  - –Epithelial carcinoma

Nongynecologic

- Benign
  - –Diverticular abscess
  - –Appendiceal abscess or mucocele
  - –Nerve sheath tumors
  - –Ureteral diverticulum
  - –Pelvic kidney
  - –Paratubal cysts
  - –Bladder diverticulum
- Malignant
  - –Gastrointestinal cancers
  - –Retroperitoneal sarcomas
  - –Metastases

lesser degree in patients with a known *BRCA1* or *BRCA2* mutation (11).

Clinical Tests

Physical Examinations

Pelvic examinations, including a rectal exam, even under anesthesia, have shown limited ability to identify an adnexal mass, especially with increasing patient body mass index (BMI) greater than 30 (12). Even so, features most consistently associated with an adnexal malignancy include a mass that is irregular; has a solid consistency; is fixed, nodular, or bilateral; or is associated with ascites. Benign conditions that can produce many of these findings, especially in premenopausal women, include endometriosis, chronic pelvic infections, hemorrhagic corpus luteum, and uterine leiomyoma.

Ultrasonography

High-frequency, gray-scale transvaginal ultrasonography can produce high-resolution images of an adnexal mass that approximate its gross anatomic appearance. Advantages of transvaginal ultrasonography include its widespread availability, good patient tolerability, and cost-effectiveness, making transvaginal ultrasonography the most widely used imaging modality to evaluate adnexal masses. In asymptomatic women (both premenopausal or postmenopausal) with pelvic masses, transvaginal ultrasonography is the imaging modality of choice. No alternative imaging modality has demonstrated sufficient superiority to transvaginal ultrasonography to justify its routine use (Table 1).

Although image quality is operator dependent, interobserver agreement among experienced ultrasonographers is quite high ($\kappa = 0.85$) (13). The main limitation of transvaginal ultrasonography use alone relates to its lack of specificity and low positive predictive value for cancer, especially in premenopausal women. Abdominal ultrasonography is very useful as an adjuvant to transvaginal ultrasonography because transvaginal ultrasonography may not provide an accurate image of masses that are both pelvic and abdominal.

Table 1. Modalities for the Evaluation of Adnexal Masses

Modality	Sensitivity	Specificity
Gray-scale transvaginal ultrasonography	0.82–0.91%	0.68–0.81%
Doppler ultrasonography	0.86%	0.91%
Computed tomography	0.90%	0.75%
Magnetic resonance imaging	0.91%	0.88%
Positron emission tomography	0.67%	0.79%
CA 125 level measurement	0.78%	0.78%

Agency for Healthcare Research and Quality. Management of adnexal mass. Evidence Based Report/Technology Assessment No. 130. AHRQ Publication No. 06-E004. Rockville (MD): AHRQ; 2006.

Information provided should include the size and consistency of the mass (cystic, solid, or mixed), whether the mass was unilateral or bilateral, presence or absence of septations, mural nodules, papillary excrescences, and free fluid in the pelvis. In premenopausal or postmenopausal women, excrescences, ascites, and mural nodules raise the suspicion for cancer, whereas absence of these findings suggests a benign diagnosis. Ultrasound findings should be correlated with physical findings, and a refined differential diagnosis should be constructed.

In an effort to quantify cancer risk based on morphology, several transvaginal ultrasound scoring systems have been proposed (14–19). Whereas scoring criteria vary among these systems, most assign low risk scores to sonolucent cysts with smooth walls, thin or absent septations, and absence of solid components. In initial publications, scoring systems were able to distinguish benign from malignant masses in most instances (sensitivity, 65–100% and specificity, 67–95%); however, prospective validation studies have provided consistently lower figures for each scoring system so evaluated (17, 20–22). In a rigorous meta-analysis of these scoring systems, the pooled sensitivities and specificities ranged from 86% to 91% and from 68% to 83%, respectively (23).

