Research Article

Clinico-Pathological Evaluation of Adnexal Masses among Patients Attending to Tertiary Care Centre

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ABSTRACT

Background: Adnexal masses are commonly encountered in gynaecological practice and may arise from ovarian, tubal, or surrounding structures. While most are benign, a significant proportion may be malignant, necessitating accurate diagnosis for appropriate management. This study aimed to evaluate adnexal masses using clinical, biochemical, radiological, and histopathological parameters and to differentiate between functional, benign, and malignant lesions.

Methods: A prospective observational study was conducted over 18 months among 106 women admitted with suspected adnexal masses in a tertiary care hospital. Patients with ectopic pregnancy and uterine masses were excluded. Data were collected through clinical evaluation, laboratory investigations including tumor markers (CA-125), imaging (ultrasound/MRI), and histopathological examination. Statistical analysis was performed using SPSS version 20, applying descriptive and inferential statistics with significance set at $p<0.05$.

Results: The mean age was 44.75±9.65 years, with most patients in the 41–50-year group. The commonest symptom was abdominal pain (64.1%), followed by abnormal uterine bleeding (26.4%). Ovarian origin accounted for 80.2% of masses, with 84.9% being unilateral. Most lesions were benign (82.1%), while 17.9% were malignant. Among ovarian tumors, benign lesions constituted 60%, malignant 21.2%, and non-neoplastic 18.8%. Mucinous cystadenoma was the most common benign tumor, and serous cystadenocarcinoma the most common malignant tumor. Malignancy was significantly associated with increasing age, menopausal status, irregular menstrual cycles, elevated CA-125 levels, and higher Risk Malignancy Index scores ($p<0.001$).

Conclusions: Adnexal masses are predominantly benign, with ovarian origin being most common. Clinical features combined with CA-125 and RMI are valuable in predicting malignancy. Early and accurate evaluation is essential for optimal management and improved outcomes.

Keywords: Adnexal Mass, Benign, Histology, Symptoms, CA 125, RMI Score.

INTRODUCTION

Adnexal masses can arise from the ovary, fallopian tube or para-ovarian / para-tubal structures. Many tools used to assess these adnexal masses.[1] In the United States, 289,000 women approximately are hospitalized each year due to adnexal mass, with 11 in 5 women developing an adnexal mass in their lifetime.[2]While most adnexal masses are benign, 13-21% are malignant, emphasizing the importance of prompt and accurate diagnosis to reduce mortality and morbidity. Notably, about 10% of ovarian cancers are hereditary, with individuals having a family history of breast-ovarian cancer syndrome or nonpolyposis colorectal cancer being at an increased risk of developing malignancy, highlighting the need for early detection and intervention.

According to Pavlik et al's study, premenopausal women have a higher prevalence of ovarian cysts (35%) compared to postmenopausal women (17%). Additionally, the incidence of new cyst formation is significantly higher in premenopausal women (15.3%) than in

postmenopausal women (8.2%). This suggests that ovarian cysts are more common and more likely to develop in premenopausal women.[3]

Nezhat found amongst 1101 women, only 0.4% of the tumors in women under the age of 55 years were malignant while 80% were functional or endometriomas.[4] another study with women at or below the age of 45 found a 1.4% incidence of malignancy. [5]

In a cohort study of 31,834 women in whom 6,807 had an ultrasound scan abnormality, 63% of these had complete resolution of their cysts.[3]

In a cohort of 15,106 asymptomatic postmenopausal women, a similar percentage (69%) was found to resolve spontaneously.[6]

When a woman is found to have an ovarian cyst or an adnexal mass, the nature of this mass and the symptoms she experiences determine the management of this tumor. The most important determination is whether the tumor is benign or malignant. Benign lesions can be managed expectantly if a woman is asymptomatic. Alternatively benign lesions can be managed by conservative surgery with laparoscopic excision. Minimally invasive surgery requires shorter hospitalization, affords the patient a faster recovery and allows a speedier return to work. Laparoscopic surgery is also more aesthetically pleasing to women with smaller incision scars. Malignant lesions on the other hand will need to be managed by an oncology team in a tertiary unit. This has been found to provide the best outcome for these women. These lesions often require a staging laparotomy and debulking surgery. Women managed and operated on by a gynaecological oncologist have better operative staging, more complete debulking with less residual tissue and better survival rates and should therefore be referred preoperatively. [7]

Non-invasive diagnosis has therefore become even more relevant and important. It is imperative that all efforts are made to determine the nature of a tumor before embarking on empirical surgical management. The present study is undertaken to evaluate the adnexal masses by clinical, biochemical, radiological parameters in all age group women attending the gynecology department in tertiary care center.

