Approach to the patient with an adnexal mass

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INTRODUCTION

An adnexal mass (ie, solid or cystic mass of the ovary, fallopian tube, or surrounding connective tissues) is a common gynecologic issue. Adnexal masses may be found in females of all ages and have many etiologies (table 1).

The principal goals of the evaluation of an adnexal mass are to determine whether the mass is "almost certainly benign," has a "reasonable chance of being malignant," and whether there is an urgent condition (eg, ectopic pregnancy, adnexal torsion) that requires prompt medical or surgical treatment. Management of nonurgent conditions may involve:

- Expectant management – When the mass is not suspicious for malignancy and there are no other indications for surgery or surveillance, no further follow-up is needed.
- Surveillance – Surveillance is an option if the suspicion of malignancy is low but has not been completely excluded. Surveillance usually includes one or more pelvic ultrasounds and/or measurement of serum tumor markers.
- Surgery – Surgery is performed when there is a high risk of malignancy, histologic diagnosis is desired, or the patient has persistent pain or other symptoms.

This topic will focus on the evaluation and management of nonpregnant adult patients with an adnexal mass. The evaluation and management of patients with an adnexal mass in other

populations (fetus, pediatric, and pregnant patients), as well as other related topics, are reviewed separately:

- (See "Adnexal mass: Ultrasound categorization".)
- (See "Adnexal mass: Differential diagnosis".)
- (See "Ovarian cysts in infants, children, and adolescents".)
- (See "Adnexal mass: Evaluation and management in pregnancy".)

In this topic, we will use the term "patient" to describe genetic females. We encourage the reader to consider the specific counseling needs of transgender and gender nonbinary individuals.

BACKGROUND

Prevalence — Ovarian masses are the most common type of adnexal mass and are identified in approximately 8 to 35 percent of premenopausal patients [1,2] and 3 to 17 percent of postmenopausal patients [2,3].

The prevalence of specific histologic types of adnexal masses, as demonstrated in one prospective study including almost 5000 patients with a persistent adnexal mass, is shown in the table (table 2) [4]. The patients in this study, the International Ovarian Tumor Analysis (IOTA) study, underwent transvaginal ultrasound examination at 22 centers (oncology centers, referral centers for ultrasonography, and general hospitals) and were selected for surgery by the managing clinician, which may affect the prevalences listed in the table.

Clinical presentation — Patients with an adnexal mass may be asymptomatic or present with one or more of the following symptoms. Frequency of symptoms vary widely depending on the etiology of the mass and population studied:

- Pelvic pain or pressure – Pelvic pain or pressure is the most common symptom associated with an adnexal mass [5]. When present, it is often unilateral and can be of variable severity, acute or gradual onset, sharp or dull, and constant or intermittent. More generalized pain may occur if an adnexal cyst ruptures and spills irritants (eg, blood, sebaceous material, inflammatory contents) into the peritoneal cavity.
- Abdominal fullness or pressure
- Gastrointestinal discomfort (eg, nausea, vomiting, constipation, bloating)
- Difficult or frequent urination

- Dysmenorrhea
- Dyspareunia
- Fever
- Abnormal uterine bleeding (AUB) – AUB is more common in certain types of adnexal masses, including pregnancy-related masses (eg, ectopic pregnancy) and hormonally active ovarian tumors (eg, sex cord-stromal tumors). (See "Abnormal uterine bleeding in nonpregnant reproductive-age patients: Terminology, evaluation, and approach to diagnosis", section on 'Irregular bleeding'.)

DIAGNOSTIC EVALUATION

Patients with an adnexal mass and acute and/or severe pain or hemodynamic instability should be evaluated and stabilized in the emergency department (see 'Patients requiring prompt intervention' below). Patients in whom a potentially urgent condition is not suspect are typically evaluated in an outpatient setting.

- The medical history should include the following:
  - Menstrual history (including last menstrual period and presence/severity of dysmenorrhea)
  - Characteristics of the pain (if present)
  - Presence/absence of fever
  - Sexual history
  - Presence/absence of infertility
  - Risk factors (table 3) or symptoms (table 4) of ovarian cancer

  This is discussed in more detail separately. (See "The gynecologic history and pelvic examination", section on 'Gynecologic history'.)

- Physical examination, including pelvic examination (if not already done), is used to assess the size, consistency, and mobility of a mass, if palpable. Small adnexal masses may be difficult to palpate due to the deep anatomic location of the ovary. Larger masses can extend out of the pelvis and be difficult to feel. In patients with a prior hysterectomy, the ovaries may rise out of the pelvis and be difficult to palpate due to loss of ligamentous attachments.

Findings such as pain with palpation; abdominal distention, ascites, or bloating; or a mass that is irregular, fixed, and/or associated with posterior cul-de-sac nodularity should be noted. Nodularity and/or fixation can be signs of endometriosis, infection, or malignancy.

Signs of a hormonally active mass, such as virilization, should also be noted.

- Basic laboratory evaluation includes a pregnancy test and complete blood count.

DIAGNOSIS

The diagnosis of an adnexal mass may be suspected on pelvic examination and confirmed with pelvic imaging (usually transvaginal ultrasonography); alternatively, the diagnosis may be made when an adnexal mass is visualized on imaging ordered for another indication (eg, pelvic pain). If the patient has pain, the sonographic probe can often be utilized to locate the area of pain, thus suggesting a potential etiology.

A **definitive** diagnosis of the **etiology** of an adnexal mass is made by characteristic histologic findings following surgery.

A **presumptive** diagnosis of the **etiology** of an adnexal mass can often be made based on the classic sonographic appearance of the mass (eg, physiologic cyst, dermoid cyst, endometrioma, hydrosalpinx, peritoneal inclusion cyst, serous and mucinous cystadenoma, cystadenofibroma, ovarian fibroma) and can be further supported with clinical findings, such as:

- Patient age and menopausal status
- Acuteness and severity of pain
- Associated symptoms, as detailed above (see 'Clinical presentation' above)
- Physical examination findings (see 'Clinical presentation' above)
- Laboratory findings (eg, a positive pregnancy test, leukocytosis)
- Risk factors (table 3) or symptoms (table 5) associated with epithelial ovarian cancer (EOC)
- History of a preexisting malignancy that might metastasize to the ovary (see "Epithelial carcinoma of the ovary, fallopian tube, and peritoneum: Clinical features and diagnosis", section on 'Assessing for metastatic disease')

The various types of adnexal masses (table 1) are reviewed in detail separately. (See "Adnexal mass: Differential diagnosis".)

MANAGEMENT

Patients requiring prompt intervention — Adnexal masses that require prompt intervention because of their potential for causing serious morbidity (eg, hemorrhagic shock, sepsis) and/or loss of ovarian function include:

- Ectopic pregnancy – (See "Ectopic pregnancy: Clinical manifestations and diagnosis" and "Ectopic pregnancy: Choosing a treatment".)
- Adnexal torsion – (See "Ovarian and fallopian tube torsion".)
- Tubo-ovarian abscess – (See "Epidemiology, clinical manifestations, and diagnosis of tubo-ovarian abscess" and "Management and complications of tubo-ovarian abscess".)
- Ruptured or hemorrhagic ovarian cyst – (See "Evaluation and management of ruptured ovarian cyst".)

Patients at increased risk of malignancy

Assessing the risk of malignancy — Risk of malignancy is based primarily on the sonographic characteristics of the adnexal mass in the context of the patient's relevant clinical information (including a history of a hereditary ovarian cancer syndrome), which is discussed in detail separately. (See "Adnexal mass: Ultrasound categorization" and 'Patients with a hereditary ovarian cancer syndrome' below.)

It is important to emphasize that there is no universally accepted classification system for defining the risk of malignancy of an adnexal mass. Furthermore, there can be substantial variability in both image acquisition (eg, type of equipment, expertise of the sonographer) and interpretation. Thus, if there is suspicion for malignancy, or uncertainty about the degree of risk for malignancy, a repeat ultrasound examination with a specialist in gynecologic sonography, additional imaging with magnetic resonance imaging (MRI), and/or consultation with a gynecologic oncologist should be obtained [6]. (See 'Role of additional imaging' below and 'When to refer to a gynecologic oncologist' below.)