One morphology index assigns a morphologic score to the ultrasound image of the adnexal mass by considering three criteria: 1) ovarian tumor volume, 2) cyst wall structure, and 3) septa structure (16) (Table 2). Volume is calculated using an ellipsoid formula: length × width × height × 0.523, and each component is assigned a score from 0 to 4 for a possible composite score of 0–12. For example, a sonolucent, smooth-walled mass measuring less than 10 cm^3 would be assigned a composite score of 0, whereas a multiseptate mass with irregular wall structure or solid component measuring 100 cm^3 would be assigned a score of 10. Although, in a study of 213 patients (24), a composite score of 5 or more was associated with an 89% sensitivity to distinguish a malignant mass from a benign mass, the positive predictive value of a score of 5 or more was only 46%. In other words, more than one half of the masses that were classified as malignant based on a score of 5 or more were actually benign. In addition, intraobserver variation in assigning scores for wall and septal structure was quite high ($\kappa = 0.41$ and 0.47, respectively).

Color Doppler Ultrasonography

Color Doppler ultrasonography permits measurement of blood flow in and around a mass. Based on the hypothe-

Table 2. Morphology Index for Ovarian Tumors

Score	0	1	2	3	4	5
Volume	Less than 10 cm^3	10–50 cm^3	Greater than 50–100 cm^3	Greater than 100–200 cm^3	Greater than 200–500 cm^3	Greater than 500 cm^3
Structure	Smooth wall, sonolucent	Smooth wall, diffuse echogenicity	Wall thickening, less than 3 mm fine septa	Papillary projection equal to or greater than 3 mm thick	Complex, predominantly solid	Complex, solid and cystic areas with extratumoral fluid

Liu JH, Gass M. Management of the perimenopause. New York (NY): © The McGraw-Hill Companies, Inc; 2006.

sis that hypoxic tissue in tumors will recruit low-resistance, high-flow blood vessels, the ultimate goal of color Doppler ultrasonography is to increase the specificity of gray-scale two-dimensional ultrasonography alone. Color Doppler ultrasonography performed at the time of transvaginal ultrasonography measures various blood flow indices, including resistive index, pulsatility index, and maximum systolic velocity (25–31). The current role of color Doppler ultrasonography in evaluating pelvic masses remains controversial because the ranges of values of resistive index, pulsatility index, and maximum systolic velocity between benign and malignant masses overlap considerably in most publications on this subject.

In an attempt to overcome the overlap among color Doppler ultrasonography blood flow indices, "vascular sampling" of suspicious areas (papillary projections, solid areas, and thick septations) using both three-dimensional transvaginal ultrasonography and power Doppler ultrasonography has been investigated (13, 32–35). In addition, three-dimensional ultrasound examination of vascular architecture has proved to be highly discriminatory in distinguishing benign masses from cancers in some reports (36). In particular, a "chaotic" vascular architecture correlated highly with malignancy. These newer approaches deserve prospective clinical trials to define their role in distinguishing benign from malignant masses.

Other Imaging Modalities

Computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET) are not recommended for use in the initial evaluation of adnexal masses. In addition, after a thorough transvaginal ultrasound examination is performed, additional imaging with these modalities usually is of limited value. Because of their high cost, use of these imaging modalities should be reserved for specific situations. Based on limited data, MRI might have superior ability compared with transvaginal ultrasonography in correctly classifying malignant masses at the expense of a lower overall detection rate (37–40). Gadolinium-contrast MRI can improve sensitivity (37, 41, 42), but in addition to its expense, its inconvenience precludes its routine use over transvaginal ultrasonography. However, MRI often will be helpful in differentiating the origin of nonadnexal pelvic masses, especially leiomyomata (43).

Currently, the best use of CT imaging is not to detect and characterize pelvic masses but to evaluate the abdomen for metastasis when a cancer is suspected based on transvaginal ultrasound images, examination results, or serum markers. A CT scan can detect omental metastases, peritoneal implants, pelvic or periaortic lymph node enlargement, hepatic metastases, obstructive uropathy, and possibly an alternate primary cancer site, including pancreas or colon.

Because of the much higher cost with no clear advantage over transvaginal ultrasonography, current data do not support the use of PET scanning in the preoperative assessment of adnexal masses.