Aim: To evaluate adnexal masses and to differentiate between functional, benign and malignant conditions and to find out the occurrence of adnexal masses and diagnostic accuracy of clinical and pathological findings.

Objectives
- To study the socio demographic profile, presentation and types of adnexal mass.
- To evaluate the incidence of adnexal mass.
- To find out the occurrence of adnexal masses and diagnostic accuracy of clinical and pathological findings.

MATERIAL AND METHODS
This study was a Prospective Observational Study conducted among 106 patients admitted to gynaecological department through OPD and emergency room for a period of 18 months.

All patients admitted with clinical suspicion of adnexal mass and all patients diagnosed outside and referred to our hospital were included in the study. Patient diagnosed after admission or preoperatively as ectopic pregnancy and all uterine masses were excluded from the study.

Investigations Required: 5 ml of venous blood was collected.

Basic investigations such as
- Complete blood picture.
- Random Blood Sugar, Bleeding Time, Clotting Time.
- LFT RFT Serum Electrolytes.
- Complete urine examination.
- HIV HBSAg VDRL screening.
- Radiological-Ultrasound imaging, MRI (if needed).
- Biochemical-Tumor markers.
- Pathological-Histopathological examination.

Statistical Analysis of Data
The data was entered into MS excel and further analysed using SPSS version 20. Descriptive statistics were analyzed as follows: The categorical data was analyzed using percentages and the continuous data was analyzed using mean and standard deviation. Inferential statistics was analyzed as follows: Chi-square test, 't'test etc. were used. A probability value of <0.05 was considered as statistically significant.

RESULTS
A study was done on 106 patients with Adnexal masses attending Department of OBG in a Tertiary care hospital for a period of 18 months to evaluate adnexal masses clinic pathologically.

Table 1: Distribution of Age, Menstrual Details, Parity among Study Population

Variables		Frequency	Percentage
Age group (Years) Mean age - 44.75 (9.65)	<20	2	1.9
	20-30	3	2.8
	31-40	31	29.2
	41-50	41	38.7
	51-60	24	22.6
	>60	5	4.7
Menarche age (Years)	11	12	11.3
	12	12	20.7
	13	51	48.1
	14	10	9.5
	15	6	5.7
	16	5	4.7
Menstrual cycle pattern	Regular	82	77.4
	Irregular	24	22.6
Menstrual status	Premenopausal	73	68.9
	Menopausal	33	31.1
Parity	Nullipara	9	8.5
	Primigravida	28	26.4
	Multiparous	69	65.1

It is seen from the table that the majority of the subjects were in the age group between 40 and 50 years with a mean age of 44.75 years and 4.7%% of the subjects were aged <30 and >60 years. The study participants aged 18 years to 65 years. 48.1% of the patients attained menarche at the age of 13 years. 20.7% of the patients attained menarche at the age of 12 followed by 11.3% at 12 years respectively. Only 4.7% of the patients had menarche at 16 years. Most of the patients had regular menstrual cycles i.e., in 82 (77.4%) patients. Irregular menstrual cycle and abnormal menstrual cycle was seen in 24 patients i.e., 22.6%. Most patients were in reproductive stage i.e., premenopausal (n=76, 68.9%). Menopause was attained in 31.1% (n=33) of women. Unmarried patients were 5 out of 9 patients who had no children (8.5%). Most patients had more than one children (n=69, 65.1%). Only one child is seen in 26.4% of patients with adnexal masses.

