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RESEARCH ARTICLE

A retrospective observational study in assesment of role of sonography in adnexal masses and its histopathological correlation in tertiary care centre.

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ABSTRACT

Background- Adnexal masses (masses of the ovary, fallopian tube, or surrounding tissues) commonly are encountered by obstetrician–gynaecologist and often present diagnostic and management dilemmas. Types of adnexal mass ranges from benign ovarian and non-ovarian to primary and secondary malignant ovarian masses. Although most adnexal masses are benign, the main goal of the diagnostic evaluation is to exclude malignancy. Transvaginal ultrasonography remains the gold standard for evaluation of adnexal masses.

The management of the adnexal masses varies according to age at presentation, whether benign or malignant, acute emergency or chronic presentation.

Aim- The study aimed to determine the causes of adnexal masses and correlation of ultrasonographic and histopathologic findings of the adnexal masses.

Methods- This is a retrospective observational study, performed in the Department of Obstetrics and Gynaecology, in tertiary care hospital. Operative and demographic details of patients operated for adnexal masses over a period of one year was obtained from case records of patient.

Results- Among 90 cases studied, 86.66%(78) cases of adnexal masses was of ovarian origin followed by 11.66%(7) was of tubal origin.

Among 90 cases of adnexal masses, 91.11%(82) cases were benign , 4.44%(4) were of borderline and malignant.

Most common ovarian cause of adnexal mass was endometriotic cyst(22.22%) followed by serous cyst adenoma(20%) The highest sensitivity was found for follicular cyst (87.5%) followed by dermoid and serous cyst adenoma (83.33%).

Malignancy was found in 8 cases among which 6 were correctly reported by USG resulting in sensitivity of 75%.

Conclusion- It was concluded from the current study findings that sonography was primary modality and best screening tool for evaluation of pelvic masses. Ultrasound has high sensitivity for correctly diagnosing benign versus malignant pelvic lesions. Sonography was observed to be best modality to differentiate between solid and cystic pelvic masses.

Introduction

The uterine adnexa (gynaecologic origin) consist of the ovaries, the fallopian tubes, and the uterine ligaments. Although adnexal pathology often involves one of these structures, contiguous tissue of non-gynaecologic origin also may be involved[2].The diagnosis and treatment of adnexal masses, which may be found in the ovary, fallopian tube, or adjacent tissues, can be challenging for obstetrician-gynaecologists. The majority of adnexal masses are incidentally found during a pelvic examination or imaging. Acute or intermittent pain is a less prevalent symptom that may accompany a tumor[1].

Type of adnexal masses ranges from benign ovarian and non-ovarian to primary and secondary malignant ovarian masses[1].

While most adnexal masses originate in the ovaries or fallopian tubes, they may also be pathological enlargements of structures involving the uterus, retroperitoneum, intestine, or broad ligament, or even metastatic disease from breast or stomach[1].

Adjunctive diagnostic techniques such as sonography, magnetic resonance imaging (MRI), and computed tomography (CT) may help delineate the nature of adnexal enlargement. Pelvic ultrasonography, especially three dimensional, is an accurate means of determining the location, size, extent, and consistency of pelvic masses and is also useful for detecting obstructive uropathy, ascites, and metastasis[2].

The patient's age and family medical history are major factors in treatment choices. Even though the majority of adnexal masses are benign, ruling out malignancy is the primary objective of a diagnostic assessment.

Indications for visualization and as indicated to obtain a tissue diagnosis of an adnexal mass with laparoscopy or exploratory laparotomy include the following[2]:

1. Ovarian mass greater than 6 cm in diameter
2. Adnexal mass greater than 10 cm in diameter
3. Any solid mass first developing after menopause
4. Failure to discover the nature of the mass (e.g., leiomyoma) with radiologic or sonographic imaging techniques

Surgical intervention ultimately may be necessary to determine the nature of the adnexal mass. Minimally invasive surgery is useful to exclude benign ovarian or nonovarian neoplasms[1].

Majority of adnexal masses however requires surgical management. Hence the main objective of evaluation of adnexal masses is to differentiate between benign and malignant conditions.

A complete evaluation of patient from the history, physical examination, ultrasound and laboratory tests helps in diagnosis of an adnexal mass.

Transvaginal ultrasonography remains the gold standard for evaluation of adnexal masses. Doppler resistance index has been used as a “vascular” scoring system. Colour Doppler ultrasonography appears to be a reliable method in pre-surgically evaluating ovarian neoplasms[2].

