Problems in Family Practice

The Adnexal Mass

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Accurate diagnosis of the adnexal mass requires knowledge of embryology, anatomy, and physiology. Bimanual pelvic examination remains the primary and most practical means of detecting and evaluating adnexal pathology. Selective use of diagnostic techniques will help determine the nature and extent of involvement. Prompt and specific diagnoses facilitate therapy and improve results.

The uterine adnexae consist of ovaries, fallopian tubes, and uterine ligaments. Although most adnexal pathology originates within one of these structures, it is often bilateral and found to involve contiguous tissues. A knowledge of embryology, pelvic anatomy, physiology, and gynecologic endocrinology and oncology is essential if one is to detect, diagnose, and treat adnexal pathology.

Bimanual pelvic examination is the most practical means of screening for adnexal mass. Emphasis must be placed on early detection, expecially in cases of ectopic pregnancy and ovarian tumors, if morbidity is to be reduced and the survival rate improved. Adjunctive diagnostic techniques may be helpful but should not be used in an indiscriminate manner. Correlation of data should produce a specific diagnosis and should help in formulating the therapeutic approach.

Primary care physicians are responsible for the detection of adnexal pathology. They should insist on routine pelvic examinations and be competent in performing them. They must be aware of the various diagnostic possibilities, gynecologic and nongynecologic, and consider each in logical sequence.[1] It is the purpose of this article to present a practical approach to the diagnosis and managment of adnexal masses of gynecologic origin.

Physical Examination

It is essential that a patient empty her bladder before having a pelvic examination. She should be positioned on the examining table and appropriately draped. Examination of the external genitalia is followed by an internal visual examination using adequate lighting and speculum of proper size. Then a bimanual, abdominal-vaginal-rectal examination should be performed in a systematic manner so as to palpate all pelvic organs for size, shape, consistency, position, mobility, and the presence or absence of tenderness. The cul de sac, rectovaginal septum, and pelvic side walls must be palpated for their contents, lymph nodes, or abnormal masses. Pathologic findings should be described in detail, using scientific terminology. Diagrams may be helpful.

Subsequent reexamination of the pelvis may be necessary for technical reasons or if the patient is uncooperative. If the rectum is filled with feces, the bowel should be evacuated with a laxative or enema prior to reexamination. If the patient is un-

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cooperative, obese, or otherwise difficult to examine, the opinion of a second examiner may be helpful. The examination may be conducted while the patient is anesthetized, or one of the newer imaging techniques, such as ultrasonography, may be used.

The size, configuration, and consistency of palpable masses may be determined. Inspection, auscultation, percussion, and palpation of the abdomen is necessary to evaluate bowel function, to determine direct, indirect, or rebound tenderness or rigidity, and to demonstrate the presence or absence of ascites.

Diagnostic Techniques

Although the pelvic examination remains the primary means of detecting adnexal masses, diagnostic techniques are available for locating and further defining the pathological process. To the information obtained by sigmoidoscopy, barium enema, and intravenous urography now can be added information from laparoscopy, ultrasonography, and computerized tomography.

Patients with lower bowel complaints or pelvic masses are candidates for sigmoidoscopy and barium enema. Intravenous urography is part of the evaluation of patients with urinary symptoms and pathologic masses within the pelvis. Plain films of the pelvis may detect calcifications within ovarian tumors (ie, cystic teratomas) and leiomyomas.

Laparoscopy is of value in determining the nature of pelvic disease, the presence of intraperitoneal extension, and the presence of ascites. Specimens may be obtained for histologic and cytologic evaluation. In general, laparoscopy is ill-advised if there is a definite indication for exploratory laparotomy.

Pelvic ultrasonography is an accurate means of determining the location, size, extent, and consistency of pelvic masses.[2] It is capable of detecting obstructive uropathy, ascites, and metastasis. Ectopic and intrauterine pregnancies can be detected and differentiated. The technique may be used to assess the results of therapy. The ultrasonic examination is rapidly performed, does not expose the patient to ionizing radiation, and is readily available in most medical centers. Since it can be performed in any body plane, it is the preferred screening technique for determing the presence of pelvic masses. It is the procedure of choice in evaluating ovarian pathology because of its ability to distinguish cysts from complex and solid masses. It cannot, however, provide a histologic diagnosis, nor is it a substitute for proper surgical management or pelvic examination.

