

ADENEXAL CYSTS; SURVEY OF ULTRASONOGRAPHY, PREOPERATIVE FINDINGS, HISTOPATHOLOGY

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ABSTRACT...Objectives: (1) To evaluate the risk of malignancy in surgically removed ovarian cysts that was before the operation neither simple nor complex. (2) To determine the relationship of age with type of ovarian tumour. (3) To categorize the management of these cases according to the intra-operative findings. (4) To analyze the occurrence of various histopathological types of tumour. **Date Source:** Medline **Study Design:** Single centered prospective descriptive study of 150 cases. **Place and Duration of Study:** Department of Obstetrics and Gynaecology at Shaikh Zayed Hospital Lahore from 1st July 2005 to, 31st December 2006. **Subject and method:** 150 patients presented with adnexal cysts on preoperative ultrasonography, peroperative findings and histopathology reports. These patients were followed up in OPD. **Results:** Showed the distribution of non-neoplastic and neoplastic tumours which were 84% and 16% respectively. The occurrence of malignancy increased with advancing age especially after 45 years Common presentations were lower abdominal pain (53%) followed by menstrual disturbances (30%), abdominopelvic mass, abdominal distension and infertility. Risk of malignancy also increased with parity. 73% masses were unilateral, 84% benign masses were unilocular whilst 85% malignant masses were echogenic and the complex cysts with papillary projection and multiloculations showed 3-6 times higher risk of malignancy. Most patients were managed by exploratory laparotomy. Cystectomy and total abdominal hysterectomy were the commonest procedures performed. Regarding histopathologic evaluation 40% patients had tumours, 2.66% borderline malignancy and 13.3% malignant. 44% had non-neoplastic lesions. Serous and endometriotic cysts were the commonest benign histopathologic types and among malignant ones, epithelial ovarian tumours were the leading variants. **Conclusions:** Preoperative characterization of adnexal masses using sonographic and demographic data may have considerable potential in determining risk of malignancy and may be advantageous in terms of counseling patients for management.

Key words: Neoplastic, Malignancy, Exploratory Laparotomy, Adnexal Mass, Histopathology.

INTRODUCTION

Adenexal masses represent a common problem in clinical practice¹ and ovarian cancer is a disease which presents late and responds poorly to treatment. Despite advances in surgical and chemotherapeutic techniques, the prognosis for ovarian cancer has largely remained unchanged for last 3 decades. The overall 5 years survival for patients with disease outside the ovary at initial surgery is only 15%². Unfortunately over 75% of patients fall within this group².

Attempts to detect early-localized ovarian cancer have not yet been successful. Despite advances in imaging techniques, the identification of the origin and character of a pelvic mass remains difficult³. Most patients with a pelvic mass who are referred to a gynaecologist appear to have a tumour of ovarian origin. Prediction of

characteristics of a pelvic mass may help in the management of such tumours.

The routine application of ultrasonography and improvements in ultrasonographic equipments have led to the detection of an increasing number of adnexal cysts⁴. Ultrasonography without doubt is the mostly used imaging diagnostic technique in the differential diagnosis of adnexal tumours. Basically it correlates morphologic images with the gross macroscopic pathologic features of ovarian tumours. This correlation has been demonstrated to be excellent, however the extreme variability of macroscopic characteristics of ovarian tumours makes a precise histologic diagnosis difficult from sonographic images in most cases¹. The problem of preoperative diagnosis of the benign or malignant nature of ovarian masses has not yet been completely solved.

Surgery can be optimally planned if it is known before hand whether an ovarian neoplasm is benign or malignant.

Ultrasound enables quite accurate evaluation of characteristics of the mass with sensitivity of 62-100% since the specificity of technique is only 73-95%, it is not possible to predict with certainty whether the mass is benign or malignant.⁵ To increase the accuracy regarding prediction of malignancy, many scoring stems have been developed for objective evaluation of changes in morphological parameters like volume, internal echogenicity, nature of wall of cyst, presence of septae, papillae and solid components. Using these criteria one can be sure of nature of ovarian mass preoperatively but for the final diagnosis histopathology is still the gold-standard⁶.