Transvaginal colour Doppler sonography has identified the following parameters as useful in determining malignant versus benign

ovarian masses: number of vessels detected in each tumour, tumour vessel location (central vs. peripheral), peak systolic velocity, lowest resistance index, mean resistance index, mean pulsatility index[2].

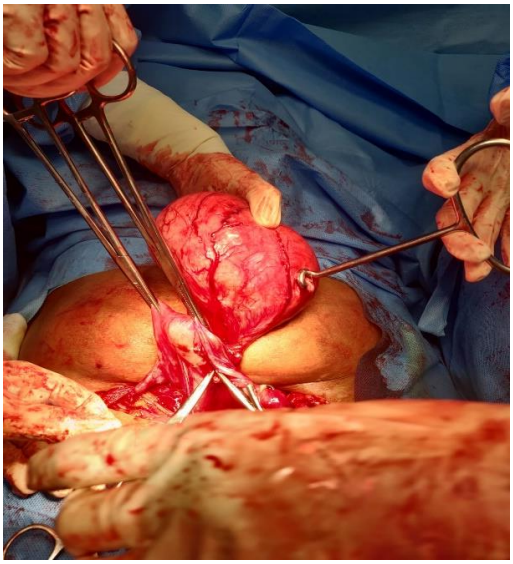

Figure-1 Broad ligament fibroid

Expectant management is justified only when an asymptomatic physiologic cyst is suspected. Most cysts greater than 6 cm in diameter require a thorough evaluation. Imaging techniques are invaluable for characterizing the nature of the adnexal enlargement[1].

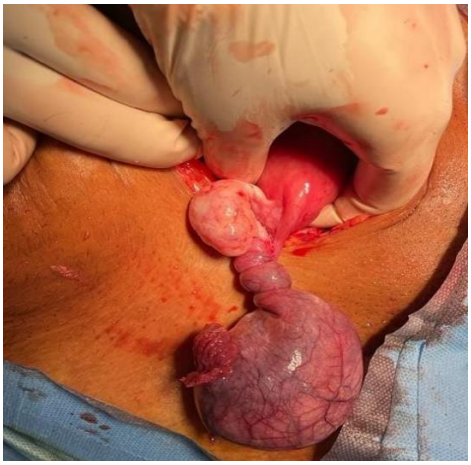

Figure-2 Para-tubal cyst with fallopian torsion

The differential diagnosis should include adnexal torsion, ruptured hemorrhagic cyst, degenerating leiomyomata, ectopic pregnancy, unruptured tubo-ovarian abscess, acute appendicitis with or without abscess formation, and diverticular disease of the sigmoid colon[2].

The management of the adnexal masses varies according to age at presentation, whether benign or malignant, acute emergency or chronic presentation.

The study aimed to determine the causes of adnexal masses and co-relation of ultrasonographic and histopathologic findings.

Material and Methods

This is a retrospective observational study performed in the Department of Obstetrics and Gynaecology, tertiary care hospital. Case data of patients from the medical records department were used to acquire demographic, sonography findings and operational characteristics of patients who underwent surgery for adnexal masses during a one-year time frame.

INCLUSION CRITERIA

The study included all patients who underwent surgery for adnexal masses in the obstetrics and gynaecology department.

EXCLUSION CRITERIA

Age below 15years were excluded

All relevant data, including age, clinical presentation, imaging studies, tumour markers and intra-operative findings, histopathological report were collected and filled in a pre-designed proforma and entered into Microsoft excel sheets.

USG machines Samsung Hera w9 and Philip affinity 30 were used for this study.

Sonographic assessment of the given adnexal masses was made using 2-5Mhz curved transducer for abdominal sonography and a transducer with frequency 5-7.5Mhz for transvaginal sonography.

Intraoperative findinds include type of surgery done like laparotomy or laproscopic approach.

Hematoxylin and eosin stain was used for histopathological examination and specific immunohistochemistry was used in suspected malignancy such as krukenberg positive for calretinin and desmin for leiomyosarcoma.

The diagnosis was made on basis of clinical examination and imaging findings and were then correlated with the final histopathological examination report and the accuracy of ultrasonographic finding was calculated.

The statistical analysis was done as means and percentages of continuous variables. The sensitivity of ultrasound in diagnosing adnexal masses was then calculated and tabulated using SPSS software for windows.