Serum Marker Screening

The most extensively studied serum marker to distinguish benign from malignant pelvic masses is CA 125. It is most useful when nonmucinous epithelial cancers are present, but it is not of value in distinguishing other categories of ovarian malignancy (44). The serum marker CA 125 level is elevated in 80% of patients with epithelial ovarian cancer but only in 50% of patients with stage I disease at the time of diagnosis, hence its lack of utility as a screening test (1). Additionally, β-hCG, L-lactate dehydrogenase (LDH), and alpha-fetoprotein (AFP) levels may be elevated in the presence of certain malignant germ cell tumors, and inhibin A and B sometimes are markers for granulosa cell tumors of the ovary. The overall sensitivity of CA 125 screening in distinguishing benign from malignant adnexal masses reportedly ranges from 61% to 90%; specificity ranges from 71% to 93%, positive predictive value ranges from 35% to 91%, and negative predictive value ranges from 67% to 90% (26–28, 45–48). Wide variations in these figures reflect differences in cancer prevalence in the study population, the proportion of

patients who are postmenopausal, and the threshold of CA 125 levels considered abnormal. The low sensitivity occurs because the CA 125 level is elevated in only one half of early stage epithelial ovarian cancers and rarely in germ cell, stromal, or mucinous cancers. The low specificity occurs because the CA 125 level frequently is elevated in many commonly encountered clinical conditions, including uterine leiomyomata, endometriosis, acute or chronic pelvic inflammatory disease, ascites of any etiology, and even inflammatory conditions such as systemic lupus erythematosus and inflammatory bowel disease. Because most of these clinical conditions occur in premenopausal women and because most epithelial ovarian cancers occur in postmenopausal women, the sensitivity and specificity of an elevated CA 125 level in concert with a pelvic mass is highest after menopause.

Clinical Considerations and Recommendations

▶ *What ultrasound findings are suggestive of benign disease?*

Unilocular, thin-walled sonolucent cysts with smooth, regular borders are overwhelmingly benign, regardless of menopausal status or cyst size, with malignancy rates in most series of 0–1% (49–53). In the largest prospective study published to date, 2,763 postmenopausal women with unilocular cysts no larger than 10 cm were evaluated using serial ultrasonography at 6-month intervals. Spontaneous resolution occurred in more than two thirds of patients, and no cancers were detected after a mean follow-up of 6.3 years, suggesting that the risk of malignancy in such patients was virtually nonexistent (51). Therefore, simple cysts up to 10 cm in diameter as measured by ultrasonography are almost universally benign and may safely be followed without intervention, even in postmenopausal patients.

Small descriptive studies have reported ultrasound characteristics that may be specific for selected benign diagnoses. Typical findings reported for endometriomas include a round homogeneous-appearing cyst containing low-level echoes within the ovary, with sensitivity of 83% and specificity of 89% in differentiating them from other types of ovarian cysts (54, 55). Mature teratomas typically contain a hypoechoic attenuating component with multiple small homogeneous interfaces; these were determined with 98% accuracy in a series of 155 suspected dermoid cysts (56). In addition, hydrosalpinges appear as tubular-shaped sonolucent cysts, with a sensitivity of 93% and specificity of 99.6% for differentiating this diagnosis from other adnexal masses (57).

▶ *When is a CA 125 test warranted?*

The value of elevated CA 125 levels is in distinguishing between benign and malignant masses in postmenopausal women. Few studies evaluate the predictive value of CA 125 levels stratified by menopausal status but, of those that do, specificity and positive predictive value are consistently higher in postmenopausal patients. In a prospective study of 158 patients undergoing laparotomy for a pelvic mass, the positive predictive value of an elevated CA 125 level was 98% in postmenopausal women (cancer prevalence 63%) but was only 49% in premenopausal women (cancer prevalence 15%) (58).

Whereas CA 125 level measurement is less valuable in premenopausal than postmenopausal women in predicting cancer risk, extreme values can be helpful. For example, although premenopausal women with masses and either normal or mildly elevated CA 125 levels usually have benign diagnoses, a markedly elevated CA 125 level raises a much greater concern for malignancy, even though women with benign conditions such as endometriomas can have CA 125 level elevations of 1,000 units/mL or greater (59). A normal CA 125 level in the absence of transvaginal ultrasound findings suspicious for cancer can justify observation in the asymptomatic woman.