An emerging classification system for standardizing the reporting of sonographic findings and describing the risk of malignancy of an adnexal mass is the American College of Radiology (ACR) Ovarian-Adnexal Reporting and Data System (O-RADS), which is promising, but not yet widely

used [6] (see "Adnexal mass: Ultrasound categorization", section on 'O-RADS'). The classification system is as follows (table 6):

- **Normal ovary** (O-RADS 1) – This includes follicles (ie, simple cysts) and corpus lutea ≤3 cm.
- **Almost certainly benign** (O-RADS 2; risk of malignancy <1 percent) – This includes typical hemorrhagic cysts, dermoid cysts, and endometriomas (all <10 cm), and simple paraovarian cysts, typical peritoneal inclusion cysts, and typical hydrosalpinges (of any size).
- **Low-risk** (O-RADS 3; risk of malignancy 1 to <10 percent)
- **Intermediate-risk** (O-RADS 4; risk of malignancy 10 to <50 percent)
- **High-risk** (O-RADS 5; risk of malignancy ≥50 percent)

Given the complexities of noninvasive diagnosis, many patients who undergo surgery to exclude malignancy will have a benign mass [7,8]. However, since the prognosis of carcinoma of the ovary, fallopian tube, or peritoneum is poor unless the disease is treated at an early stage, the need for a diagnosis of malignancy usually outweighs the potential morbidity associated with surgical intervention. (See "Epithelial carcinoma of the ovary, fallopian tube, and peritoneum: Clinical features and diagnosis" and "Overview of epithelial carcinoma of the ovary, fallopian tube, and peritoneum".)

Role of tumor markers and multimodal tests

- **Serum tumor markers** – The utility of serum biomarkers in risk assessment for malignancy is limited.
  - Cancer antigen 125 (CA 125) is the most common tumor marker evaluated in patients with adnexal masses suspicious for an epithelial ovarian cancer (EOC). In our practice, we measure CA 125 in all postmenopausal patients with an adnexal mass. In premenopausal patients, we measure a serum CA 125 **only** if the ultrasound appearance of a mass raises sufficient suspicion of malignancy to warrant a repeat ultrasound or surgical evaluation.

    Other serum tumor markers, including human epididymis protein 4 (HE4), carcinoembryonic antigen (CEA), and cancer antigen 19-9, are discussed in detail separately. If positive, these markers can be used for monitoring disease response to treatment. (See "Adnexal mass: Role of serum biomarkers in diagnosing epithelial carcinoma of the ovary, fallopian tube, or peritoneum", section on 'Biomarkers'.)

- Patients with an adnexal mass who present with symptoms or signs of estrogen excess (eg, abnormal uterine bleeding [AUB]) or androgen excess (eg, virilization) may have a germ cell or sex cord-stromal tumor. Serum markers associated with these histologic types are shown in the table (table 7). In many cases, however, the diagnosis of these histologic types is made only by postoperative pathology evaluation of the ovary. (See "Sex cord-stromal tumors of the ovary: Epidemiology, clinical features, and diagnosis in adults" and "Ovarian germ cell tumors: Pathology, epidemiology, clinical manifestations, and diagnosis", section on 'Tumor markers'.)

- **Multimodal tests** – Multiple risk scoring systems (ie, Risk of Malignancy Index, ADNEX Model) have been proposed to differentiate between benign and malignant adnexal masses. These systems include sonographic features and other factors, such as menopausal status and serum CA 125. However, such models can be cumbersome to use. (See "Adnexal mass: Role of serum biomarkers in diagnosing epithelial carcinoma of the ovary, fallopian tube, or peritoneum", section on 'Biomarker panels for patients undergoing surgery'.)

Role of additional imaging — For most patients, the diagnosis of an adnexal mass is made by ultrasound. For masses with indeterminate features on ultrasound, or images that are suboptimal, further characterization of the mass can be achieved by obtaining MRI or referral to an ultrasound specialist (ie, a physician whose practice includes a focus on ultrasound assessment of adnexal lesions) [6]. (See "Adnexal mass: Ultrasound categorization", section on 'Step four: Is additional evaluation needed?'.)

Computed tomography (CT) is **not** a primary modality for evaluation of adnexal masses; however, some patients will have an adnexal mass detected incidentally on a CT ordered for a different indication. While the diagnosis of a simple cyst, dermoid, or hydrosalpinx can typically be made by the classic appearance of these lesions on imaging, further imaging with transvaginal ultrasound is often needed to better characterize these masses.

CT or MRI is used as part of noninvasive staging of patients with suspected ovarian cancer. (See "Epithelial carcinoma of the ovary, fallopian tube, and peritoneum: Clinical features and diagnosis", section on 'Assessing for metastatic disease'.)

When to refer to a gynecologic oncologist — Referral to a gynecologic oncologist is advised for masses that are suspicious for ovarian, fallopian tube, or peritoneal cancer [6]; outcomes of staging and cytoreduction are superior when the procedure is performed by a gynecologic oncologist compared with other surgeons [9-13]. In a systematic review including 18 observational studies, patients with advanced ovarian epithelial cancer had a six- to nine-

month median survival benefit when operated on by a gynecologic oncologist; in patients with early-stage disease, gynecologic oncologists were also more likely to perform optimal staging [12].

In 2011, the American College of Obstetricians and Gynecologists and the Society of Gynecologic Oncology published a joint guideline about referral of patients with an adnexal mass to a gynecologic oncologist (table 8) [9]. For premenopausal patients, the guideline advises referral for those with a "very elevated" CA 125 level, but a specific value is not given. The 2002 version of the guideline used a value of >200 units/mL, but this was removed in 2011 [14]. Studies evaluating the performance of the 2002 guideline showed that 70 to 79 percent of premenopausal and 93 to 94 percent of postmenopausal patients with ovarian cancer will be captured by this threshold (specificity 70 and 60 percent, respectively) [15,16]. (See 'Candidates for surgical evaluation' below.)

Candidates for surgical evaluation

Patients with a high-risk mass on imaging — Patients of any menopausal status with a high-risk adnexal mass on imaging (O-RADS 5) often require surgery for diagnosis and treatment (algorithm 1 and algorithm 2). This includes patients with findings suggestive of metastatic disease (eg, ascites, peritoneal masses, enlarged pelvic lymph nodes [rare]) even in the absence of malignant features in the mass itself.

Less invasive studies (eg, paracentesis, thoracentesis, omental, pleural, or lymph node biopsies) are occasionally performed instead of surgery to confirm malignancy, especially in older patients with imaging concerning for advanced disease. However, image-guided biopsy of the ovary i**s not** recommended as incising or rupturing the mass can lead to spillage of malignant cells into the peritoneum and a more advanced stage of disease. (See "Epithelial carcinoma of the ovary, fallopian tube, and peritoneum: Clinical features and diagnosis", section on 'Assessing for metastatic disease'.)

Other high-risk postmenopausal patients — Postmenopausal patients with an adnexal mass and any of the following high-risk features are also managed surgically (algorithm 2):

- **Elevated tumor marker** – For example, CA 125 level >35 units/mL. Use of other serum markers (eg, HE4, lactate dehydrogenase, alpha-fetoprotein, CEA) is discussed in detail elsewhere. (See 'Role of tumor markers and multimodal tests' above.)

- **Large mass size** – A mass ≥10 cm in diameter is typically an indication for surgical exploration [17-19]. In our practice, we also proceed with surgery for patients with masses measuring 5 to 10 cm **and** symptoms suggestive of ovarian cancer (table 4).

Whether a size threshold should prompt surgical removal is unclear as several studies have found no significant difference in size between malignant and benign masses [17-21]. Historically, however, larger masses were considered more likely to be malignant.

Larger size does increase the chances of developing symptoms (eg, abdominal bloating, urinary symptoms, constipation). In addition, the larger the mass, the more difficult it can be to completely assess it sonographically (either with transvaginal or transabdominal imaging) and further assessment with MRI may be needed. Furthermore, a certain subset of these masses will continue to grow, which may necessitate an open, rather than laparoscopic, approach.

Mass size, as well as other sonographic characteristics of malignancy, are discussed in detail separately. (See "Adnexal mass: Ultrasound categorization", section on 'Malignancy'.)