Ethical committee clearance were obtained for all cases in the study.

Results

A total of 90 cases of adnexal masses was collected from the hospital records in a study conducted over 12 months. The age of the patients ranged from 16-70years.

Age

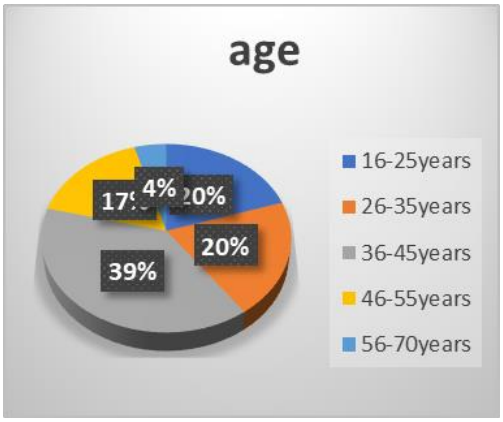

Fig-3

In total of 90 cases 39%(35) were in age group of 36-45years , and 20%(18) were in age group of 16-25years and 4%(4) belongs to age group of 56-70years.(fig-3).

Table -1 Causes of adnexal masses

Ovarian causes	N(78)	Non ovarian causes	N(12)
Endometriotic cyst	20(22.22%)	Hydrosalpinx	5(5.55%)
Bening cystic teratoma	10(11.11%)	Chronic ectopic	1(1.11%)
Mature cystic teratoma	2(2.22%)	Tubo- ovarian mass	1(1.11%
Serous cyst adenoma	18(20%)	Para-ovarian cyst	1(1.11%)
Mucinous cyst adenoma	8(8.88%)	Broad ligament fibroid	2(2.22%)
Functional cyst	8(8.88%)	GTN	1(1.11%)
Corpus luteal cyst	1(1.11%)	Leiomyosarcoma	1(1.11%)
Borderline mucinous tumor	2(2.22%)		

Ovarian causes	N(78)	Non ovarian causes	N(12)
Borderline serous tumor	2(2.22%)		
Krukenberg tumor	2(2.22%)		
Hemorrhagic cyst	5(5.55%)		

Most common ovarian cause of adnexal mass was endometriotic cyst(22.22%) followed by serous cyst adenoma(20%)(table-1).

Table -2 Presentinting complaints

Symptoms	Number of cases	Percentage
Pain	40	44.44%
Mass per abdomen	12	13.33%
AUB	8	8.88%
Amenorrhea	7	7.77%
Post menopausal bleeding	3	3.33%
Infertility	10	11.11%
Incidental findings	10	11.11%

Most of the patients presented with pain abdomen in 40 (44.44%) followed by mass per abdomen in 12 (13.33%) and in 10(11.11%) patients it was diagnosed incidentally(table-2).

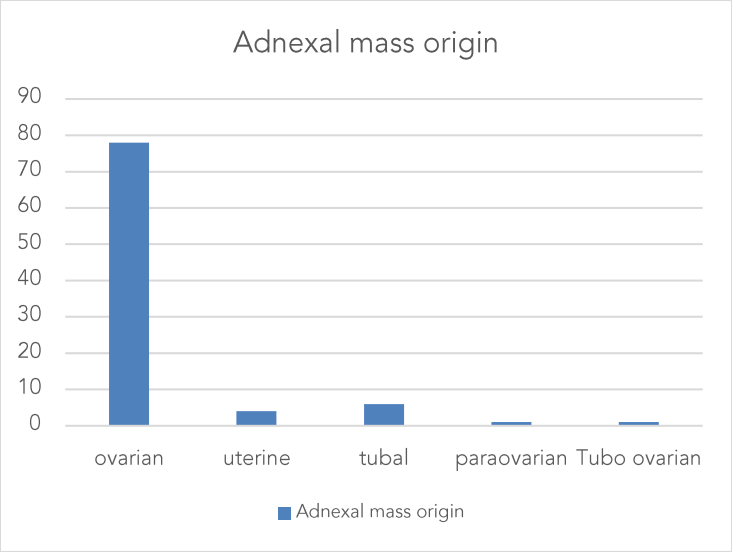

Fig-4

Among 90 cases studied, 86.66%(78) cases of adnexal masses were of ovarian origin followed by 11.66%(7) were of tubal origin(fig-4).