Typically CA 125 values will increase over time when a cancer is present, whereas this is not necessarily so for benign masses. Although this observation is intuitive, there are few studies published that specifically address this hypothesis (60).

▶ *What evaluation is necessary in the premenopausal woman?*

Almost all pelvic masses in premenopausal women are benign. The initial evaluation in this age group is influenced by the presence or absence of abdominal or pelvic symptomatology. Symptomatic patients typically have diagnoses that require immediate interventions, including antibiotics and possibly surgery for tuboovarian abscesses, medical management or surgical intervention for ectopic pregnancies, surgical management for torsion of an ovarian cyst, and expectant management for most ruptured ovarian cysts. Appropriate evaluation for such women includes a medical history and physical examination, quantitative β-hCG level evaluation, complete blood count, and transvaginal ultrasonography. Additional studies may be indicated, including serial hematocrit measurements and appropriate cultures.

Rarely, a patient with acute symptomatology might have a malignancy. Acute hemorrhage into a cancerous ovary or rapid growth of a malignancy can present in such a manner. Such malignant tumors often are germ

cell tumors, occurring in adolescents or women in their late teens or twenties (61, 62). In such a situation, tumor markers specific for many such germ cell tumors, including β-hCG, AFP, and LDH in conjunction with transvaginal ultrasonography, might aid in the diagnosis.

What evaluation is necessary in the postmenopausal woman?

The exclusion of many common diagnoses of premenopausal women (eg, functional cyst, endometriosis, tuboovarian abscess, and ectopic pregnancy) and the greater probability that a mass will be malignant in postmenopausal women results in a much higher index of suspicion for malignancy when a mass is present in women in this age group. The hallmark for evaluation of such women includes transvaginal ultrasonography and CA 125 level measurements. Any elevation of CA 125 levels is highly suspicious for malignancy in women in this age group (45, 63) as are transvaginal ultrasound findings of masses that contain solid areas or excrescences or that are associated with free fluid in the abdomen or pelvis or both. With the exception of simple cysts on a transvaginal ultrasound finding, most pelvic masses in postmenopausal women will require surgical intervention.

It also is important to note that the ovary is a relatively common site for metastases from uterine, breast, colorectal, or gastric cancers. All postmenopausal women with a mass should have breast and digital rectal examinations as well as mammography if it has not been performed in the past 12 months. An endometrial biopsy should be performed if transvaginal ultrasound findings show a thickened endometrial lining and abnormal uterine bleeding is present. Additionally, if the patient is found to be anemic, has a positive fecal occult blood test result, and is older than 50 years, upper and lower gastrointestinal endoscopy should be performed to rule out primary gastric or colon cancer.

Is aspiration of cyst fluid appropriate?

Aspiration of nonunilocular cyst fluid for both diagnosis and treatment of an adnexal mass may seem quicker, less invasive, and less expensive than surgery; however, it is typically regarded as contraindicated in postmenopausal women for several reasons, especially when there is a suspicion for cancer. First, diagnostic cytology has poor sensitivity to detect malignancy, ranging from 25% to 82% (64–69). In addition, even when a benign mass is aspirated, the procedure often is not therapeutic. Approximately 25% of cysts in perimenopausal and postmenopausal women will recur within 1 year of the procedure (70). Finally, aspiration of a malignant mass may induce spillage and seeding of cancer cells into the peritoneal cavity, thereby changing the stage and prognosis. Although definitive evidence supporting this notion is lacking, there have been many cases of aspirated malignant masses recurring along the needle tract through which the aspiration was done (71, 72). Furthermore, there is strong evidence that spillage at the time of surgery decreases overall survival of stage I cancer patients compared with patients with tumors that were removed intact (73, 74).