- **Intermediate-risk mass plus symptoms or risk factors** – Postmenopausal patients with an intermediate-risk mass on imaging (O-RADS 4) plus ovarian cancer symptoms (table 4) or risk factors (table 3) typically undergo surgical exploration because the presence of symptoms and/or risk factors for ovarian cancer adds to the degree of suspicion for malignancy.

Other high-risk premenopausal patients — Premenopausal patients with an adnexal mass and any of the following high-risk features are also managed surgically (algorithm 1):

- **Intermediate-risk mass plus elevated CA 125** – Premenopausal patients with an intermediate-risk mass on imaging (O-RADS 4) and a highly elevated CA 125 level (eg, >200 units/mL) are at an increased risk for malignancy.

  In premenopausal patients, CA 125 is often associated with many conditions other than ovarian carcinoma, and thus, a higher threshold (eg, >200 units/mL) is used compared with postmenopausal patients (eg, >35 units/mL); this higher CA 125 threshold is based solely on expert opinion (table 9 and figure 1). Because of the poor diagnostic performance of CA 125 in premenopausal patients, there has been some discussion of using an even higher CA 125 threshold in this group, but this has only been evaluated in a small number of studies [15]. (See "Adnexal mass: Role of serum biomarkers in diagnosing epithelial carcinoma of the ovary, fallopian tube, or peritoneum".)

- **An adnexal mass suspicious for a germ cell or sex cord-stromal tumor** – Surgery is required for these patients to obtain a definitive histologic diagnosis prior to treatment and staging (if malignant). This is discussed in more detail elsewhere. (See "Ovarian germ

cell tumors: Pathology, epidemiology, clinical manifestations, and diagnosis", section on 'Diagnosis' and "Sex cord-stromal tumors of the ovary: Epidemiology, clinical features, and diagnosis in adults", section on 'Diagnosis'.)

- In general, large mass size (eg, ≥10 cm in diameter) alone is **not** an indication for surgery in premenopausal patients as it is for postmenopausal patients; however, as in postmenopausal patients, large mass size increases the likelihood of the patient developing symptoms and makes assessment of the mass with ultrasound more difficult. Surveillance can be performed for premenopausal patients with an adnexal mass that is large but has no other findings suspicious for malignancy. (See 'Candidates for surveillance' below.)

Scope of surgery — The type of surgery (eg, ovarian cystectomy, oophorectomy, staging procedure) and surgical approach (ie, laparoscopic versus open) is based on many factors, including patient age, desire for future childbearing, degree of suspicion for malignancy, and intraoperative findings (including frozen section assessment, if performed). This is discussed in detail elsewhere. (See "Oophorectomy and ovarian cystectomy".)

- **Postmenopausal patients** – For postmenopausal patients with a suspected malignancy, a staging procedure is performed. For patients with a benign-appearing mass (by gross examination or frozen section), we typically perform unilateral oophorectomy with bilateral salpingectomy; bilateral salpingectomy has the potential beneficial effect of decreasing the risk of developing ovarian cancer. Removal of the contralateral ovary depends on patient age, years since menopause, desire to avoid subsequent surgery for additional adnexal pathology, and threshold for long-term health risks following bilateral oophorectomy. (See "Opportunistic salpingectomy for ovarian, fallopian tube, and peritoneal carcinoma risk reduction", section on 'Role of the fallopian tube in carcinogenesis' and "Oophorectomy and ovarian cystectomy", section on 'Oophorectomy versus cystectomy'.)

- **Premenopausal patients** – For premenopausal patients with suspected malignancy, the type of surgery depends on disease stage and desire for future childbearing. For patients in whom preoperative suspicion of malignancy is low, the mass appears benign intraoperatively, and there is no evidence of metastatic disease, we generally perform ovarian cystectomy rather than oophorectomy. Opportunistic salpingectomy may also be performed in patients who have completed childbearing. (See "Overview of epithelial carcinoma of the ovary, fallopian tube, and peritoneum", section on 'Fertility preservation' and "Opportunistic salpingectomy for ovarian, fallopian tube, and peritoneal carcinoma risk reduction".)

Candidates for surveillance — Patients who do not meet the criteria for surgery described above (see 'Candidates for surgical evaluation' above) are managed with surveillance. Surveillance typically includes one or more pelvic ultrasounds and/or measurement of serum tumor markers; however, there is no consensus regarding the best approach and various surveillance frequencies have been described [2,3,6,9-12,22]. In general, on repeat imaging, neoplastic cysts enlarge, nonphysiologic benign cysts remain unchanged or enlarge slowly, and physiologic cysts resolve [17,23]. In some cases, further characterization of the mass with another imaging modality (eg, MRI) is warranted. (See 'Role of additional imaging' above and "Adnexal mass: Ultrasound categorization", section on 'Step four: Is additional evaluation needed?'.)

Surveillance frequency

- Patients with an **intermediate-risk mass on imaging** (O-RADS 4) and none of the indications for surgery described above (see 'Candidates for surgical evaluation' above) are managed based on menopausal status:

  - **Postmenopausal patients** – We repeat a transvaginal ultrasound and CA 125 level in 6 weeks, 12 weeks, and then every 3 to 6 months for 1 year; a final ultrasound and CA 125 level are performed after an additional one year. (See 'When to stop surveillance or proceed with surgery' below.)

  - **Premenopausal patients** – We repeat a transvaginal ultrasound in six weeks. This allows visualization of the mass at a different point in the menstrual cycle. We then repeat an ultrasound in three months and then in six months; a final ultrasound is performed after an additional one year. (See 'When to stop surveillance or proceed with surgery' below.)

    A CA 125 level is not routinely repeated in all premenopausal patients. If the initial CA 125 level was <35 units/mL, we do not repeat the test. If the initial level was moderately elevated (≥35 to ≤200 units/mL), we repeat the test with each ultrasound until a pattern emerges. If the level is consistently low or moderately elevated, we discontinue CA 125 testing.

- For most premenopausal and postmenopausal patients with a **low-risk mass on imaging** (O-RADS 3) and none of the indications for surgery described above (see 'Candidates for surgical evaluation' above), we repeat a transvaginal ultrasound in three months and then in six months. However, expert recommendations vary, and other surveillance intervals have been described. (See "Adnexal mass: Ultrasound categorization", section on 'Step one: Is it a simple cyst?'.)

In a prospective study including over 1300 patients (mean age 57 years, range 25 to 95 years) undergoing surveillance for a septated cystic mass without solid areas or papillary projections (ie, low-risk mass; O-RADS 3) and followed for a mean of 77 months (range 4 to 252 months), one patient was diagnosed with an ovarian tumor of borderline malignancy; there were no cases of ovarian carcinoma [24].

When to stop surveillance or proceed with surgery — When patients with an adnexal mass are managed with surveillance, it is important to counsel the patient about which morphologic or size changes would prompt surgical exploration and when surveillance may be discontinued.

During surveillance, we proceed with surgery if any of the following occur:

- The mass develops high-risk features of malignancy (or there are new findings suggestive of metastatic disease).
- The mass is increasing in size or is ≥10 cm.
- Tumor markers become elevated (eg, CA 125 level >35 units/mL in postmenopausal patients or >200 units/mL in premenopausal patients) or trend upward.

If the mass remains unchanged or decreases in size and the CA 125 level remains normal, surveillance continues until the planned stopping point is reached. If the mass resolves, we discontinue surveillance. (See 'Patients at increased risk of malignancy' above and 'Patients with almost certainly benign masses' below.)

In one of the largest studies evaluating surveillance for adnexal masses, over 39,000 asymptomatic patients (mean age 57 years, range 25 to 95) were prospectively followed with annual transvaginal ultrasound [2]. During the 25-year study period (mean duration of follow-up 7.3 years), approximately 20 percent of patients were found to have an ovarian abnormality, of which 42 percent resolved within one year. Surgery was performed on 557 patients, of which 85 (15 percent) were ovarian malignancies; this represents less than 1 percent of the total study population. The findings of this study support the practice of serial sonography to evaluate patients with an adnexal mass that is indeterminate or low risk for malignancy but do not provide data regarding the frequency of surveillance.