Among 90 cases of adnexal masses , 91.11%(82) cases were benign , 4.44%(4) were of borderline and malignant.

Every case was evaluated by comparing the clinical and histological preoperative diagnoses with the USG diagnoses. After dermoid and serous cyst adenomas (83.33%), follicular cysts (87.5%) showed the greatest sensitivity.

Malignancy was found in 8 cases among which 6 were correctly reported by USG resulting in sensitivity of 75% (table 3).

Table-3 Ultrasonographic and histopathological co-relation of adnexal masses

Histopathology	Number of cases	USG correctly diagnosed	Sensitivity (%)
Dermoid	12	10	83.33
Endometrioma	25	22	88
Follicular cyst	8	7	87.5
Para-ovarian cyst	1	0	0
Hydrosalpinx	5	2	40
Serous cystadenoma	18	15	83.33
Mucinous cystadenoma	8	6	75
Malignancy	8	6	75

Discussion

It may be challenging for obstetrician-gynecologists to diagnose and treat adnexal masses, which are masses of the ovary, fallopian tube, or adjacent tissues. The majority of adnexal masses are discovered by chance during a pelvic examination or imaging[1].

Patients with adnexal masses usually present with symptoms which range from non- specific complaints such as abdominal distention to acute abdominal pain and mass per abdomen.

Adnexal masses of size more than 5cm occupying the pelvis can cause pressure symptoms, heaviness or urinary or bowel symptoms. They may also present with menstrual abnormalities and dysmenorrhea[3].

Adnexal masses of ovarian origin are of growing concern due to high fatality associated with ovarian malignancy because they are diagnosed at advanced stage due to vague symptoms and absence of recommended screening tests[18].

In most of the patients with adnexal masses abdominal pain is the most common presenting symptom. Ectopic pregnancy, tubo-ovarian mass, ovarian cyst torsion,

haemorrhage, rupture of cyst presenting as adnexal masses will present as acute abdomen and requires quick assessment and management[4].

Patients in menopause, especially older ones, with high BMI and RMI should immediately be referred to a tertiary level institution, where appropriate surgery could be performed[19].

Adnexal masses of size less than 5cm are usally asymptomatic and hence can be missed clinically. Many of these adnexal masses are incidentally identified during USG examination.

Guideline recommendations involve assessing a mass based on its characteristics and the patient's individual risk factors, once a pelvic mass is discovered, usually beginning with visualizing the mass via imaging. The most common imaging modality used to characterize pelvic masses is transvaginal ultrasonography (TVUS), but they may also be incidentally identified by CT scans or MRI[5].

The interpreter's level of expertise greatly affects the sensitivity of TVUS. Experienced sonographers utilizing subjective judgment had a TVUS sensitivity of 96.2% and specificity of 96.3% in a prospective study included 199 women with adnexal masses (37.7% prevalence). However, there was a notable disparity in the area under the curve (AUC) value between more experienced sonographers and those with less expertise; the sensitivity for the former was 72.4% and the specificity 88.8%. This lack of clarity prompted the development of ultrasonography equipment and standardized evaluation criteria to assist doctors in risk categorization of pelvic tumors[6].

When deciding how to treat adnexal masses after obtaining TVUS data, the widely-used North American Society of Radiologists in Ultrasound (SRU) consensus statement might be useful. Recommendations for masses before and after menopause, according to size and physical characteristics, are detailed in this statement. Additional follow-up may not be necessary for small, basic cysts that do not show Doppler colour flow. These cysts are probably only physiologic in nature, connected to regular ovulation, and will likely go away within six months. Regular monitoring or surgical intervention may be necessary for cysts with larger or more complicated shape[7].

Multiple septations and nodules are described in this statement as signs that may indicate probable cancer and need surgical intervention.

The American College of Obstetricians and Gynecologists (ACOG) and the Society of Gynecologic Oncology (SGCO) both recognize elevated CA125-II as a criterion for referring patients with pelvic masses to gynecological oncologists, even if it is not authorized for solely diagnostic or screening purposes. Because there is no hard and fast rule on what counts as high in premenopausal individuals, the referral process becomes subjective when using these criteria[8].

This section summarizes the recommendations made by the American College of Obstetricians and Gynecologists (ACOG) for the evaluation of adnexal masses using the characteristics of transvaginal ultrasound (TVUS)[1].

1.Benign: Simple cysts under 10 cm.
2.Malignant: Solid Mass, Separations > 3 mm, Mural Nodules, Papillary Excrescences, Ascites (Free Fluid).