An exception to avoiding aspiration of a mass exists for those patients who have clinical and radiographic evidence of advanced ovarian cancer and who are medically unfit to undergo surgery. In these women, malignant cytology confirmed in this fashion will establish a cancer diagnosis, thereby permitting initiation of neoadjuvant chemotherapy (75, 76).

When is observation appropriate?

Repeat imaging is most appropriate when either the morphology of the mass on an ultrasound finding suggests benign disease (49), or when morphology is less certain but there is a compelling reason to avoid surgical intervention. Examples include functional cysts in ovulating women, suspected endometriomas in asymptomatic women with normal or elevated, but not increasing, CA 125 levels, simple cysts in any setting, and hydrosalpinges. Specific diagnostic criteria for most of these conditions were discussed previously. Thus, repeat imaging is recommended whenever there is uncertainty of a diagnosis and when cancer or a benign neoplasm is in the differential diagnosis (77). Furthermore, some women for whom the usual management of a mass would require surgical intervention are at substantial risk for perioperative morbidity and mortality. In such instances, repeat imaging often is safer than immediate operative intervention, although the frequency of repeat imaging has not been determined.

Which patients may benefit from referral to a gynecologic oncologist?

It has been well-established that women with ovarian cancer whose care is managed by a physician who has advanced training and expertise in the treatment of women with gynecologic cancer, such as a gynecologic oncologist, have improved overall survival rates as compared with those treated without such collaboration. Improved survival rates reflect both proper staging, thereby identifying some patients with unexpected occult metastasis who require adjuvant chemotherapy and aggressive debulking of advanced disease (78–80).

The Society of Gynecologic Oncologists (SGO) performed a multi-center, retrospective validation trial of

SGO–American College of Obstetricians and Gynecologists (ACOG) guidelines (Box 2) in which referral criteria and final histology of 1,035 women undergoing surgical exploration for a pelvic mass in six referral centers were reviewed (81). The prevalence of primary ovarian cancer was 30.7%, and the prevalence of cancers metastatic to the ovary was 4.8%. When applying the referral criteria, the positive predictive value was 33.8% and 59.5% in premenopausal and postmenopausal women, respectively. The negative predictive value was 92% for premenopausal and 91.1% for postmenopausal women. A second set of SGO guidelines referenced premenarchal patients and young adults with elevated germ cell tumor marker levels who may require surgical staging and adjuvant chemotherapy for malignant germ cell tumors (82) and supported the referral criteria recommended in the guidelines.

How should adnexal masses be managed in pregnancy?

Despite the widespread use of ultrasonography during pregnancy, creating opportunities for detection of pelvic masses, there are few studies regarding adnexal masses in pregnant women is 0.05–3.2% of live births (83–87). The most commonly reported pathologic diagnoses are mature teratomas and paraovarian or corpus luteum cysts (87–89). Malignancy is diagnosed in only 3.6–6.8% of patients with persistent masses and, in this age group, most malignancies are either germ cell, stromal, or epithelial tumors of low malignant potential.

The best approach to evaluate the pregnant patient with a mass is similar to that of the premenopausal patient described earlier. Depending on gestational age, abdominal ultrasonography may be used in addition to transvaginal ultrasonography because the ovaries may be outside of the pelvis later in gestation. Magnetic resonance imaging is the modality of choice if additional imaging is needed because it poses no fetal radiation exposure. Levels of CA 125 peak in the first trimester (range, 7–251 units/mL) and decrease consistently thereafter (90). Accordingly, low-level elevations in pregnancy typically are not associated with malignancy.

Despite a lack of supporting data, surgical removal of persistent masses in the second trimester is a common practice, with the intent to prevent emergent intervention for torsion or rupture. Several investigators have examined the role of expectant management; they report that 51–70% of adnexal masses will resolve during pregnancy (86–91), with predictors of persistence being mass size greater than 5 cm and "complex" morphology on transvaginal ultrasound findings. The actual occurrence of acute complications is reportedly less than 2% (85). Therefore, because adnexal masses in pregnancy appear to have low risk for both malignancy and acute complications, they may be considered for expectant management.