PATIENTS AND METHODS

After approval of the institutional ethical committee and obtaining informed consent from patients, 150 adult patients with adnexal cysts scheduled for elective surgeries under general anaesthesia, were studied.

This study was done on patients aged between 15-75 years. Inclusion criteria for this study were reproductive age group peri and postmenopausal with ovarian mass, all women scheduled for operation for adnexal mass with infertility and acute or chronic pelvic pain. Patients with complex cyst of any size and simple cyst >8cm diagnosed on ultrasound were included. Exclusion criteria for this study were adnexal masses due to ectopic pregnancy, on conservative management, patients unfit for surgery or refused surgery and who already had bilateral salpingo-oophorectomy.

Patients were admitted either through outpatient department or casualty department. The routine of our Gynecology Unit is that on admission, we collect the biodata of patients including name, age, marital status, parity and we analyze the presenting symptoms, menstrual history including any irregularity, dysmenorrhoea, dyspareunia, age of menarche or time elapsed since menopause in postmenopausal patients. Also enquiries were made regarding use of fertility drugs or oral contraceptive pills. Past history of pelvic infections

were also noted. Enquiries regarding breast-feeding and family history of cancers including breast, endometrial, colon or ovarian were also made. After completing the particulars of history a thorough general physical and systemic examination was performed. Gynecological examination including examination of external genitalia, sterile speculum examination and bimanual. Pelvic examination was carried out. Rectal examination was also done where needed.

Baseline investigations complete blood count, urine complete analysis, blood group and rhesus factor, blood sugar tests were done in all patients. Specific investigations were requested if required (e.g. RFT's, LFT's, S Electrolytes, coagulation profile, chest x-ray, ECG, tumour markers, CA 125, Alpha-fetoproteins, β -hcG carcino-embryonic antigen), ascitic fluid for cytology, computed tomography (CT) or magnetic resonance imaging (MRI).

Transabdominal sonography was done in all cases and certain parameters were noted regarding size and site of cyst either in right ovary or left or central. Type of cyst whether simple or complex and any fluid in cul-de-sac or in peritoneum. In doubtful cases Doppler USG was also performed. According to ultrasonographic findings simple cysts were included in group I and complex cyst were categorized in group II. After evaluating the patients were prepared for surgery either for laparoscopy or laparotomy depending on individual case. The intra-operative findings were noted and any tissue removed during surgery was submitted for histopathological analysis. The management of the patients was individualized depending upon the age, parity of patients and nature of lesion. Finally the histopathological diagnosis was obtained and co-related with sonographic and per-operative findings and further management in the form of either radical surgery, chemotherapy or radiotherapy was planned. Patients were advised to come for follow up after one week to Gynecology Department and afterwards in the out-patient department.

Nominal variables were recorded as frequency and/or percentages and numerical data was recorded as Mean \pm SD. Correlation between ultra-sonographic

diagnosis, preoperative assessment and final histopathology findings were evaluated using Chi-Square test. Comparison with the reported literature was done using Z-scores. For all analysis a p value <0.05 was considered significant. The SPSS programme version 16 was used for all data analysis.

RESULTS

The occurrence of various types of adnexal masses broadly classified into non-neoplastic and neoplastic are shown in Table I. The non-neoplastic masses include follicular cysts, endometriotic cysts, corpus luteal cysts as well as inflammatory masses. The benign tumours were found in 60 patients (40%) and tumours of borderline malignancy were found in 4 patients (2.66%) and malignant tumour were found in 20 patients (13%). The presenting symptoms of the patients are listed in Table II. Some had only one symptom and others had a combination of symptoms.