Table 2: Distribution of Symptoms, Tumors Characteristic and Markers among Study Population

Variables		Frequency	Percentage
Symptoms	Pain	58	641
	Distension of abdomen	26	24.5
	Lump	20	18.9
	AUB	28	26.4
	Dysmenorrhea	18	17
	Postmenopausal bleeding	6	5.6
	Amenorrhea	4	3.8
	Infertility	7	6.6
	Vague GI symptoms	12	11.3
	Incidental findings	6	5.7
Organs involved	Ovary	85	80.2
	Fallopian tubes	9	8.5
	Para ovarian	5	4.7
	Broad ligament	4	3.8
	GIT	1	0.9
	Disseminated TB	2	1.9
Laterality	Unilateral	90	84.9
	Bilateral	16	15.1
Gross appearance	Cystic	44	41.5
	Solid	10	9.4
	Complex	52	49.1

Malignancy	Benign/non-malignant	87	82.1
	Malignant	19	17.9
CA 125	<100	68	64.2
	100-200	20	18.9
	201-300	9	8.5
	>300	9	8.5
RMI	<25	47	44.3
	25-200	49	46.2
	>200	10	9.4

All patients had multiple symptoms. Out of the wide range of symptoms, mostly patients presented with pain (vague, severe) i.e., 64.1% followed by abnormal uterine bleeding in 26.4%, distension of abdomen (including ascites) in 24.5%. Abdominal mass was physically palpable in 18.9% patients. Out of 106 patients ovary is affected in 80.2% of the patients followed by Fallopian tubes in 8.5%. Paraovarian cyst are involved in 4.7%, Broad ligament in 3.8%, Disseminated Tuberculosis in 1.9% and Gastro intestinal system involved in 0.9% patients primarily. Out of 106 patients enrolled in the study with adnexal masses on investigation found that 84.9% patients had mass unilaterally, while in 15.1% bilaterally. Out of 90 patients with adnexal masses on one side, 53 (58.9%) patients had pathology on left side while 41.1% had on right side. Majority of the patients had benign tumor i.e., in 87 patients (82.1%) with adnexal pathology including non neoplastic lesions while malignant in 17.9% of patients.

In the present study majority of the patients (64.2%) had values lessthan 100, followed by 100 – 200 in 18.9% patients. In our study 46.2% showed scores of Risk malignancy index in intermediate risk, followed by low risk in 44.3%patients and high risk was seen in 9.4% of patients only.

Tabe 3: Distribution of Non Ovarian and Ovarian Masses in Patients with Adnexal Pathology

Non Ovarian Masses	Frequency (n=21)	Percentage
Fallopian tube	9	42.85
Hydrosalpinx	7	33.3
Chronic ectopic	2	9.5
Disseminated TB	2	9.5
Para-ovarian cyst	5	23.8
Ligament	4	19.04
Sub serous fibroid/Broad ligament	2	9.5
Fibroid	2	9.5
GIT-GIST	1	4.81
Ovarian Masses (n=85)		
Non neoplastic	16	18.8
Benign	51	60
Malignant	18	21.2

Among the adnexal pathologies, 21 had non ovarian masses, 85 had ovarian masses. Out of 21 non ovarian, majority of the masses were primarily from Fallopian tube i.e., 42.85% followed by paraovarian cysts attached to ovary or fallopian tube were in 23.8% of patients. Broad ligament originated masses were seen in 19.04%. Disseminated tuberculosis which was primarily diagnosed as ovarian cancer was seen in 9.5% of patients with non-ovarian masses. Only one case (4.81%) was seen involving gastrointestinal tract primarily, diagnosed initially as a gastrointestinal stromal tumor. Among all the non-ovarian adnexal masses most common was the fallopian tube involved Hydrosalpinx (33.33%).

Majority of the ovarian lesions were benign on histopathology (n=51, 60%), followed by malignant lesions (n=18, 21.2%) and non-neoplastic lesions in 18.8% ovarian pathologies.