Box 2. Society of Gynecologic Oncologists and American College of Obstetricians and Gynecologists Referral Guidelines for a Newly Diagnosed Pelvic Mass

Premenopausal (younger than 50 years)

- CA 125 levels greater than 200 units/mL
- Ascites
- Evidence of abdominal or distant metastasis (by results of examination or imaging study)
- Family history of breast or ovarian cancer (in a first-degree relative)

Postmenopausal (older than 50 years)

- Elevated CA 125 levels
- Ascites
- Nodular or fixed pelvic mass
- Evidence of abdominal or distant metastasis (by results of examination or imaging study)
- Family history of breast or ovarian cancer (in a first-degree relative)

Im SS, Gordon AN, Buttin BM, Leath CA 3rd, Gostout BS, Shah C, et al. Validation of referral guidelines for women with pelvic masses. Obstet Gynecol 2005;105:35–41.

When should laparotomy versus laparoscopy be used in the management of the unilateral adnexal mass?

Advancements in the preoperative assessment of pelvic masses permit the distinction of benign from malignant masses with a relatively high degree of confidence in most cases. Given such advancements in diagnosis, coupled with advancements in minimally invasive surgical techniques, laparoscopic management of many women with benign pelvic masses is appropriate and desirable. In general, if a mass is suspicious for cancer based on transvaginal ultrasound findings, CA 125 levels, and clinical assessment, laparoscopic surgery usually is considered contraindicated, although laparoscopic staging and management of ovarian cancer have been reported (92–94).

Several retrospective studies addressing the laparoscopic management of pelvic masses have confirmed

low complication rates ranging from 0% to 10%. Higher complication rates occur when masses are suspicious for cancer (95–102). In these studies, the mean conversion rate from laparoscopy to laparotomy was 6.4% (range, 0–25%), and the mean rate of cancer diagnosis was 4.3% (range, 0–17%). When compared with women undergoing laparotomy, the most consistent endpoints showing statistical significance are shortened length of hospital stay, decreased pain, and decreased convalescence time for women in whom masses are managed laparoscopically (97–101).

Three published randomized trials comprising 394 patients compare the findings and outcome of laparoscopy versus laparotomy in women with clinically benign pelvic masses (102–104). Conversion to laparotomy was performed only for endoscopic suspicion of cancer with conversion rates ranging from 0% to 1.5%. Rates of intraoperative cyst rupture were equal between the two approaches. In each study, statistically significant decreases in operative time, perioperative morbidity, length of hospital stay, and postoperative pain following laparoscopy versus laparotomy were demonstrated.

▶ *When is removal of the uterus and contralateral adnexa appropriate?*

The extent of surgery typically is a function of diagnosis, age, and patient wishes for ovarian function or future fertility. In premenopausal women, the operation of choice is cystectomy, when feasible, including most if not all mature teratomas and many endometriomas and cystadenomas. When ovarian tissue cannot be preserved, a unilateral oophorectomy or salpingo-oophorectomy is indicated. Patients must be advised about the risk of bilaterality, which can be as high as 25% for benign serous tumors, approximately 15% for benign teratomas, and as low as 2–3% for benign mucinous tumors. Wedge biopsy of a normal appearing contralateral ovary is not advised because doing so might adversely affect fertility (105). Perimenopausal or postmenopausal patients also may choose to undergo cystectomy or unilateral salpingo-oophorectomy. However, hysterectomy or bilateral salpingo-oophorectomy or both are considered appropriate options following completion of childbearing to reduce the risk of requiring future pelvic surgery and to exclude the risk of developing uterine, cervical, or ovarian cancer. It is unclear whether the potential benefits of ovarian preservation outweigh the risks of leaving them in situ. One decision-analysis model performed in women at average risk demonstrated excess mortality risk largely because of coronary heart disease and hip fracture if oophorectomy is performed before age 59 years (106).