Table-I. Prevalence of various adnexal masses

Adnexal mass	No. of patients (n=150)	%age
Non-neoplastic	66	44
Neoplastic		
Benign	60	40
Borderline	4	3
Malignant	20	13

Four patients were asymptomatic. Two were diagnosed during antenatal USG scanning and one during follow-up of hysterectomy and one came for BTL and was diagnosed during its work-up. Among symptomatic patients the commonest symptom was lower abdominal pain (53%) followed by menstrual disturbances (30%), mass abdomen (22%) and abdominal distension (19%). The other less frequent symptoms were inability to conceive (18%) either primary or secondary. Eight percent patients presented with pressure symptoms including urinary frequency, constipation leg edema and epigastric problems. Among these one patient presented with unusual symptom of right upper limb swelling and her swelling subsided after surgery and she had malignant tumour.

Table-II. Clinical presentation of patient's adnexal mass

Symptoms	No. of patients	%age
Lower abdominal pain	79	53
Menstrual disturbance	45	30
Abdominal mass	33	22
Abdominal distension	29	19
Infertility	27	18
Pressure symptoms	12	8
Weight loss	10	7
Anorexia	10	7
Hirsutism	3	2
Symptoms of metastasis	3	2
Vaginal discharge	2	1
Asymptomatic	4	3

Distribution of various adnexal masses according to the age of patients is shown in Table III.

Table-III. Distribution of adnexal masses according to age group

Age (yrs)	No. of patients	Benign	Malignant
15-19	10	10 (100%)	-
20-35	67	63 (94%)	4 (6%)
36-45	51	44 (86%)	7 (14%)
<i>Age range 15-75 years</i>		<i>Mean age 39.62±10.86</i>	<i>P<0.05</i>

All tumours upto 20 years were benign (100%). There was a sharp rise in occurrence of malignancy above 45 years ranging from 55-60%. So the fact that the incidence of malignancy rises with advancing age is well illustrated by this study.

Table IV shows the distribution of adnexal masses according to parity. Although nulliparity is the risk factor for ovarian malignancy but according to my study the risk of malignancy is increasing with increasing parity, the reason behind is that patients of high parity were older than those with low parity.

Table-IV. Distribution of adnexal masses according to parity

Parity	n. of patients	Benign	Malignant
Unmarried	19 (13%)	8 (94%)	1 (5%)
Nulliparus	32 (21%)	0 (93%)	2 (6%)
P1	11 (7%)	9 (82%)	2 (18%)
P2	20 (13%)	5 (75%)	3 (15%)
P3	19 (13%)	4 (73%)	5 (26%)
P4	19 (13%)	7 (89%)	2 (10%)
P5	13 (13%)	9 (69%)	4 (31%)
P6	5 (5%)	4 (8%)	1 (20%)
P7	4 (3%)	3 (75%)	1 (25%)
P8	5 (3%)	3 (60%)	2 (40%)
P9 and above	3 (2%)	1 (33%)	2 (66%)

P < 0.05

This study confirms that the risk of malignancy associated with unilocular echo-free cysts without papillary projections i.e. group I was low and the risk of malignancy in cysts containing papillary projections, echogenic foci or containing solid components i.e. group II was 3 to 6 times higher than that in unilocular echo-free cysts as shown in Table V.

Table-V. Comparison between benign and malignant tumours based on preoperative sonographic findings

Parameter	Benign (n=126)	Malignant (n=24)
Echogenicity	29 (23%)	20 (83%)
Papillary projections	12 (9.6%)	17 (71%)
Unicular	84 (67%)	11 (46%)
Multicular	41 (33%)	12 (50%)

P < 0.05

A clinical diagnosis of inflammatory mass was made in 10 patients but out of them two patients had hydro-salpinx and 8 had complex tubo-ovarian mass. Eight patients out of 150 presented with acute pain and out of them 3 had ruptured corpus luteal cysts and 2 had torsion of ovarian

cyst, further two had intracystic haemorrhage and one had degeneration, necrosis and haemorrhage in fibroid misleading the diagnosis.

Intraoperative findings regarding cysts are shown in Table VI.