Table 4: Non Neoplastic Ovarian Adnexal Masses and Histopathological Findings of Benign Adnexal Mass in Ovaries

Non Neoplastic Ovarian Masses (n=16)	Frequency	Percentage
Simple cysts	13	81.3
Corpus luteal cysts	2	12.5
Endometrioma	1	6.2

Benign Adnexal Masses (n=51)			
Surface epithelial tumors (n=32 (62.7%))	Serous cystadenoma	7	21.9
	Serous cysadenofibroma	5	15.6
	Mucinous cystadenoma	14	43.8
	Sero-mucinous cystadenoma	4	12.5
	Benign Brenner's tumor	2	6.2
Sex cord stromal tumors (n=7 (13.7%))	Adult granulosa cell tumor	4	57.1
	Fibroma	3	42.9
Germ cell tumor	Mature cystic teratoma(Dermoid)	11	21.6
others	Ovarian Leiomyoma	1	2

Out of 85 cases of ovarian adnexal mass, 16 patients had shown primarily non neoplastic tumor. Majority of the patients have shown simple cysts i.e., 81.25%, in 13 patients. 2 patients have shown corpus luteal cyst (12.5%), and one patient had Endometrioma (6.25%).

On histopathological investigation, 51 patients had benign ovarian tumor. Benign tumors are again classified into Surface epithelial tumors, Sex cord stromal tumors, germ cell tumors.

Surface epithelial tumors are the most common benign tumors (n=32, 62.7%) among which commonest is Mucinous cystadenoma (n=14, 43.8%) followed by serous cystadenoma in 21.9%. Next common tumor is Germ cell tumor i.e., Mature Cystic teratoma (Dermoid) in 21.6 % patients with benign adnexal masses. In two pregnant women, dermoid cyst and serous cystadenoma was diagnosed and in three postnatal women, one serous cystadenoma and two Collision tumor of ovary.

Table 5: Histopathological Findings of Malignant Adnexal Mass in Ovaries

Malignant (n=18)		Frequency	Percentage
Surface epithelia tumors (n=10 (55.6%))	Serous cystadenocarcinoma	5	50
	Mucinous cystadenocarcinoma	1	10
	Sero – mucinous cystadenocarcinoma	1	10
	Endometrioid carcinoma	1	10
	Clear cell adenocarcinoma	1	10
	Mixed epithelial tumor	1	10
Sex cord stromal tumors (n=3 (16.7%))	Juvenile granulosa cell tumor	1	33.3
	Sertoli Leydig cell tumor	1	33.3
	Gynandroblastoma	1	33.3
Germ cell tumors (n=3 (16.7))	Dysgerminoma	1	33.3
	Immature teratoma	1	33.3
	Yolk sac tumor	1	33.3
Metastatic	Krukenberg's tumor	1	5.5
Others	Undifferentiated carcinoma	1	5.5

On histopathological investigation, 18 patients had malignant ovarian tumor. Malignant tumors are again classified into Sex cord stromal tumors, Surface epithelial tumors, metastasis and germ cell tumors. The most common malignant tumor is serous cystadenocarcinoma.

Table 6: Association between Adnexal Masses and Age, Menstrual Details, Parity, Symptoms, Tumors Characteristic and Markers

Variable		Benign	Malignant	P Value
Age group (Years)	<20	2 (100)	0 (0)	<0.001
	20-30	3 (100)	0 (0)	
	31-40	31 (100)	0 (0)	
	41-50	38 (92.7)	3 (7.3)	

	51-60	12 (50)	12 (50)	
	>60	1 (20)	4 (80)	
	Mean age	42.3± 8.6	56.2±5.3	<0.001
Menstrual cycle pattern	Regular	73 (83.9)	9 (47.4)	<0.001
	Irregular	14 (16.1)	10 (52.6)	
Menstrual status	Premenopausal	71 (91.6)	2 (10.5)	<0.001
	Menopausal	16 (18.4)	17 (89.5)	
Parity	Nullipara	8 (9.2)	1 (5.3)	
	Primigravida	27 (31)	1 (5.3)	0.042
	Multiparous	52 (59.8)	17 (89.5)	
CA 125	<100	68 (78.2)	0 (0)	<0.001
	100-200	16 (18.4)	4 (21.1)	
	201-300	3 (3.4)	6 (31.6)	
	>300	0 (0)	9 (47.4)	
	Mean	78.3 ± 55.7	294± 78	<0.001
RMI	<25	47 (54)	0 (0)	<0.001
	25-200	40 (46)	9 (47.4)	
	>200	0 (0)	10 (52.6)	
	Mean	71.5 ± 7.82	180 ± 16.1	<0.0001