Another study (International Ovarian Tumor Analysis [IOTA]) is also evaluating outcomes following surveillance of adnexal masses, but results have not been finalized. An interim analysis of the IOTA 5 study included approximately 1900 patients with a newly diagnosed adnexal mass who qualified for surveillance [25]. Within the first two years of follow-up,

spontaneous resolution occurred in 20 percent of patients while 16 percent of patients required surgical management. Findings at the time of surgery included invasive malignancy (0.4 percent), borderline tumor (0.3 percent), torsion (0.4 percent), and cyst rupture (0.2 percent). The interim results suggest that conservative management for benign-appearing adnexal masses is safe and associated with a low risk of malignancy or acute complications.

Patients with indeterminate masses — For any adnexal mass, if the appearance is indeterminate on ultrasound, further evaluation is needed. (See 'Role of additional imaging' above and 'When to refer to a gynecologic oncologist' above.)

Patients with almost certainly benign masses

Management according to mass type — Nonacute, almost certainly benign masses (ie, O-RADS 2, risk of malignancy <1 percent) often have characteristic sonographic features that allow for a presumptive diagnosis without surgical exploration (see 'Assessing the risk of malignancy' above); these include the following masses:

- **Physiologic cyst** – Physiologic (eg, follicular) cysts may cause pain or pressure symptoms, but since many of these cysts are transient, symptoms usually improve with cyst resolution. In general, cysts >5 cm are managed with surveillance, while small cysts (<3 to 5 cm) do not require follow-up [6]. This is discussed in more detail separately. (See "Adnexal mass: Differential diagnosis", section on 'Functional or corpus luteal cysts' and "Adnexal mass: Ultrasound categorization", section on 'Step one: Is it a simple cyst?'.)

  In addition to analgesics, patients with a history of recurrent, painful ovarian cysts can often be managed with combined estrogen-progestin oral contraceptives (COCs). COCs inhibit ovulation and prevent the formation of new physiologic ovarian cysts; thus, while COCs do **not** decrease the size of existing cysts, they provide time for the existing cyst to resolve while reducing the chances of formation of new symptomatic cysts [26]. Numerous studies have investigated the effects of COCs on follicular cyst development and ovulation [27-34]. In general, patients using COCs with a dose of ≤35 mcg ethinyl estradiol developed fewer follicular cysts than patients not using hormonal contraception; there was no difference in the suppression of cyst development between monophasic and multiphasic COCs. Other types of estrogen-progestin contraceptives (eg, patch, ring) have not been well studied for this indication, but they are likely to have the same effect. (See "Combined estrogen-progestin oral contraceptives: Patient selection, counseling, and use", section on 'Noncontraceptive uses'.)

  The risk of malignancy in a patient with an anechoic, unilocular ovarian cyst <10 cm on a high-quality sonogram and no other findings suggestive of malignancy is low [3,35,36]:

- In a population-based study of a large health care group including over 72,000 patients who underwent pelvic ultrasound from 1997 to 2008 and followed for at least three years (range 3 to 14 years), 15,305 patients (21 percent) were diagnosed with a simple ovarian cyst, of whom only one patient was diagnosed with ovarian cancer [36].

- In a series of 8794 asymptomatic postmenopausal patients offered transvaginal ultrasonography at the time of a routine gynecologic examination, 2.5 percent (215 patients) had a simple unilocular adnexal cyst and 149 had complete follow-up information [3]. Among the 45 patients (30 percent) undergoing surgical management, one had ovarian cancer (3 cm cyst, elevated CA 125 level of 45 units/mL). Among the 104 patients followed conservatively, 44 percent had cyst resolution (median time to resolution 15 months, range 6 to 54 months). The remaining patients had persistent cysts throughout the study.

- **Endometrioma <10 cm** – Endometriomas are associated with dysmenorrhea, pelvic pain, or infertility. They are also often associated with endometriosis at other sites within the pelvis. Surgical removal is the usual treatment if the patient is symptomatic, infertile, or the endometrioma is expanding. Surveillance is preferred when the patient is asymptomatic and the endometrioma is small (generally less than 5 cm). (See "Endometriosis: Management of ovarian endometriomas".)

- **Hydrosalpinx** – A hydrosalpinx may be asymptomatic or may result in chronic pelvic pain or infertility [37]. An asymptomatic hydrosalpinx generally does not need to be removed or followed with imaging. The exception is patients undergoing in vitro fertilization; pregnancy rates can be improved after surgical removal of the hydrosalpinx. For symptomatic patients, other etiologies of chronic pelvic pain should be excluded before salpingectomy is performed. (See "Female infertility: Reproductive surgery", section on 'Salpingectomy before in vitro fertilization'.)

- **Paratubal or paraovarian cyst** – A simple, asymptomatic paratubal or paraovarian cyst can be managed expectantly without further follow-up. If the cyst is large (>10 cm), if the patient is symptomatic, or if there is concern for torsion, it should be removed. (See "Adnexal mass: Differential diagnosis", section on 'Paraovarian/paratubal cysts and tubal and broad ligament neoplasms' and "Ovarian and fallopian tube torsion", section on 'Paratubal, broad ligament, or paraovarian cyst torsion'.)

- **Broad ligament leiomyoma** – A broad ligament leiomyoma may be located adjacent to the ovary and fallopian tube and thus be confused with an adnexal mass. If a diagnosis of

a leiomyoma is made with pelvic ultrasound, it can be managed in the same manner as other leiomyomas. (See "Uterine fibroids (leiomyomas): Treatment overview".)

- **Mature teratoma <10 cm** – While most mature teratomas (dermoid cysts) are benign, surgery (eg, ovarian cystectomy) is indicated in some cases to make a definitive diagnosis and avoid potential problems such as torsion or malignant transformation (eg, squamous cell carcinoma). Although uncommon, mature teratomas can rupture; this requires urgent surgical intervention. (See "Ovarian germ cell tumors: Pathology, epidemiology, clinical manifestations, and diagnosis", section on 'Mature cystic teratomas' and "Evaluation and management of ruptured ovarian cyst", section on 'Ruptured teratoma'.)

Other considerations

- If resection of an almost certainly benign mass is not indicated (see 'Management according to mass type' above) but the patient is symptomatic, analgesics may be used for treatment of symptoms.

- If resection of an almost certainly benign mass is indicated but the patient is not a candidate for surgery, surveillance with serial ultrasound examinations may be initiated to assess for stability and changes suspicious for malignant transformation.

  When the management plan is surveillance, in our practice, we perform a repeat ultrasound in six months and then in one year; however, there are no high-quality data to support this practice, and other surveillance frequencies have been described [6].

- Patients who are managed with surveillance but develop persistent symptoms (eg, pain or pressure), symptoms concerning for an urgent condition (eg, torsion, ruptured ovarian cyst), features concerning for malignancy, or in whom mass size increases, should be treated surgically. (See 'When to stop surveillance or proceed with surgery' above and 'Scope of surgery' above.)

- Some patients may desire removal of the adnexal mass, despite no indications for surgery. In such cases, removal is reasonable if the patient strongly prefers surgical management and is willing to accept the risks of surgical morbidity and loss of an ovary.

SPECIAL CONSIDERATIONS

Patients with a hereditary ovarian cancer syndrome — Patients with a hereditary ovarian cancer syndrome (eg, mutations in breast cancer type 1 or 2 susceptibility genes [*BRCA1* or *BRCA2*] or Lynch syndrome) are managed differently than the general population and a lower

threshold is used for surgical exploration. This is discussed in detail separately. (See "Risk-reducing salpingo-oophorectomy in patients at high risk of epithelial ovarian and fallopian tube cancer".)

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: Ovarian and fallopian tube disease".)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see "Patient education: Ovarian cancer (The Basics)" and "Patient education: Ovarian cysts (The Basics)")
- Beyond the Basics topics (see "Patient education: Ovarian cysts (Beyond the Basics)" and "Patient education: Ovarian cancer diagnosis and staging (Beyond the Basics)")

SUMMARY AND RECOMMENDATIONS

- **Urgent conditions** – Patients who present with acute pain and an ovarian mass or with a diagnosis of ectopic pregnancy, ovarian torsion, tubo-ovarian abscess, or ruptured or hemorrhagic ovarian cyst may require urgent surgical intervention. (See 'Patients requiring prompt intervention' above.)

