

MANAGEMENT OF OVARIAN MASSES : DECISION MAKING BASED ON ENDOVAGINAL SONOGRAPHIC CHARACTERISTICS

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SUMMARY

Modern management of ovarian neoplasm is being heavily influenced by two important factors, namely, the knowledge that majority of tumors are benign, and the nature of the tumor can be preoperatively predicted fairly accurately by employing ultrasound imaging, particularly endovaginal sonography. These two strategic facts have been very much highlighted in the article. Among the 566 ovarian enlargements, 92.93% were amenable for sonographic diagnosis. While ovarian tumors form the overwhelming majority (89.24%) of ovarian enlargements, most of the ovarian tumors are benign (84.68%) and cystic in nature (92.20%). More than one-half (59.14%) of the tumors develop in the reproductive age group, in whom the incidence of malignancy is still lower, ranging from 5.97 to 8.50%. Major bulk of endometrial cysts (83.38%) and functional ovarian cysts (73.68%) are also encountered in this age group.

Since the advent of sonographic diagnosis and characterization surgery could be avoided in functional cysts (16.96%), and laparoscopic ovarian cystectomy or ovariectomy could be offered for endometrial cysts and benign unilocular ovarian tumors of the reproductive age group (51.44%). Thus, laparotomy could be avoided in 67.21% of ovarian pathologies.

INTRODUCTION

Ultrasound imaging of pelvic organs

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Accepted for Publication in Oct.94

was first reported by Ian Donald in 1963 and one year later by Sunden (Granberg, 1993). Kratochwil et al in 1972 were the first to visualize normal ovaries and to

employ screening methods for early detection of ovarian tumors. Later, in 1976 with improved sonographic resolution Hackeloer et al (1976) first described the ovarian follicular growth and the cyclic changes. However, it is only recently in 1989, its importance as a diagnostic tool in tumor of the pelvis was demonstrated by Granberg et al 1989.*

New diagnostic methods and new surgical approaches have prompted a reexamination of traditional teaching regarding the management of ovarian disease in women of reproductive and postmenopausal age (Steege, 1994). Until recently, it was a standard practice to perform exploratory laparotomy for any ovarian mass larger than 5 to 7 cms in the reproductive age and any palpable ovary in the postmenopausal subjects. Present methods of preoperative evaluation and monitoring ovarian pathology, such as endovaginal sonography, CA-125 and Doppler-flow studies significantly enable the clinician to discriminate the functional cysts, benign tumors and ovarian malignancies (Fleischer 1991). The patient remains benefited because today unnecessary surgeries are obviated, and lesser invasive laparoscopic surgeries are being offered for more number of ovarian pathologies. To be able to use ultrasound to discriminate the ovarian enlargements the clinician should have the correlation between the ultrasonic appearance and the macroscopic and microscopic characteristics of the tumor (Granberg 1993).

My purpose is to detail the endovaginal monographic morphology of various ovarian tumors, functional cysts and endometrioma. These sonographic

characteristics will be retrospectively applied to 566 subjects treated by us for ovarian pathologies. The aim is precisely to identify the role of preoperative sonographic evaluation in deciding on the percentage of ovarian masses mandating surgery, and if so what percentage will really need an exploratory laparotomy and what percentage could have been managed by operative laparoscopy.

MATERIALS AND METHODS

Data related to two different groups of patients with ovarian masses studied between November, 1991 and May, 1994, is being presented. One group consists of 566 subjects with varied ovarian pathologies, the nature of which have been studied at surgery and well supported by histopathological examination. From this group the frequency of various ovarian tumors and their age related incidence of malignancy could be discerned. Another group consists of nearly 60 ovarian masses studied by endovaginal sonography and if needed supplemented by abdominal ultrasound, in whom the sonographic characteristics of various ovarian tumours, functional cysts and endometrioma have been documented.

SONOGRAPHIC CHARACTERISTICS (Table I)

Cystic Ovarian Masses

By definition, cystic ovarian masses have a smooth wall, contain no internal echoes, and demonstrate enhanced through transmission. But cystic masses often contain low-level echoes representing blood, pus, or cellular debris. Low-level echoes may also arise from proteina-

Table I

Analysis of ovarian tumors encountered at surgical exploration

Particulars	18 to 25 yrs	26 to 40 yrs	41 to 75 yrs	All patients
All Tumors	67	153	152	372
Malignancy	4(5.97%)	13(8.50%)	40(26.32%)	57(15.32%)
Cytic Tumors	64(95.52%)	141(92.16%)	138(90.79%)	343(92.20%)
Malignancy	3(4.69%)	8(5.67%)	31(22.46%)	42(12.24%)
Solid Tumors	3(4.48%)	12(7.84%)	14(9.21%)	29(7.80%)
Malignancy	1(33.33%)	5(41.67%)	9(64.29%)	15(51.72%)
Serous Tumor	20	66	80	166
Malignancy	nil	6(9.09%)	23(28.75%)	29(17.47%)
Malignancy in simple serous	0/16 nil	3/49 6.12%	10/52 19.27%	13/117 11.11%
Malignancy in Papillary Serous	0/4 nil	3/17 17/65%	13/28 46.43%	16/49 32.65%
Mucinous	15	35	50	100
Malignancy	1(6.66%)	2(5.71%)	10(20.00%)	13(13.00%)
Dermoid	22	32	14	66

ceous or mucinous material in a predominantly cystic mass. These echoes are not apparent when the ovarian mass is scanned with higher frequency transducers at transvaginal approach.