With increase in age, malignant masses are more. Patients aged morethan 50 years are risk of malignancy. This finding representing age as risk factor for malignancy was statistically significant. Among the benign tumors, majority of the patients (83.9%) had regular menstrual cycle. Among malignant tumors irregular menstrual cycle (52.6%) was observed morethan regular menstrual cycles. Irregular menstrual cycle was significantly related with malignancy statistically. Among the benign tumors, majority of the patients (81.6%) were in pre menopausal state. Among malignant tumors menopause (89.5%) was attained in majority i.e., malignancy is seen mostly in menopausal women. Menopause was significantly associated with malignancy statistically. Among the benign tumors, majority of the patients (59.8%) were multiparous. Among malignant tumors 89.5% were multiparous. Though multiparous women are higher risk for both tumors, malignant tumors were more malignant than benign (59.8Vs 89.5). Multiparity was significantly related with malignancy statistically.

Benign tumor adnexal masses had CA 125 values < 100 in 78.2% patients, followed by 18.4% who had 100 − 200 values. Among malignant tumors, > 300 value CA 125 was seen in 47.4 % patients followed by 201 − 300 in 31.6% of patients. Mean CA 125 values in benign tumor was 78.3 and malignant tumor has 294. More CA 125 values was seen in malignancy patients and this difference was statistically significant.

Benign tumor adnexal masses had RIM values <25 in 54% patients, followed by 46% who had 25 − 200 values. Among malignant tumors, >200 value of RMI was seen in 52.6 % patients followed by 25-200 in 47.4% of patients. Mean RMI values in benign tumor was 71.5 and malignant tumor has 180. More RMI values was seen in malignancy patients and this difference was statistically significant.

DISCUSSION

A prospective study was done on 106 patients with Adnexal masses attending Department of OBG in a Tertiary care hospital for a period of 18 months to evaluate adnexal masses clinico-pathologically.

In this study majority of the subjects were in the age group between 40 and 50 years with a mean age of 44.75 years. The study participants aged 18 years to 65 years.

In the study by Monika Anant et al[8] A total of 160(n) cases of adnexal masses reports were extracted from the records of patients operated in the study period of 24 months. The age of patients ranged from 11 years to 70 years. In the study by Srimathi AJ et al[9] It was seen from the table that the majority of the subjects were in the age group between 40 and 50 years with a mean age of 43.5 years and only 2.5% of the subjects were aged more than 65 years. In Satyabhama Marandi et al[10] study majority being in the age group of 21- 30 years (41.26%) followed by age group of 31-40 years (33.33%). In Sonakshi Pandey et al[11] study Majority of cases were from the age group 25-44 years.

In this study patients had multiple symptoms. Out of the wide range of symptoms, mostly patients presented with pain (vague, severe)

i.e., 64.1% followed by abnormal uterine bleeding in 26.4%, distension of abdomen (including ascites) in 24.5%. Abdominal mass was physically palpable in 18.9% patients.

Similar to current study Monika Anant et al[8] Most patients had pain abdomen (76.12%) followed by lump abdomen (21%). 11 patients (6.9%) were diagnosed incidentally with adnexal masses while imaging studies were prescribed for other disease.

In Srimathi AJ et al[9] study it was observed that the most common symptom presented by the subjects was abnormal uterine bleeding followed abdominal distension and severe pain.

In Sonakshi Pandey et al[11] study Commonest presentation with functional cyst was prolonged /scanty menstrual cycles followed by heavy menstrual cycles. Most patients with hydrosalpinx and infective pathology presented with polymenorrhagia. In this study 6 cases of infective pathology (tuberculosis) were found. Beside discharge per vaginum, associated urinary symptoms and history of amenorrhea were also found in cases of hydrosalpinx. Out of 11 patient of chronic ectopic pregnancy, 6 patients presented with pressure symptoms.

In Al-Shukri, et al[12] study Abdominal pain was the most common symptom followed by nausea and vomiting. In Dasgupta, et al[13] study Most patients complained of more than one symptom. While the most common complaint was abdominal pain (55%), others suffered from a combination of abdominal swelling (32%), menstrual irregularities (31%), and bleeding per vagina (8%). In the study by Asma Batool et al[14] Abdominal pain was the commonest presenting symptom (64%).