- **Masses suspicious for malignancy** – There is no universally accepted classification system for defining the risk of malignancy; one emerging system is the American College of Radiology (ACR) Ovarian-Adnexal Reporting and Data System (O-RADS) (table 6).

  Patients with masses suspicious for malignancy are managed based on menopausal status and risk for malignancy (algorithm 1 and algorithm 2). (See 'Patients at increased risk of malignancy' above.)

  - **Surgery** is performed for patients with any of the following:

    - Patients of any menopausal status with a high-risk mass (O-RADS 5) on imaging and/or imaging findings suggestive of metastatic disease (eg, ascites, peritoneal masses). (See 'Patients with a high-risk mass on imaging' above.)

    - Postmenopausal patients with an adnexal mass suspicious for malignancy **and** an elevated tumor marker (eg, cancer antigen 125 [CA 125] level >35 units/mL); a mass that is ≥10 cm in diameter; **or** both an intermediate-risk mass (O-RADS 4) on imaging **plus** symptoms or risk factors for ovarian cancer (table 4 and table 3). In our practice, we also proceed with surgical exploration for postmenopausal patients with a 5 to 10 cm mass who also have symptoms suggestive of ovarian cancer (table 4). (See 'Other high-risk postmenopausal patients' above.)

    - Premenopausal patients with an intermediate-risk mass (O-RADS 4) on imaging **and** a serum CA 125 level that is very elevated (eg, >200 units/mL) or if a germ cell or sex cord-stromal tumor is suspected. (See 'Other high-risk premenopausal patients' above.)

    For premenopausal patients, ovarian cystectomy rather than oophorectomy is reasonable if the preoperative suspicion of malignancy is low, the mass appears benign intraoperatively, and there is no evidence of metastatic disease. Oophorectomy is performed for postmenopausal patients and for patients of any menopausal status with an ovarian mass that is suspicious for malignancy. (See 'Scope of surgery' above.)

  - **Surveillance** is performed for patients with low- and intermediate-risk masses on imaging and **no** other indications for surgery; the risk of malignancy in these patients is low. There is no consensus regarding optimal surveillance frequencies; in our practice we perform the following (see 'Candidates for surveillance' above):

- For patients of any menopausal status and a low-risk mass (O-RADS 3) on imaging and no other indications for surgery, we repeat an ultrasound in three months and then in six months.

- For postmenopausal patients with an intermediate-risk mass (O-RADS 4) on imaging and no other indications for surgery, we repeat a transvaginal ultrasound and CA 125 level in 6 weeks, 12 weeks, and then every 3 to 6 months for 1 year. We perform a final ultrasound and CA 125 level one year later.

- For premenopausal patients with an intermediate-risk mass (O-RADS 4) on imaging and no other indications for surgery, we repeat a transvaginal ultrasound in six weeks, three months, and again in six months. We perform a final ultrasound one year later.

- **Almost certainly benign masses** – Symptomatic patients who present with a nonacute, almost certainly benign mass (O-RADS 2) can be managed with analgesics as first-line therapy. We reserve surgical management for patients with any of the following: persistent symptoms or symptoms concerning for an urgent condition (eg, torsion, ruptured ovarian cyst), some mature teratomas (to make a definitive diagnosis and avoid potential problems such as torsion, rupture, or malignant transformation), and for patients with a hydrosalpinx in whom in vitro fertilization is planned. (See 'Patients with almost certainly benign masses' above.)

- **Patients with a hereditary ovarian cancer syndrome** – Patients with a hereditary ovarian cancer syndrome are managed differently than the general population and a lower threshold is used for surgical exploration. (See 'Patients with a hereditary ovarian cancer syndrome' above.)

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Topic 83704 Version 34.0

GRAPHICS

Differential diagnosis of an adnexal mass

Gynecologic: Ovarian	Gynecologic: Tubal	Gynecologic: Extraovarian and extratubal	Nongynecologic
Benign			
▪ Functional (physiologic) cyst ▪ Corpus luteal cyst ▪ Luteoma of pregnancy ▪ Theca lutein cyst ▪ Polycystic ovaries ▪ Endometrioma ▪ Cystadenoma ▪ Benign ovarian germ cell tumor (eg, mature teratoma) ▪ Benign sex cord-stromal tumor	▪ Ectopic pregnancy ▪ Hydrosalpinx	▪ Paraovarian cyst ▪ Paratubal cyst ▪ Uterine leiomyoma (pedunculated or cervical) ▪ Tubo-ovarian abscess	▪ Constipation ▪ Appendiceal abscess ▪ Diverticular abscess ▪ Pelvic abscess ▪ Bladder diverticulum ▪ Ureteral diverticulum ▪ Pelvic kidney ▪ Peritoneal cyst ▪ Nerve sheath tumor
Malignant or borderline			
▪ Epithelial carcinoma ▪ Epithelial borderline neoplasm ▪ Malignant ovarian germ cell tumor ▪ Malignant sex cord-stromal tumor	▪ Epithelial carcinoma ▪ Serous tubal intraepithelial neoplasia	▪ Metastatic endometrial carcinoma ▪ Cystadenocarcinoma (rare)	▪ Appendiceal neoplasm ▪ Bowel neoplasm ▪ Metastasis (eg, breast, colon, lymphoma) ▪ Retroperitoneal sarcoma

Adapted from: Rauh-Hain JA, Melamed A, Buskwofie A, Schorge JO. Adnexal mass in the postmenopausal patient. Clin Obstet Gynecol 2015; 58:53.

Prevalence of specific adnexal mass pathologies in patients in the International Ovarian Tumor Analysis group (IOTA) study (n = 4848)

Tumor pathology	All patients, n (%)	Patients from oncology centers, n (%)	Patients from other hospitals, n (%)
All benign pathologies	**3183 (65.7)**	**1861 (57.0)**	**1322 (83.4)**
Endometrioma	845 (17.4)	456 (14.0)	389 (24.5)
Benign teratoma (dermoid)	512 (10.6)	334 (10.2)	178 (11.2)
Simple/parasalpingeal cyst	285 (5.9)	147 (4.5)	138 (8.7)
Functional cyst	128 (2.6)	69 (2.1)	59 (3.7)
Hydrosalpinx	112 (2.3)	53 (1.6)	59 (3.7)
Peritoneal pseudocyst	34 (0.7)	21 (0.6)	13 (0.8)
Abscess	45 (0.9)	34 (1.0)	11 (0.7)
Fibroma	245 (5.1)	168 (5.1)	77 (4.9)
Serous cystadenoma	543 (11.2)	326 (10.0)	217 (13.7)
Mucinous cystadenoma	359 (7.4)	203 (6.2)	156 (9.8)
Rare benign pathologies	75 (1.5)	50 (1.5)	25 (1.6)
All malignant pathologies	**1665 (34.3)**	**1402 (43.0)**	**263 (16.6)**
Primary invasive stage I	222 (4.6)	184 (5.6)	38 (2.4)
Primary invasive stage II	82 (1.7)	64 (2.0)	18 (1.1)
Primary invasive stage III	658 (13.6)	579 (17.7)	79 (5.0)
Primary invasive stage IV	102 (2.1)	88 (2.7)	14 (0.9)
Rare primary invasive pathologies*	113 (2.3)	80 (2.5)	33 (2.1)

Borderline stage I	249 (5.1)	197 (6.0)	52 (3.3)
Borderline stage II	9 (0.2)	6 (0.2)	3 (0.2)
Borderline stage III	25 (0.5)	23 (0.7)	2 (0.1)
Borderline stage IV	1 (0.02)	1 (0.03)	0
Secondary metastatic cancer	204 (4.2)	180 (5.5)	24 (1.5)

* Including malignant sex cord-stromal tumors, germ cell tumors, mesenchymal tumors, lymphomas, and rare malignant epithelial tumors (eg, malignant Brenner tumor).