Table-VI. Intraoperative findings of mass and other observations

Findings	No. of Pts.	%age
Ovarian mass		
Unilateral	109	73
n=150 Bilateral	38	25
Central	3	2
Cystic	101	67
n=150 Solid	25	17
Mixed	24	16
Ut present	143	95
n=150 Ut absent	7	5
Ascitic fluid	22	15
Omentum involved	15	10
Visceral infiltration	12	8

Most of these patients were managed by exploratory laparotomy and during the operation a detailed examination of the abdominal cavity was done. Unilateral ovarian cyst was the commonest finding in around 72-73% patients. In 38 cases mass was bilateral and 3 patients had central mass. Majority (67%) of masses were cystic in nature. In 25 patients there was solid tumour and 24 patients had both solid and cystic components in ovarian mass.

Seven patients developed post-hysterectomy ovarian cyst but out of them only 1 (10%) had malignant tumour. Rest of 6 were benign.

Twenty two patients out of 150 had demonstrable ascities whether diagnosed clinically or sonographically

and in all fluid was sent for cytology and in 18 cases it was positive for malignant cells.

Two patients had pleural effusion and pleural tap was done. In both it was positive for malignancy that's why surgery was deferred.

In 15 patients there were metastatic deposits in greater omentum. Visceral infiltration was found in 12 patients and involving mostly the liver and mesentery of small and large bowel. Among these two patients had metastatic lesions even in the anterior abdominal wall.

Four patients had distant metastasis to lungs and bones detected on CT scanning. Majority of patients underwent laparotomy and the surgical procedures performed is shown in Table VII.

Procedure	No. of patients	%age
Cystectomy	59	39
Unilateral salpingo-oophorectomy	17	11
TAH+BSO	33	22
THA+USO	4	3
B/L salpingo-oophorectomy	17	11
TAH+BSO+debulking	22	15
TAH with cystectomy & ovarian conservation	3	2
Open/close (biopsy)	4	3
Deferred surgery	3	2

Fifty-nine patients had cystectomy and it was the most common procedure done as preoperative diagnosis was of benign pathology. Seventeen patients were young and cysts were benign looking thereby cystectomy and unilateral salpingo-oophorectomy was done but all these patients were counseled before hand that if histopathology turned out to be malignant then clearance surgery would be the next step.

Four patients, in their thirties and early forties, did not wish further fertility so their TAH and unilateral salpingo-

oophorectomy performed and the healthy ovary was conserved for estrogen production for its beneficial effects on health.

In 33 patients TAH + BSO was performed. In 3 patients TAH along with cystectomy was done and both ovaries were conserved. Among 7 patients who had post-hysterectomy cyst 5 had BSO and in rest of two cysts were removed (cystectomy) and ovaries conserved. Both of these patients were < 40 years.

In 22 patients debulking was performed. In another 3 patients surgery was deferred. Among them two were pregnant and advised to have regular follow up and final decision would be taken after delivery and puerperium. Later on both patients returned and had cystectomy and both had benign lesions. One patient in which surgery was not performed was 75 years old with advanced malignancy, only ascitic tap was done for relief of symptoms.

In 4 patients after opening peritoneal cavity no further procedure could be performed due to frozen pelvis only biopsies were taken. Out of them 3 had malignancies and one had pelvic tuberculosis.

The final diagnosis after all was made on histopathology report and is shown in Table VIII. Among 150 patients 126 patients had benign lesion, 4 had borderline malignancy and 20 had malignant tumours.

Among non-neoplastic lesions 24% had endometriosis (36/66 patients), 16 patients have follicular cysts 10 had inflammatory masses and 4 had haemorrhagic corpus luteal cysts. Among benign lesions the commonest finding was serous cyst adenoma found in 36/60 patients and the rare was benign Brenner tumour found in 2 cases/60 patients.

Out of 4 borderline tumours, 3 were mucinous cyst adenoma variety and one was papillary serous cyst adenocarcinoma. Among malignant ones epithelial tumours were found in 10 patients (42%), 4 patients (16.6%) were of sex-cord stromal tumours 3 patients (12.5%) were having germ cell tumours and 2 patients (8%) were unclassified as these were poorly

differentiated (high grade lesions) and 1 patient had advanced metastatic disease (4%). Their distribution is shown in Table IX.