Computerized tomography will detect and measure pelvic masses of 2 cm or greater in diameter with precision. It offers an advantage over ultrasonography in the visualization of bowel, ureters, pelvic musculature, and bone. The technique has proved especially useful in gynecologic oncology because it defines the extent of paracervical and parametrial involvement, determines the resectability of neoplasms, and can be used to direct fine needle biopsy. Obese patients are more easily studied by computerized tomography, which can be used to assess resolution of the pathological process following therapy. It has the disadvantage that imaging is accomplished by using ionizing radiation.

Adnexal Masses

Adnexal masses may be of gynecologic or of nongynecologic origin. In either circumstance, it is of primary importance to determine whether they are of a neoplastic or nonneoplastic variety.[3] In the case of gynecologic masses, it is also important to know if the mass is of ovarian origin, for pathological enlargement of the ovary (>6 cm in diameter) must be considered potentially malignant until proven otherwise.

A classification of adnexal masses is given in Table 1, and it will serve as an outline for the further discussion of this topic.

Nonneoplastic Ovarian Masses

Physiologic ovarian cysts occur frequently because the ovary is a dynamic organ with cyclic function. The preovulatory ovary contains graafian follicles, and the postovulatory ovary contains the corpus luteum. Failure of the graafian follicle to rupture or regress may lead to the development of a follicular cyst, whereas failure of the corpus luteum to regress in a nonpregnant patient may lead to the development of a corpus luteum cyst.

Follicular cysts are usually less than 6 to 8 cm in diameter and may cause menstrual irregularities. They are smooth surfaced, mobile, slightly tender upon palpation, and are filled with a straw colored

Table 1. Classification of Adnexal Masses

- **Gynecologic Origin**
  - Nonneoplastic
    - Ovarian
      - Physiologic cysts
        - Follicular
        - Corpus luteum
      - Theca lutein cyst
      - Luteoma of pregnancy
      - Polycystic ovaries
      - Endometriosis
      - Inflammatory cysts
    - Nonovarian
      - Ectopic pregnancy
      - Congenital anomalies
      - Embryologic remnants
      - Tubal
        - Pyosalpinx
        - Hydrosalpinx
  - Neoplastic
    - Ovarian (see WHO classification[4])
    - Nonovarian
      - Leiomyoma
      - Paraovarian cyst
      - Endometrial carcinoma
      - Tubal carcinoma
- **Nongynecologic Origin**
  - Nonneoplastic
    - Appendiceal abscess
    - Diverticulosis
    - Adhesions of bowel and omentum
    - Peritoneal cyst
    - Feces in rectosigmoid
    - Urine in bladder
    - Pelvic kidney
    - Urachal cyst
    - Anterior sacral meningocele
  - Neoplastic
    - Carcinoma
      - Sigmoid
      - Cecum
      - Appendix
      - Bladder
    - Retroperitoneal neoplasm
    - Presacral teratoma

fluid. These cysts usually regress through absorption of fluid or spontaneous rupture. Rupture may produce sudden pain in the lower abdominal area and subsequent examination would reveal the absence of the cyst. If the cyst is less than 6 cm in diameter, it may be managed conservatively with biweekly examinations until regression is documented. If regression fails to occur during six weeks of observation, or if enlargement occurs, exploratory laparotomy is indicated. Some authors have advocated the use of oral contraceptives for treatment in patients with functional cysts. The ingestion of exogenous hormones results in negative feedback on the pituitary gland to decrease gonadotropin stimulation of the ovary and assist regression of the cyst. A patient taking oral contraceptives rarely develops a physiologic cyst. The presence of an ovarian cyst in a patient on oral contraceptives is reason for concern and should be investigated, as this patient should not be ovulating and is incapable of forming either follicular or corpus luteum cysts.