3.Indeterminate: Complex Masses of any size, Simple cysts > 10 cm

Almost 80-90% of adnexal masses are diagnosed by clinical and history of the patient. USG pelvis is one of the part of routine clinical examination of gynaecological practice. Transabdominal and transvaginal routes are preferred for optimal visualisation[9].

About 90-% of adnexal masses are adequately characterised by USG alone.

Transvaginal ultrasonography remains the standard for evaluation of adnexal masses. Findings suggestive of malignancy in an adnexal mass include a solid component, thick septations (greater than 2 to 3 mm), bilaterality, Doppler flow to the solid component of the mass, and presence of ascites[16].

All women, regardless of menopausal status, should be referred if they have evidence of metastatic disease, ascites, a complex mass, an adnexal mass greater than 10 cm, or any mass that persists longer than 12 weeks[16].

In a comprehensive meta-analysis, the sensitivity of pelvic ultrasonography in detecting ovarian cancer varied between 86% and 91%. (9) In our study USG could correctly diagnose 6/8 cases of ovarian cancer with sensitivity of 75%.

The sensitivity of USG detecting benign masses ranged from 66% for para-ovarian cyst to > 90% for follicular cyst[10].

Tubo-ovarian masses, germ cell tumors, sex cord tumors are difficult to identify by USG[11].

In our study 86.66%(78) cases of adnexal masses were of ovarian origin followed by 11.66%(7) were of tubal origin which was comparable with the study conducted by Dr.Monika Anant etal in which 71.8% were ovarian origin and 10.6% was tubal origin[12].

Most of the patients presented with pain abdomen in 40 (44.44%) followed by mass per abdomen in 12 (13.33%) and in 10(11.11%) patients it was diagnosed incidentally comparable with study conducted by Dr. Rays etal in which abdominal pain was the most common symptom followed by gradual swelling of abdomen[17].

Among 90 cases of adnexal masses, 91.11%(82) cases were benign ,4.44%(4) were of borderline and malignant which was comparable with the study conducted by Dr.Monika Anant etal in which 88.13% were benign, 1.87% borderline and 10% were malignant[12].

And study conducted by Dr.Yashi etal shows 30 (75%) masses prove to be benign on histopathology while 10 (25%) masses were malignant[15].

Most common ovarian cause of adnexal mass was endometriotic cyst(22.22%) followed by serous cyst adenoma.

In our study the highest sensitivity was found for follicular cyst (87.5%) followed by dermoid and serous cyst adenoma (83.33%).

Malignancy was found in 8 cases among which 6 were correctly reported by USG resulting in sensitivity of 75% whereas study conducted by Dr.Monika Anant etal the highest sensitivity was found for dermoid(95%) and poorest for paraovarian cyst and sensitivity of 84% for malignant cases[12].

And study conducted by Dr.Yashi etal shows sensitivity and specificity of ultrasound in predicting malignancy were 70% and 80% respectively[15].

Magnetic resonance imaging (MRI) has the potential to be the gold standard when it comes to diagnosing pelvic masses. Magnetic resonance imaging (MRI) was 93% sensitive and 91% specific for pelvic masses that were previously classified as ambiguous by ultrasound, according to a recent multicenter cohort study. Although ACOG recommendations do not endorse MRI as a primary method of detection or evaluation, they do advocate its use in situations when TVUS cannot provide a clear picture[13].

It seems that positron emission tomography (PET) and computed tomography (CT) scans are the least competent to completely characterize a pelvic mass. Although this imaging technique is effective in detecting and defining solid-component masses, septated cysts, and ascites in late illness, it is not as good at detecting and characterizing low-grade tumors, borderline tumors, and early stages of the disease. Because of these limitations, computed tomography (CT) and positron emission tomography (PET) scans are not generally suggested by the American College of Obstetricians and Gynecologists (ACOG) as first diagnostic tools for pelvic masses. In high-risk situations, the ACOG recommendations state that CT should be used to look for metastases in the abdomen[14].

Conclusion

The results of this research showed that sonography was the most effective screening method for detecting pelvic masses and the main modality for evaluating them. When it comes to detecting benign versus malignant pelvic lesions, ultrasound has high sensitivity. It was shown that sonography was the most effective method for distinguishing between solid and cystic pelvic masses.

Conflict of Interest:

None

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