Functional Cysts of the Ovary

In the premenopausal women, the most common cystic mass is the physiologic ovarian cysts. These may represent either follicular or luteal cysts. Luteal cysts tend to have thicker wall than follicular cysts, both measuring 3 to 5 cms in size. The intraovarian location of the cysts can be identified by displacement of ovarian parenchyma, forming a "beak" of normal

ovarian tissue around the cyst. When hemorrhage occurs in the cyst, low-level echoes or thin internal septae can be identified in the ovarian mass. Therefore hemorrhagic corpus luteum can be mistaken for various ovarian tumors such as dermoid, mucinous tumor, torsion ovarian tumor and endometrial cyst. The differentiating points are that functional cysts are usually solitary, less than 6 cms in size, devoid of adhesions, and tend to regress.

Endometrioma

Endometrioma usually measure 5 to 8 cms in size, and these cysts have various

Table II

Endosonographically detectable ovarian enlargements

Pathology	Total No	% of total ovarian Pathology (566)	% of ovarian Cystic Masses (537)	% of ovarian Tumors (372)	% of ovarian Cystic Tumors
Serous Tumors	166	23.33	30.91	44.62	48.40
Mucinous Tumors	100	17.67	18.62	26.88	29.15
Endometrial Cysts	99	17.49	18.44		
Functional Cysts	95	16.96	17.69		
Dermoid	66	11.66	12.29	17.74	19.24
Total	526	92.93	97.95	89.24	96.79

sonographic appearances ranging from anechoic to echogenic, and from loculated to septated, depending on the amount of coagulation of the internal blood components. However, the most typical and the commonest presentation is that of a cyst filled with fine low-level homogenous echoes uniformly distributed inside the cyst cavity. The cyst wall itself is thick with irregular border due to fibrosis. This typical presentation has 100% specificity for endometrioma but lacks sensitivity because endometrioma could sometimes present with echofree fluid content. Other diagnostic features are bilateral nature, multiple cysts, and periovarian adhesions, and all these features are discernible at endovaginal sonography, so much so, endometrioma is seldom under or overdiagnosed.

Serous Cystadenoma

Serous cystadenomas tend to be hypoechoic, more often unilocular, less

often bilateral and may have external or internal cauliflower like papillary excrescences. Sometimes uniform low-level echoes may be seen representing mucinous content of the cyst. Echogenic material that is mobile may be the result of either hemorrhage or cellular debris. These cysts on an average measure 10 cm., and do not attain huge size. Smooth and thin walled, and completely anechoic cysts with good through transmission are seldom malignant, even in the postmenopausal age. Borderline malignancy in serous tumors may have increased incidence of bilaterality, the cyst fluid may be more often mucinous, and papillary component is usually more abundant. In serous cystadenocarcinoma the papillary formations, thick septation, and solid areas are much more prominent and increased.

Mucinous Cystadenoma

Mucinous cystadenomas may attain a

huge size, are thin walled and mostly multilocular with thin internal septae. Areas of echogenic material arising from mucin can be seen as fine uniform low-level echoes. they are usually benign unlike their serous counterpart. Occasionally papillary formations may be discerned, even though they are more common in the malignant variety. Papillary structures and solid areas are more often seen in borderline tumors, and malignant tumors have increased papillary formations, thick septation and solid areas.

Dermoid Cyst

Complex ovarian masses are lesions that contain both cystic and solid components and the most common one of these is the dermoid cysts. Dermoid cysts are usually solitary and are spherical or ovoid in shape. The sonographic appearance may vary, ranging from anechoic to echogenic. The echogenicity is higher than that of clear fluid but much lower than that of a solid tumor. It contains solid areas which are hair follicles and calcified elements within the cyst. Often dermoid cysts contain sebum which is a buttery material that tends to layer anteriorly due to its low specific gravity. These cysts may contain hair, which, because of its high echodensity, produce a typical acoustic shadow. The typical hair ball may change its position within the cyst, as proved by tilting the patient during examination. Complex ovarian masses such as hemorrhagic corpus luteum and endometrioma and mucinous cystadenoma should be considered in the differential diagnosis of dermoid.