▶ *When is conservative surgery an option in ovarian cancer management?*

Regardless of menopausal status, when cancers are present, including tumors of low malignant potential, the standard management includes hysterectomy with bilateral salpingo-oophorectomy and staging procedures by a physician with advanced training and experience with gynecologic cancer. Exceptions exist for some premenopausal women who wish to preserve their childbearing capabilities. Conservative surgery to preserve future fertility, including unilateral salpingo-oophorectomy or even ovarian cystectomy, does not appear to be associated with compromised prognosis in premenopausal women when the cancer is a germ cell tumor (107–109), a stage I stromal tumor, a tumor of low malignant potential (83, 92, 110–113), and even cases of stage IA, grade 1–2 invasive cancers (114, 115). Such patients should undergo complete surgical staging even when the uterus and opposite ovary will be preserved. Rates of recurrence are relatively low, being reported as 0–18.5% in low-malignant-potential tumors (83, 110, 112, 113) and 9.6–14.7% in patients with stage IA, grade 1–2 tumors (114, 115). Long-term survival rates in these series exceeded 90% for all tumors. Reproductive outcomes generally are favorable; however, these cases remain small in number.

The surgeon often may rely on frozen-section evaluation for operative decision making. The accuracy of frozen-section diagnosis varies from 72% to 88.7% (116). In addition, diagnostic accuracy has been shown to be lower in masses greater than 10 cm (74%) because of possible sampling errors with large masses, tumors of low malignant potential (78%), and ovarian cancers (75%) (116).

Summary of Recommendations and Conclusions

The following recommendations and conclusions are based on limited or inconsistent scientific evidence (Level B):

- In asymptomatic women with pelvic masses, whether premenopausal or postmenopausal, transvaginal ultrasonography is the imaging modality of choice. No alternative imaging modality has demonstrated sufficient superiority to transvaginal ultrasonography to justify its routine use.
- Specificity and positive predictive value of CA 125 level measurements are consistently higher in

postmenopausal women compared with premenopausal women. Any CA 125 elevation in a postmenopausal woman with a pelvic mass is highly suspicious for malignancy.

- Simple cysts up to 10 cm in diameter on ultrasound findings are almost universally benign and may safely be followed without intervention, even in postmenopausal patients.
- Unilateral salpingo-oophorectomy or ovarian cystectomy in patients with germ cell tumors, stage I stromal tumors, tumors of low malignant potential, and stage IA, grade 1–2 invasive cancer who undergo complete surgical staging and who wish to preserve fertility does not appear to be associated with compromised prognosis.

The following recommendations and conclusions are based primarily on consensus and expert opinion (Level C):

- Women with ovarian cancer whose care is managed by physicians who have advanced training and expertise in the treatment of women with ovarian cancer, such as gynecologic oncologists, have improved overall survival rates compared with those treated without such collaboration.
- Most masses in pregnancy appear to have a low risk for both malignancy and acute complications and, thus, may be considered for expectant management.

Proposed Performance Measure

The percentage of patients evaluated for an asymptomatic pelvic mass who receive a transvaginal ultrasound examination

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The MEDLINE database, the Cochrane Library, and ACOG's own internal resources and documents were used to conduct a literature search to locate relevant articles published between January 1985 and January 2007. The search was restricted to articles published in the English language. Priority was given to articles reporting results of original research, although review articles and commentaries also were consulted. Abstracts of research presented at symposia and scientific conferences were not considered adequate for inclusion in this document. Guidelines published by organizations or institutions such as the National Institutes of Health and the American College of Obstetricians and Gynecologists were reviewed, and additional studies were located by reviewing bibliographies of identified articles. When reliable research was not available, expert opinions from obstetrician–gynecologists were used.

Studies were reviewed and evaluated for quality according to the method outlined by the U.S. Preventive Services Task Force:

- I Evidence obtained from at least one properly designed randomized controlled trial.
- II-1 Evidence obtained from well-designed controlled trials without randomization.
- II-2 Evidence obtained from well-designed cohort or case–control analytic studies, preferably from more than one center or research group.
- II-3 Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments also could be regarded as this type of evidence.
- III Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

Based on the highest level of evidence found in the data, recommendations are provided and graded according to the following categories:

Level A—Recommendations are based on good and consistent scientific evidence.

Level B—Recommendations are based on limited or inconsistent scientific evidence.

Level C—Recommendations are based primarily on consensus and expert opinion.

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