Table-VIII. Distribution of various adnexal masses according to histopathology

Adnexal Mass	No. of Patients	%age
Non-neoplastic		
Follicular cysts	16	11
Endometriotic cysts	36	24
Inflammatory	10	7
Corpus luteal cysts	4	3
Neoplastic		
Benign		
Serous cyst-adenoma	36	24
Benign cystic teratoma	11	7
Mucinous cyst adenoma	8	5
Thecoma/fibroma	3	2
Benign Brenner tumour	2	1
Malignant		
Mucinous adenocarcinoma of borderline malignancy	2	12
Serous cyst adenocarcinoma of borderline malignancy	1	4
Papillary serous cyst adenocarcinoma	5	21
Mucinous cyst adenocarcinoma	3	12
Endometrioid adenocarcinoma	2	8
Malignant teratoma	2	8
Dysgerminoma	1	4
Granulosa cell tumour	2	8
Stromal ovarian malignancy	2	8
Poorly differentiated carcinoma	2	8
Metastatic carcinoma	1	4

Table-IX. Broad categorization of malignant ovarian tumours

Tumour	No. of patients	%age
Epithelial tumour	10	42
Germ cell tumours	3	12
Sex cord stromal tumours	4	17
Metastatic	1	4
Unclassified	2	8

DISCUSSION

Ovarian masses are one of the most frequent reasons for referrals to specialist gynecologists⁵. In woman's life a variety of lesions can present as an adnexal mass. Timely diagnosis and appropriate management of an adnexal mass is very important otherwise many grave complications can occur. Although geographic and racial differences in the incidence of cancer are well recognized, the various parameters of this study are comparable with other studies.

The risk of malignancy in my study was increasing with increasing age and maximum increase in the risk was seen after 45 years of age. The risk was only 14% in age group 36-45 years while it was 59% in age group 46-60 years. According to a study conducted in Pakistan the mean age for epithelial ovarian cancer was 49.5 years⁶. Another Pakistani study showed the higher incidence of ovarian malignancy seen in 21-30 years and 41-50 years⁷. One study by Alcazar showed the mean age of patients with ovarian malignancy was 44.5 years⁷. So the fact that with increasing age the incidence of malignancy increases corresponds to the results of study done to find the pattern of incidence of age related ovarian cancer in South East England (1967-96)².

Common mode of presentation in my study was lower abdominal pain (53%) followed by menstrual disturbances (30%), abdominal mass (22%), abdominal distension (19%) and infertility (18%). A study by Saleem showed that (61%) patients presented with pain whether acute or chronic, 45% with menstrual disturbances, 18% with abdominopelvic mass and 15% with infertility⁸.

The present study did not show any increased risk of malignancy with nulliparity and reduced family size contrary to this nulliparity and reduced family size are well recognized risk factors for ovarian malignancy. In my study however the risk of malignancy was seen more in multipara than nullipara, the reason behind is that patients with more children were older than those with less children or no children. A study by Malik also showed that most of well defined risk factors like early menarche, late menopause, nulliparity, lack of lactation were uncommonly observed⁶. But the other study denied the above findings and had shown well established risk of malignancy with nulliparity and small family size (68%)⁷.

In my study the non-neoplastic lesions were 44%. and among neoplastic the benign ones were 40%, borderline malignant tumour constitute 3% and malignant ovarian tumour were 13%. Comparable results were found in another Pakistani study in which the non-neoplastic variety constitute 54% and benign tumours were 27.7%, malignant tumours were 6.88% and extra-ovarian masses were 11.11%⁸. A study done by Giuseppe also analyzed 67 women out of them 52 patients had benign lesion, benign epithelial tumours were found in 17 patients, 12 had dermoid cysts, 8 had endometriotic cysts, 4 had par-ovarian cysts, 3 had hydrosalpinx, 2 had fibroma and 6 patients were diagnosed to have other type of lesions. Three women had borderline malignancy and 12 women had malignant ovarian tumours. This study also showed the occurrence of benign and malignant ovarian tumours. In this study 124 patients were studied and out them 93 (75%) patients were benign and among them 43 (46%) had epithelial tumours, 19 (20%) had dermoid cysts, 17 (18%) had endometriosis, 7 (7%) had fibroma, 4 (4%) had pelvic abscess, 2 (2%) had hydrosalpinx and 1 (1%) had thecoma of the ovary. Out of 124 patients 31 (25%) had malignant ovarian tumours, and among them 14 (45%) had serous cyst adenocarcinoma, 6 (19%) had mucinous cyst adenocarcinoma, 2 (6%) had clear cell carcinoma, 2 (6%) had undifferentiated tumours, 1 (3.3%) had granulose tumours and remaining were krukemberg tumour, immature teratoma, endometroid adenocarcinoma and metastatic breast tumours⁵.