Majority of the patients had benign tumor i.e., in 87 patients (82.1%) with adnexal pathology including non-neoplastic lesions too while malignant in 17.9% of patients. In the study by Satyabhama Marandi et al[10] Out of 189 cases 129(68.25%) cases were ovarian in origin (92.1% benign and 3.87 % malignant), 50 cases (26.45 %) were of tubal origin.

Among the adnexal pathologies, 21 had non ovarian masses, 85 had ovarian masses. Out of 21 non-ovarian, majority of the masses were primarily from Fallopian tube i.e., 42.85% followed by para-ovarian cysts attached to ovary or fallopian tube were in 23.8% of patients. Broad ligament originated masses were seen in 19.04%. Disseminated tuberculosis which was primarily diagnosed as ovarian cancer was seen in 9.5% of patients with non-ovarian masses. Only one case (4.81%) was seen involving gastrointestinal tract primarily, diagnosed initially as a gastrointestinal stromal tumor. Among all the non-ovarian adnexal masses most common was the fallopian tube involved Hydrosalpinx (33.33%).

In the study by Monika Anant et al[8] Among total 160 cases studied, 88.13% were benign, 1.87% borderline and 10% malignant. Among these lesions, 142 (88.75%) were unilateral and 18 (11.25%) bilateral. Ovarian lesions (71.87%) followed by tubal (10.6%), contributed to vast majority of adnexal masses.

The study by Srimathi AJ et al.[9] revealed that right ovarian cyst was the most common finding on ultrasonography, making up 27% of all observations and representing the most frequent ultrasound diagnosis. It was observed that with increase in age, malignant masses are more. Patients aged more than 50 years are more prone for malignancy. This finding representing age as risk factor for malignancy was statistically significant.

In Sonakshi Pandey et al study Main bulk of the malignant tumors was in 5th & 6th decades, in comparison to the benign tumors where main bulk was 3rd & 4th decades. Benign tumors were clustered in a decade earlier than malignant tumor. The malignant masses were predominantly seen in age category of 45-60 years. 60% presented of them showed advanced stage [3rd & 4th stage]. 2 patients of <16 year age group were presented with germ cell tumor.[11]

Similar findings were seen in another study showing increased incidence of malignancy with increasing age.[15] Also most of the malignant masses are epithelial in origin similar to the study presented by Alessandrino F .and colleagues. [16]

A study by Dasgupta[62] et al found a statistically significant correlation between patients' menstrual status and the nature of adnexal masses (benign or malignant), which is consistent with the findings of the current study. In Dasgupta, et al[13]study Histopathological examination revealed that 61% of benign (36, 61%) and 56.5% of malignant tumors (23, 39%) were of surface epithelial type. Mucinous cystadenoma (12, 54.5%) was the commonest benign while serous cystadenocarcinoma (6, 46.2%) was the most common type of malignant surface epithelial tumor. All the benign germ cell tumors (7, 19.4%) were mature cystic teratomas. The sex cord stromal tumors constituted 16.7% of benign and 13% of malignant tumors.

Benign tumor adnexal masses had CA 125 values < 100 in 78.2% patients, followed by 18.4% who had 100 − 200 values. Among malignant tumors, > 300 value CA 125 seen in 47.4 % patients followed by 201 − 300 in 31.6% of patients. Mean CA 125 values in benign tumor was 78.3 and malignant tumor has 294. High CA 125 values were detected in patients with malignancy and this difference was statistically significant. Dasgupta, et al[13] reported serum CA125 level higher than 35 U/ml was also found to be statistically significant in the diagnosis of malignancy.

It is concluded that the most common age group for the presentation of adnexal masses were between 40 and 50 years of age and the symptom was lower abdominal pain. Majority were benign and complex lesions on gross appearance. Out of non-ovarian tumors majority were fallopian tube in origin. On HPE mucinous cystadenoma was most common. Among pregnant women one had dermoid cyst and other had serous cystadenoma. Most common ovarian malignant tumor was serous cystadenocarcinoma.

Multiparity and lesser age of menarche were significantly associated with the risk of malignancy. More CA 125 values was seen in malignancy patients and this difference was statistically significant. The risk of malignancy index score in the current study was found to be intermediate in most cases.

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