Graphic 109383 Version 2.0

Risk factors for ovarian cancer

	Relative risk	Lifetime probability (%)[1]
General population	1.0	1.3[1]
***BRCA1* gene mutation**		35 to 46[2,3]
***BRCA2* gene mutation**		13 to 23[2,3]
Lynch syndrome (hereditary nonpolyposis colon cancer)		3 to 14[4,5]
Other gene mutations		
BRIP1		5.8[6]
RAD51C		5.2[7]
RAD51D		12[7]
Family history of ovarian or fallopian tube cancer (with negative testing for a familial ovarian cancer syndrome)	Uncertain[8]	
Infertility	2.67[9]	
Endometriosis (increase in risk of clear cell, endometrioid, or low-grade serous carcinomas)	2.04 to 3.05[10]	
Cigarette smoking (increase in risk of mucinous carcinoma)	2.1[11]	
Intrauterine device	0.68[12]	
Past use of oral contraceptives	0.73[13]	
Past breastfeeding (for >12 months)	0.72[14]	
Tubal ligation	0.69[15]	
Previous pregnancy	0.71[16]	

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Graphic 59585 Version 10.0

Frequency of symptom categories in women with ovarian cancer

Type of symptom	Percent
Abdominal	77
Gastrointestinal	70
Pain	58
Constitutional	50
Urinary	34
Pelvic	26

Data from: Goff BA, Mandel L, Muntz HG. Melancon CH. Ovarian carcinoma diagnosis. Cancer 2000; 89:2068.

Graphic 78148 Version 3.0

Ovarian cancer symptoms consensus statement

Historically, ovarian cancer was called the "silent killer" because symptoms were not thought to develop until the chance of cure was poor. However, studies have shown that this term is untrue and that the following symptoms are much more likely to occur in women with ovarian cancer than in women in the general population. **These symptoms include**[1,2]:
• Bloating
• Pelvic or abdominal pain
• Difficulty eating or feeling full quickly
• Urinary symptoms (urgency or frequency)
Women with ovarian cancer report that symptoms are persistent and represent a change from normal for their bodies. The frequency and/or number of such symptoms are key factors in the diagnosis of ovarian cancer[3]. Several studies show that even early stage ovarian cancer can produce these symptoms[2-6].
Women who have these symptoms almost daily for more than a few weeks should see their doctor, preferably a gynecologist. Prompt medical evaluation may lead to detection at the earliest possible stage of the disease. Early stage diagnosis is associated with an improved prognosis.
Several other symptoms have been commonly reported by women with ovarian cancer[2-5]. These symptoms include fatigue, indigestion, back pain, pain with intercourse, constipation, and menstrual irregularities. However, these other symptoms are not as useful in identifying ovarian cancer because they are also found in equal frequency in women in the general population who do not have ovarian cancer[1].

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Graphic 76135 Version 6.0

O-RADs risk stratification and management system

O-RADS score	Risk category (IOTA model)	Lexicon descriptors		Management	
				Pre-menopausal	Post-menopausal
0	**Incomplete evaluation (N/A)**	N/A		Repeat study or alternate study	
1	**Normal ovary (N/A)**	Follicle defined as a simple cyst ≤3 cm		None	N/A
		Corpus luteum ≤3 cm			
2	**Almost certainly benign (<1%)**	Simple cyst	≤3 cm	N/A	None
			>3 to 5 cm	None	Follow up in 1 year*
			>5 cm but <10 cm	Follow up in 8 to 12 weeks	
		Classic benign lesions	Refer to figure 3¶ for separate descriptors	Refer to figure 3¶ for management strategies	
		Non-simple unilocular cyst, smooth inner margin	≤3 cm	None	Follow up in 1 year If concerning, US specialist or MRI
			>3 cm but <10 cm	Follow-up in 8 to 12 weeks If concerning, US specialist	US specialist or MRI
3	**Low risk malignancy (1 to <10%)**	Unilocular cyst ≥10 cm (simple or non-simple)		US specialist or MRI Management by gynecologist	
		Typical dermoid cysts, endometriomas, hemorrhagic cysts ≥10 cm			
		Unilocular cyst, any size with irregular inner wall <3 mm height			
		Multilocular cyst <10 cm, smooth inner wall, CS = 1 to 3			
		Solid smooth, any size, CS = 1			

4	**Intermediate risk (10 to <50%)**	Multilocular cyst, no solid component	≥10 cm, smooth inner wall, CS = 1 to 3	US specialist or MRI Management by gynecologist with GYN-oncologist consultation or solely by GYN-oncologist
			Any size, smooth inner wall, CS = 4	
			Any size, irregular inner wall and/or irregular septation, any color score	
		Unilocular cyst with solid component	Any size, 0 to 3 papillary projections, CS = any	
		Multilocular cyst with solid component	Any size, CS = 1 to 2	
		Solid	Smooth, any size, CS = 2 to 3	
5	**High risk (≥50%)**	Unilocular cyst, any size, ≥4 papillary projections, CS = any		GYN-oncologist
		Multilocular cyst with solid component, any size, CS = 3 to 4		
		Solid smooth, any size, CS = 4		
		Solid irregular, any size, CS = any		
		Ascites and/or peritoneal nodules[Δ]		

Graphic shows O-RADS US risk stratification and management system.

O-RADS: Ovarian-Adnexal Reporting and Data System; IOTA: International Ovarian Tumor Analysis; N/A: not applicable; CS: color score; GYN: gynecologic.

* At a minimum, at least 1-year follow-up showing stability or decrease in size is recommended with consideration of annual follow-up of up to 5 years, if stable. However, there is currently a paucity of evidence for defining optimal duration or interval of timing for surveillance.

¶ Figure 3 of the O-RADS US risk stratification and management system defines classic benign lesions as any of the following: Typical hemorrhagic cyst, typical demoid cyst <10 cm, typical endometrioma <10 cm, simple paraovarian cyst (any size), typical peritoneal inclusion cyst (any size), and typical hydrosalpinx (any size).

Δ Presence of ascites with category 1 to 2 lesion, must consider other malignant or nonmalignant etiologies of ascites.

Graphic 131595 Version 3.0

Markers that may be secreted by germ cell and sex cord-stromal tumors of the ovary

	AFP	hCG	LDH	E2	Inhibin*	T	A4	DHEA	AMH
Germ cell tumors									
Dysgerminoma	–¶	±Δ	+	±	–	–	–	–	–
Embryonal	±	+	±	±	–	–	–	–	–
Immature teratoma	±	–	±	±	–	–	–	±	–
Choriocarcinoma	–	+	±	–	–	–	–	–	–
Yolk sac tumor (endodermal sinus tumor)	+	–	+	–	–	–	–	–	–
Gonadoblastoma◇	–	–	–	±	±	±	±	±	–
Polyembryona	±	+	–	–	–	–	–	–	–
Mixed germ cell	±	±	±	±	–	–	–	–	–
Sex cord-stromal tumors									
Thecoma-fibroma	–	–	–	–	–	–	–	–	–
Thecoma	–	–	–	±	±	–	–	–	–
Granulosa cell	–	–	–	±	+	±	–	–	+
Sex cord tumor with annular tubules	–	–	–	+	–	–	–	–	–
Sertoli-Leydig	±	–	–	±	±	±	±	±	–
Sertoli	–	–	–	–	±	±	–	–	–

AFP: alpha-fetoprotein; hCG: human chorionic gonadotropin; LDH: lactate dehydrogenase; E2: estradiol; T: testosterone; A4: androstenedione; DHEA: dehydroepiandrostenedione; AMH: anti-müllerian hormone.

* Both inhibin A and inhibin B levels should be determined (tumors might over-secrete A or B).

¶ Borderline elevations in case reports (<16 ng/mL).

Δ Low levels seen in dysgerminomas with either nondysgerminomatous elements or syncytiotrophoblastic cells.

◇ Type of germ cell sex cord-stromal tumor consisting of neoplastic germ cells and sex cord-stromal derivatives.

Graphic 55817 Version 13.0

Referral of women with a pelvic mass to a gynecologic oncologist: ACOG guidelines

Premenopausal women (refer if any are present)
Very elevated CA 125 level*
Ascites
Evidence of abdominal or distant metastases
Postmenopausal women (refer if any are present)
Elevated CA 125 level*
Ascites
Nodular or fixed pelvic mass
Evidence of abdominal or distant metastases

ACOG: American College of Obstetricians and Gynecologists; CA 125: cancer antigen 125.