The corpus luteum cyst occurs less frequently and will vary in size, depending on the amount of hemorrhage within the cyst. It is often associated with menstrual irregularities due to the prolonged secretion of progesterone and its effect on the endometrium. Usually the corpus luteum cyst will regress. Only rarely does it rupture and cause intraperitoneal hemorrhage. When this does occur, however, it may create the diagnostic dilemma of whether the patient has a ruptured corpus luteum cyst or ruptured ectopic pregnancy. Both may be associated with amenorrhea or irregular uterine bleeding, an adnexal mass, progestational changes of the endometrium, and intraperitoneal hemorrhage. Pregnancy tests, laparoscopy, and ultrasonography have been employed to differentiate these conditions; however, both conditions require prompt exploratory laparotomy.

The theca lutein cyst is encountered infrequently and is most often associated with gestational trophoblastic disease or pregnancy. Such cysts result from the luteinization of the ovary by human chorionic gonadotropin (HCG). These cysts are usually bilateral, multicystic, and may become quite large. A decrease in HCG levels, by treatment of trophoblastic disease or completion of pregnancy, leads to spontaneous regression of the cyst.

Polycystic ovarian disease (Stein-Leventhal syndrome) is usually associated with bilaterally enlarged ovaries containing multiple, subcortical follicular cysts. Patients with this condition are typically obese, hirsute, anovulatory, infertile,

and have irregular menses. These patients should receive a diagnostic evaluation by one trained in gynecologic endocrinology and infertility.

Endometriosis is a common cause of an adnexal mass.[5] Over one half of patients with endometriosis have ovarian involvement. Endometrial cysts of the ovary, termed "endometriomas," may reach 20 cm in diameter. They are referred to as "chocolate cysts" because of the thick brown fluid they contain resulting from the degradation of its bloody contents. A leaking or ruptured cyst may cause peritoneal irritation, dense adhesions, and pelvic organ fixation. Endometriotic involvement of the cul de sac and uterosacral ligaments produces tender, nodular thickenings which may be confused with the nodularity of ovarian carcinomatosis. Endometriosis may "fix" the uterine fundus in a retroverted position within the cul de sac. The disease is common in the third and fourth decade and may be associated with increasingly severe secondary dysmenorrhea, low backache, dyspareunia, irregular menstruation, and infertility. Diagnostic laparoscopy will define involvement and help determine the need for medical and/or surgical therapy.

The tubo-ovarian inflammatory complex usually results from incompletely treated or unresolved subacute or chronic pelvic inflammatory disease.[6] Although usually thought of as being of gonococcal origin, it may be of multimicrobial origin due to any one of a number of aerobic or anaerobic organisms. The inflammatory "cyst" or tubo-ovarian "abscess" is not a true cyst, but is rather a walled-off area of infection surrounded by pelvic structures. Symptoms may include lower abdominal and pelvic pain, urinary tract symptoms, rectal discomfort, and infertility. Pelvic examination reveals either unilateral or bilateral adnexal or cul de sac masses which are tender and somewhat ill-defined. Movement of the uterus causes pain by stretching its peritoneal attachments. Occasionally, the abscess will occur as a fluctuant mass above the inguinal ligament or in the cul de sac and upper rectovaginal septum. In either case, surgical drainage is indicated. A more acute inflammatory process may be present with high fever, chills, leukocytosis, diarrhea, and ileus. The toxic patient requires hospitalization, frequent evaluation, and intensive therapy as intraperitoneal leakage or rupture of a pelvic abscess may cause generalized peritonitis, shock, and death. Patients with lesser degrees of infection, namely, those with pelvic peritonitis without adnexal masses, also require hospitalization and intensive antibiotic therapy as the patient's fertility is at stake.