Solid Ovarian Tumors

Solid tumors are highly, but irregularly, echogenic masses, sometimes their texture even resembling uterine myoma. Solid ovarian tumors are relatively uncommon, forming 7.80% of all the ovarian tumors, but tend to be more often malignant (51.72%). They could present with varied pictures of solid-cystic areas, complex masses or truly solid tumors. If more than 80% of the tumor had solid areas the tumor will be classified as solid and carry a risk of malignancy which can be 40% or more.

DISCUSSION

Ovarian tumors are the commonest cause of ovarian enlargements (89.24%) and of them 92.20 are cystic tumors, and epithelial tumors constitute 75% of all ovarian tumors. Majority of ovarian tumors are benign (84.68%), and greater proportion (59.14%) of ovarian tumors occur in the age group of 18 to 40 years. Incidence of malignancy in this age group is low, ranging from 5.97 to 8.50%. Frequency of functional cysts encountered in gynecological practice range from 90% of all ovarian enlargements of pregnancy, 50% of ovarian enlargements encountered at gynecological ultrasound and 17% of ovarian enlargements undergoing surgery. Greater proportion of functional cysts (73.68%) are encountered in the reproductive age group, between 18 and 40 years of age.

There are typical endovaginal sonographic characteristics and landmarks for diagnosis of functional cysts, benign tumors and malignant ovarian neoplasia. Sonographic predictive accuracy has

been confirmed in 84% of ovarian masses subjected to surgical exploration and histopathological examination (Girija et al 1993). This present methods of screening for ovarian masses significantly reduces missing of an ovarian malignancy, and at the same time enables decision making on : (i) "watchful waiting" and if symptomatic endosonographic guided aspiration of functional cysts; (ii) operative laparoscopy for purely benign cystic tumors, (iii) or exploratory laparotomies for potentially malignant tumors.

Among the 566 ovarian enlargements encountered at surgery, atleast 526 (92.93%) were amenable for pre-operative sonographic diagnosis (Table I). Those ovarian enlargements that could be confidently diagnosed at endovaginal sonography include : (1) serous cystadenoma (23.33%), (2) mucinous cystadenoma (17.67%), (3) endometrioma (17.49%), (4) functional cysts (16.96%) and (5) dermoid cysts (11.66%). So much so, only in 7-8% of ovarian enlargements, which were solid tumors of the ovary, the precise nature could not be discerned at sonography.

The 95 (16.96%) functional ovarian enlargements do not deserve any surgical intervention, and should be managed on expectant lines. If they are symptomatic endovaginal sonographically guided aspiration could be undertaken.

The commonest of the tumors (44.62%) and the commonest to evidence malignancy (17.47%) is serous cystadenoma. However, unilocular cystic tumors form the major proportion of serous tumors (70.48%) and only (29.52%) were papillary tumors. Irrespective of age of the patient,

the incidence of malignancy has been nearly zero in thin walled smaller unilocular serous tumors devoid of papillary excrescences. Among the 20 subjects between 18 and 25 years of age, irrespective of the morphology of the tumors, all were found benign. These two groups of patients who constitute nearly 73% of the total serous cystadenoma can be managed by less invasive laparoscopic ovarian cystectomy or ovariectomy. The remaining nearly 27% of serous cystadenoma, majority of whom are > 40 years, are the only group that mandate exploratory laparotomy.

Mucinous cystadenoma forms the second common ovarian tumor encountered (17.67%). Majority are benign (87%) and the incidence of malignancy in subjects upto 40 years is only 6%. Even then laparotomy should be the preferred management for mucinous tumors in view of the usual huge size of the mass.

Endometrioma is encountered more often in infertile subjects, and a precise sonographic diagnosis by the first visit allows planned management of infertility. Ovarian endometrioma form 17.49% of the ovarian pathologies in this series. A purely pharmacological approach employing danazol has resulted in 40% conception rate for endometrial cysts of ovary diagnosed at endopelvic scan. However, operative laparoscopy attended with pre- or postoperative danazol/GnRH agonist remains an alternative approach with almost similar conception chances (Rajan, 1924). There is no indications for laparotomy in such subjects, since the possibility of an ovarian tumor has been clearly excluded at pelvic scan.

Dermoid cysts, which form 11.66% of ovarian enlargements, are best managed by ovarian cystectomy of operative laparoscopy. Laparotomy should be again avoided, since these are practically benign tumors.

To conclude, 286 of the 566 ovarian enlargements (51.44%) were suited for laparoscopic ovarian cystectomy or ovariectomy, and another 95 subjects (16.96%) deserved only expectant management. Thus, only 175 ovarian enlargements (32.69%) really mandated laparotomy. This discrimination has been made possible by the great many advances made in imaging sciences which has

significantly influenced the current management of ovarian pathologies.

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