* These guidelines do not provide a specific value for an elevated (or very elevated) CA 125 level. While the 2002 version used a value of >200 units/mL, this was removed in 2011. Studies evaluating the performance of the 2002 guidelines showed that 70 to 79% of premenopausal and 93 to 94% of postmenopausal patients with ovarian cancer will be captured by this threshold (specificity 70 and 60%, respectively).

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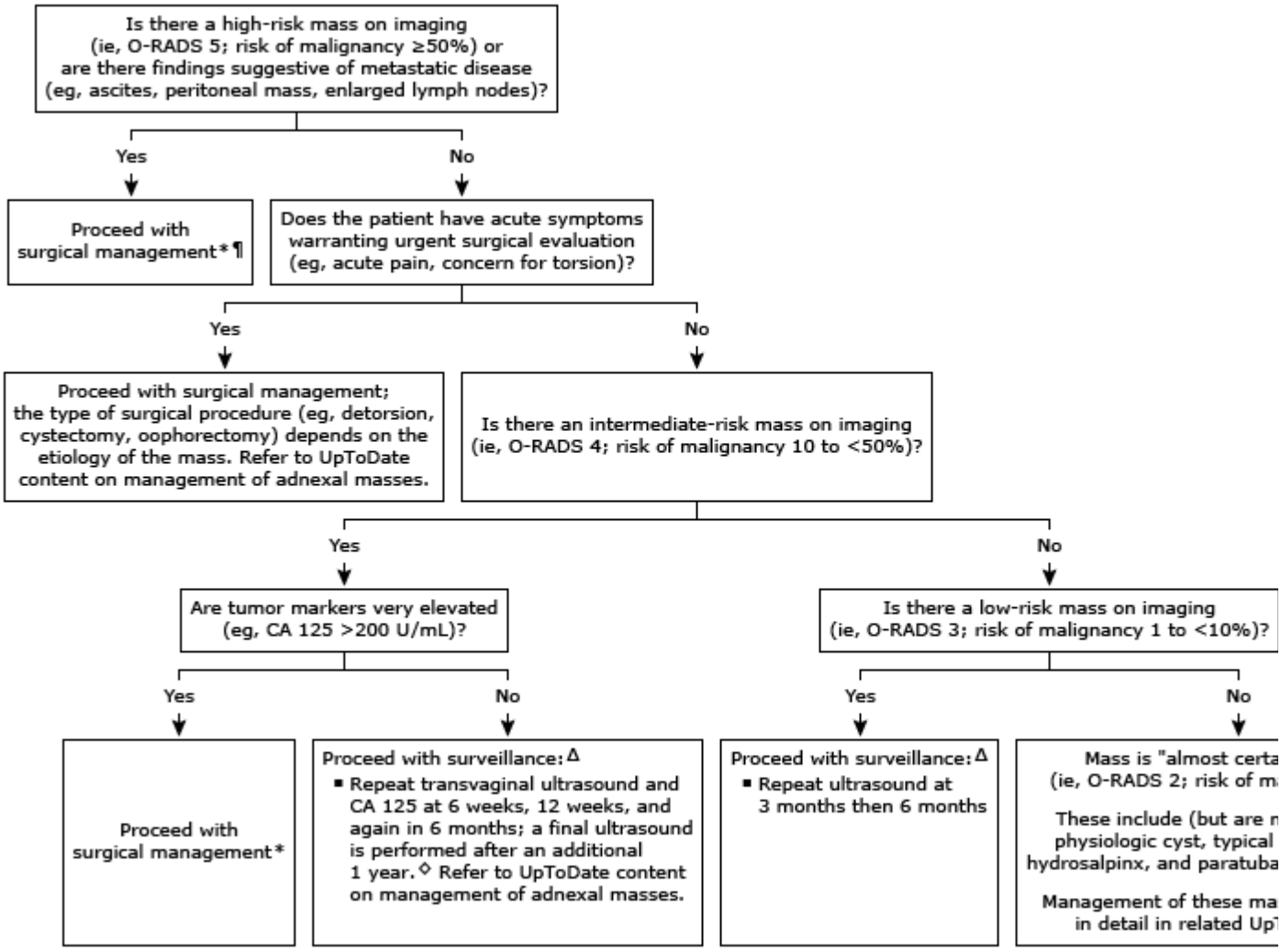
Graphic 55063 Version 9.0

Nonpregnant, premenopausal patient with an adnexal mass on imaging



This algorithm pertains to average-risk patients. Patients with a hereditary ovarian cancer syndrome (eg, *BR* Lynch syndrome) are managed differently; for more information, refer to UpToDate content on hereditary o syndromes.

Imaging typically includes pelvic ultrasound (transvaginal and transabdominal); for masses with an indeterr appearance on ultrasound, MRI or CT may be used as a secondary imaging study.

The O-RADS classification system is detailed separately in related UpToDate topics.

O-RADS: Ovarian-Adnexal Reporting and Data System; CA 125: cancer antigen 125; *BRCA*: breast cancer susc genes; MRI: magnetic resonance imaging; CT: computed tomography.

* Surgical management (cystectomy versus oophorectomy) depends on clinical suspicion for malignancy; if found, surgical management depends on disease stage and desire for future childbearing.

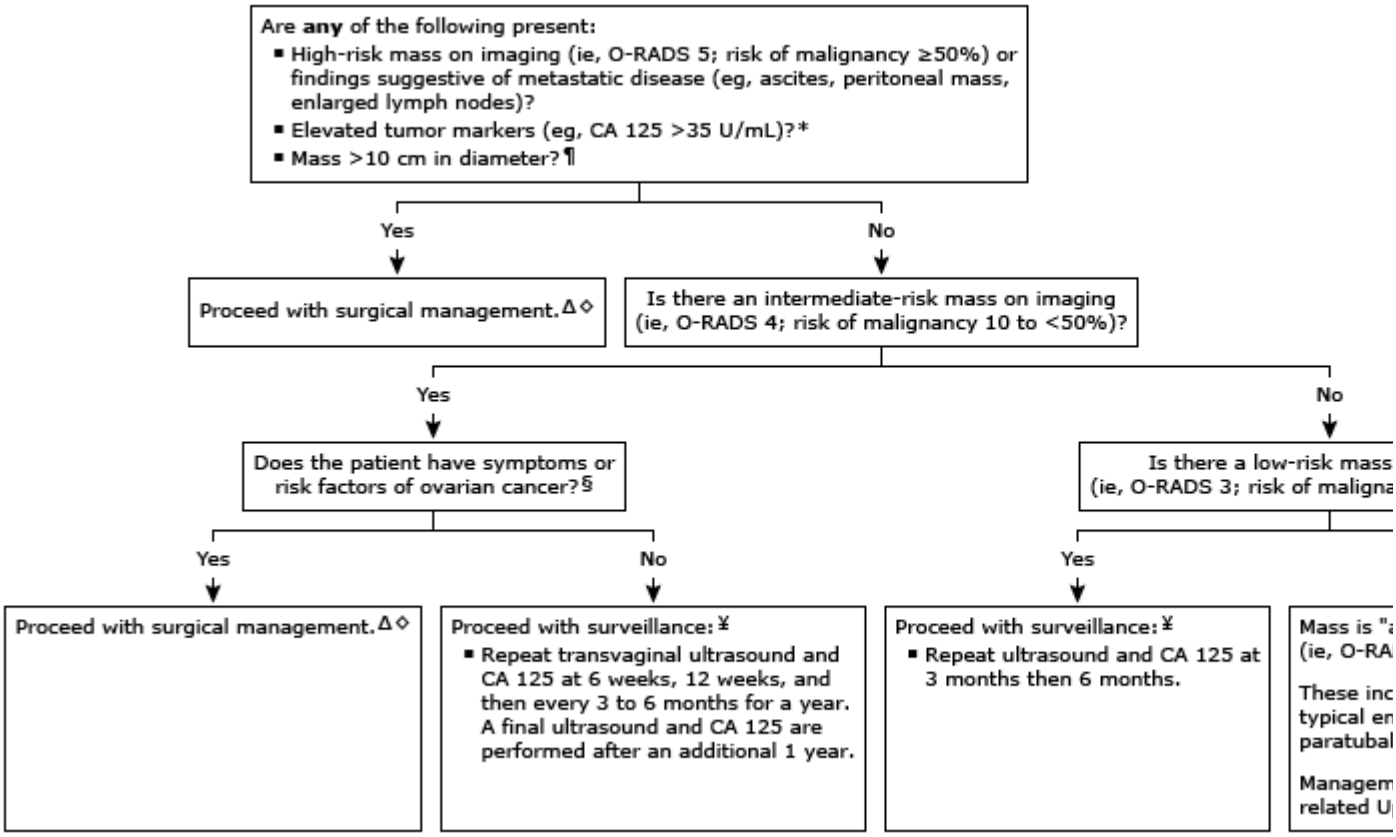
¶ Tumor markers (eg, CA 125) may be obtained preoperatively to help guide management.