Nonneoplastic and Nonovarian Masses

Ectopic pregnancy may occur as frequently as 1 in 150 pregnancies. Many such pregnancies are asymptomatic when first seen; others may be associated with acute symptoms and often with shock due to intraperitoneal hemorrhage.[7] There is usually a history of amenorrhea, nausea, breast tenderness, lower abdominal pain, and vaginal spotting. Standard urine pregnancy tests are positive in approximately 50 percent of the cases. The newer radioimmunoassays of serum for the beta subunit of HCG are positive in over 90 percent of the cases. On pelvic examination, the cervix may appear cyanotic and be of soft consistency. The uterine corpus may be slightly enlarged, and a tender mass may be palpable in the adnexa just lateral to the uterus. Rupture of the pregnancy causes the mass to be ill-defined or nonpalpable. Upon examination and palpation, the cul de sac may appear full. If culdocentesis is performed, the recovery of nonclotting blood is presumptive evidence of intraperitoneal hemorrhage and requires immediate laparotomy. Ultrasonography and laparoscopy may be of help in the diagnosis of an unruptured ectopic pregnancy. They are of little benefit once rupture has occurred.

The pyosalpinx or hydrosalpinx may be unilateral or bilateral and may occur as a result of salpingitis. A pyosalpinx represents a more acute process with purulent material within the lumen of the fallopian tube. It is usually present with lower abdominal and pelvic pain, fever, leukocytosis, and a very tender ovoid mass. The hydrosalpinx develops as a result of the partial resolution of a pyosalpinx or as a result of the sealing off of either end of the fallopian tube and the continued secretion of its mucosal lining. Usually, the hydrosalpinx is asymptomatic; however, it may be associated with chronic pelvic pain, dyspareunia, and a sense of pelvic fullness or pressure.

Congenital anomalies of the mullerian system and vestigal remnants of the wolffian system should be considered in the differential diagnosis of the adnexal mass. The bicornuate uterus may be

Table 2. Clinical Findings Suggestive of Benign or Malignant Adnexal Masses

Benign	Malignant
Unilateral	Bilateral
Cystic	Solid
Mobile	Fixed
Smooth	Irregular
No ascites	Ascites
Slow growth	Rapid growth
Young patient	Older patient

mistaken for an adnexal mass and a blind uterine horn may cause cyclic pain because of a developing hematometra. Hysteroscopy, hysterosalpingography, laparoscopy, and/or laparotomy may be required.

Neoplastic Ovarian Masses

Ovarian neoplasms are either benign or malignant. Although no one characteristic is indicative of either a benign or a malignant neoplasm, the association of clinical findings given in Table 2 can help distinguish these two groups.

Ovarian neoplasms in the reproductive age group which are unilateral, cystic, *and* less than 6 cm in diameter are likely to be benign and may be observed for regression over a period of six to eight weeks. Persistence after this period of time requires further evaluation. All ovarian neoplasms that are solid *or* greater than 6 cm in diameter require immediate investigation. Ovarian enlargement in the premenarchal or postmenopausal female must be investigated promptly, since the ovaries are not undergoing cyclic function and for physiologic reasons, should not be enlarged.[8] The postmenopausal ovary is usually small and atrophic and, if palpable, is statistically suspect for containing a malignancy. This association has become known as the postmenopausal palpable ovary (PMPO) syndrome. It requires prompt investigation as most ovarian carcinomas occur after menopause.

Symptoms of ovarian neoplasms are usually dependent on their size, rate of growth, and position within the pelvis or abdomen. Initial symptoms are somewhat vague and consist of lower abdominal fullness or pelvic discomfort due to pressure on adjacent organs such as the bladder or rectum. Large masses rise out of the true pelvis and may cause abdominal enlargement with varicosities and edema of the lower extremities. Pain is an uncommon symptom and is usually due to an accident such as degeneration, torsion, infarction, or impaction deep within the pelvis. The majority of ovarian neoplasms are asymptomatic until they become quite large, unless they undergo one of the accidents referred to, or if malignant, they invade contiguous structures or metastasize. Compression against the urinary and intestinal systems may result in symptoms of urinary frequency, incontinence, constipation, and pain on defecation. Torsion and infarction are associated with pain, nausea, abdominal distention, and fever[9] and require immediate laparotomy. Functioning ovarian tumors rarely may be associated with precocious puberty, menstrual irregularities, postmenopausal bleeding, virilization, or masculinization.[10]

The cystic teratoma, or dermoid cyst, is an unusual benign ovarian neoplasm frequently discovered during the initial pelvic examination of a young patient. The cyst is usually asymptomatic, often bilateral, frequently anterior to the uterus, and may contain calcifications or teeth. Treatment involves surgical removal of the cyst with preservation of the ovary in these young patients.