In my study most of the ovarian masses 73% were unilateral, 25% were bilateral and 2% were central. Another study by Tailor showed that 13% masses were bilateral.⁹ The study of Alcazar revealed that 50 patients out of 705 had bilateral lesions¹. My study revealed that clinical and transabdominal sonographic findings were not 100% able to clearly differentiate between different types of adnexal masses and to tell about the malignant nature of mass, so we must adopt new imaging techniques like transvaginal sonography which is now available in most tertiary care centers and can add to this colour Doppler sonography in order to make precise diagnosis preoperatively.

In my study sonographic findings of cysts which turned out to be benign 29 (23%) were echogenic 12 (10%) had papillary projections and 84 (67%) were unilocular and 41 (32%) were multilocular while the malignant cysts 20 (83%) were echogenic, 17 (71%) were having papillary projections, 11 (46%) were unilocular and 12 (50%) were multilocular. Comparing the similar features another study by Tailor which was dealing with 67 patients among them 52 were benign⁹. Eighteen percent benign cysts were echogenic and 10% had papillary projections while among the malignant cyst (87%) were echogenic and 73% cysts exhibiting papillary projections⁹. The significance of papillary projections was recognized even with rudimentary ultrasonographic equipment available in early 1970⁴. Papillary projections are an ominous sign and there is evidence that the likelihood of malignancy increases proportionately with the number of such irregularities⁴. My study also confirmed that the risk of malignancy associated with echogenicity of cyst and papillary projections i.e. in group II is 3-7 times higher than that of unilocular, echo free cysts without papillary projections. Another study by Tailor revealed that echogenicity, papillary projections, maximum diameter and volume for all tumours are significantly higher in malignant group⁹.

Besides clinical evaluation and ultrasonographic assessment the additional clue to the diagnosis was obtained by intraoperative findings. In my study most ovarian masses were unilateral and were managed by simple cystectomy 39%. Total abdominal hysterectomy

and bilateral salpingo-oophorectomy was performed in 22% of patients, bilateral salpingo-oophorectomy was done in 11% and debulking surgery was done in 15% of patients. Comparing results were found in another study 33% had cystectomy, 14% had salpingo-oophorectomy and 14% had total abdominal hysterectomy and bilateral salpingo-oophorectomy⁸.

Regarding the histopathology of the tumour in my study 84% lesion were benign and 16% were malignant. Among the malignant ovarian tumours, epithelial tumours constitute 42%, germ cell tumour 12%, sex cord stromal % and other types constitute 10-15%. This incidence corresponds with international study done at the John Hopkins Hospital in 1995 in America in which it was found that of all ovarian tumours 80-85% were benign and 15-20% were malignant. Among the malignant ovarian tumours 48-50% were epithelial in origin, 10-20% were germ cell tumours. 5-10% were sex cord stromal tumours and 10-15% were of other types¹⁰.

CONCLUSIONS

The risk of malignancy increases with complexity of ovarian mass.

- The risk of malignancy increases significantly with increasing age being higher after 45 years.
- The most prevalent benign lesion is serous cyst adenoma and endometriosis and the most prevalent malignant tumour is of epithelial origin.
- There are conflicting results regarding nature of adnexal mass according to clinical examination and ultrasonographic features preoperatively, so intraoperative findings as well as histopathology will make the final diagnosis.
- Histopathology is still the gold standard, as further management still depends upon it.

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