Δ Surgical management may be performed in patients who desire removal of the mass, even in the absence symptoms suggestive of malignancy.

◇ CA 125 levels are obtained at each ultrasound examination if the initial level is moderately elevated (35 to until a trend is established; if it is consistently low or moderately elevated, we discontinue CA 125 testing.

Graphic 132072 Version 2.0

Postmenopausal patient with an adnexal mass on imaging



This algorithm pertains to average-risk patients. Patients with a hereditary ovarian cancer syndrome (eg, *BR* managed differently; for more information, refer to UpToDate content on hereditary ovarian cancer syndro

Imaging typically includes pelvic ultrasound (transvaginal and transabdominal); for masses with an indeterr MRI may be used as a secondary imaging study, or the patient may be referred to an ultrasound specialist.

The O-RADS classification system is detailed separately in related UpToDate topics.

O-RADS: Ovarian-Adnexal Reporting and Data System; CA 125: cancer antigen 125; *BRCA*: breast cancer susc resonance imaging; HE4: human epididymis protein 4; CEA: carcinoembryonic antigen; CA 19-9: cancer anti

* Other tumor markers may include (but are not limited to) HE4, CEA, or CA 19-9.

¶ We also proceed with surgical management for patients with a mass between 5 and 10 cm diameter if the symptoms.

Δ Surgical management includes, at a minimum, unilateral salpingo-oophorectomy; a staging procedure is

◇ Tumor markers (eg, CA 125) are typically obtained preoperatively to help guide management.

§ Ovarian cancer symptoms and risk factors are discussed in detail in related UpToDate topics.

¥ Surgical management may be performed in patients who desire removal of the mass, even in the absence suggestive of malignancy.

Graphic 132071 Version 1.0

Conditions associated with an elevated serum CA 125 concentration

Gynecologic malignancies
Endometrial cancer
Epithelial ovarian, fallopian tube, and primary peritoneal cancers
Benign gynecologic conditions
Adenomyosis
Benign ovarian neoplasms
Endometriosis
Functional ovarian cysts
Meig syndrome
Menstruation
Ovarian hyperstimulation
Pelvic inflammatory disease
Pregnancy
Uterine leiomyomas

Nongynecologic conditions
Ascites
Appendicular abscess
Cirrhosis and other liver disease
Colitis
Cystic fibrosis
Diverticulitis
Heart failure
Myocardial infarction
Myocardiopathy
Pancreatitis
Pericardial disease
Pleural effusion
Pneumonia
Pulmonary embolism
Recent surgery
Renal insufficiency
Sarcoidosis
Systemic lupus erythematosus
Tuberculosis peritonitis
Urinary tract infection
Nongynecologic cancers
Breast
Colon
Gallbladder
Hematologic malignancies
Liver
Lung
Pancreas

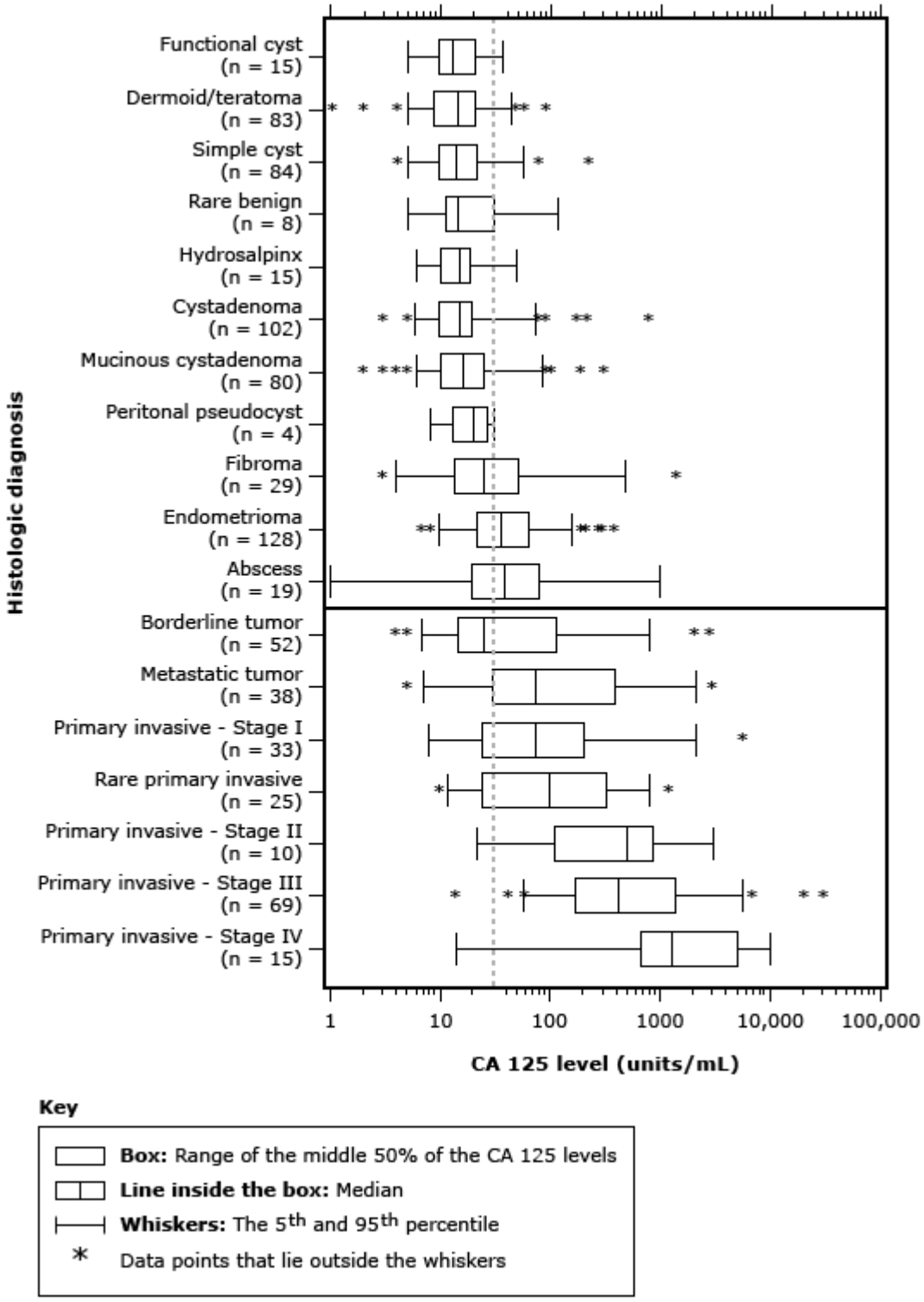
CA: cancer antigen.

Data from:

1. *Buamah P. Benign conditions associated with raised serum CA-125 concentration. J Surg Oncol 2000; 75:264.*
2. *Miralles C, Orea M, Espana P, et. al. Cancer antigen 125 associated with multiple benign and malignant pathologies. Ann Surg Oncol 2003; 10:150.*
3. *Moss EL, Hollingworth J, Reynolds TM. The role of CA125 in clinical practice. J Clin Pathol 2005; 58:308.*

Graphic 81621 Version 8.0

Box plots showing CA 125 serum levels by histologic diagnosis of adnexal masses



CA 125: cancer antigen 125.

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125. J Natl Cancer Inst 2007; 99:1706.

Contributor Disclosures

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