Ovarian carcinoma is rarely diagnosed in the truly asymptomatic patient in a routine pelvic examination. Vague symptomatology, especially of gastrointestinal origin, such as bloating, flatulence, indigestion, or abdominal fullness, should suggest the possibility of ovarian carcinoma and the need for a thorough pelvic examination. Unfortunately, patients when first seen often have evidence of ascites and metastatic disease. Ascites in the female should be considered to be due to ovarian carcinoma until proven otherwise. Paracentesis is not recommended as it may rupture a large cyst, mimicking ascites, and disseminate malignant cells. Patients who are suspected of having ovarian carcinoma should be investigated promptly, utilizing sigmoidoscopy, cystoscopy, intravenous pyelography, barium enema, and in selected cases, ultrasonography and computerized tomography in preparation for staging laparotomy.[11] Laparotomy should be performed by a surgeon familiar with gynecologic surgery for malignant disease.

The recommended classification of ovarian tumors is that of the World Health Organization and is based on histologic criteria.

Neoplastic Nonovarian Masses

The leiomyoma, or "fibroid," is a common, benign pelvic tumor of smooth muscle origin arising in the uterus. These tumors usually cause the uterus to become nodular and often become so enlarged that it presents an abdominal mass. Subserous myomas may become pedunculated and form an adnexal mass. Such masses are solid, readily moveable, and nontender. The myomas may grow to such size so as to cause pressure on the bladder and produce urinary frequency and urgency. Pressure on the colon by the myomas may produce constipation and pain on defecation. Infarction of the myoma often produces acute pain, nausea, vomiting with fever, and a patient who appears severely ill. Submucous and intramural leiomyomas may cause significant menorrhagia. The inability to distinguish a leiomyoma from an ovarian tumor on pelvic examination is an indication for additional diagnostic procedures, including surgery. Patients with leiomyomas located so as to preclude adequate palpation of the ovaries should be considered candidates for myomectomy or hysterectomy.

Paraovarian cysts, both benign and malignant, may arise from wolffian remnants within the broad ligament and form adnexal masses. These must be evaluated, usually by laparotomy.

Extension of metastasis of endometrial or cervical carcinoma may form an adnexal mass. These masses are usually hard, nodular, and inseparable from the uterus. These patients usually have irregular uterine bleeding and can be diagnosed by fractional dilatation and curettage or cervical biopsy. Carcinoma of the fallopian tube is a rare lesion but can be detected as an adnexal mass. It can be diagnosed by laparoscopy or laparotomy and is usually found in the elderly patient in the sixth and seventh decade of life. The management of fallopian tube malignancies is similar to that of ovarian cancer.

Summary

Guidelines for the diagnosis and management of the adnexal mass in the female patient have been presented. While each patient requires individual management, some broad recommendations can be made. In general, expectant management is justified only when an asymptomatic physiologic cyst is suspected. Most other categories require prompt investigation in varying degrees; nonneoplastic, infectious, benign neoplastic or obstetrical processes may require general gynecologic consultation because of the high proportion of patients that will require gynecologic surgery of some variety for definitive diagnosis and treatment.

In addition, patients with endometriosis and tubal disorders may require subspecialty consultation with a reproductive endocrinologist, especially when reproductive potential is at stake.

Those patients considered to have malignant disease require extensive evaluation, staging, and treatment. In these patients, subspecialty consultation with a gynecologic oncologist should be considered.

While diagnostic tools, including radiologic studies and laboratory determinations may be of valuable assistance in the differential diagnosis of the adnexal mass, these cannot replace a pertinent medical history, a thorough pelvic examination, and comprehensive knowledge of pelvic pathology.

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