

Research Article

Ultrasound Evaluation of Adnexal Pathologies

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Abstract: The objective of the study was to evaluate the role of ultrasound in diagnosis of adnexal pathologies. The ultrasound findings were correlated with per-operative & histo-pathological findings. The study was prospective and was carried out between March 2014 to August 2014 at the Department of Radiology, P.D.U. Govt. Medical College and Civil Hospital, Rajkot. Abdominal ultrasound & Doppler study with clinical & pathological correlation of 50 cases was done for diagnosing adnexal pathologies accurately. Out of 50 patients diagnosed by ultrasound, the most common adnexal lesions seen in our study were- simple cyst, complex cyst, hemorrhagic cyst, Hydrosalpinx, dermoids, tubo-ovarian abscess, polycystic ovarian disease, endometrioma, cystadenomas, malignant masses, torsion of ovary & ectopic pregnancy. The diagnosis given on ultrasound & Doppler was confirmed with per-op & histo-pathological findings. Pelvic ultrasound is commonly used to evaluate adnexal masses, it is important to understand the most useful sonographic features for predicting benign and malignant masses. Determining whether an adnexal mass is of ovarian or extra ovarian origin is key in arriving at the most likely diagnosis. Most adnexal masses are benign, and each of the most common benign ovarian lesions has a typical sonographic appearance. Additionally, most malignant ovarian neoplasms have a solid component with detectable flow by Doppler ultrasound, allowing one to strongly suggest the diagnosis.

Keywords: Adnexal masses, Adnexal lesions, Ultrasound of adnexa, Pelvic ultrasound, Benign adnexal lesions, Malignant adnexal lesions.

INTRODUCTION

Sonography has an important role in evaluation of gynaec pathologies. The origin of gynaec pathologies can be determined by echogenicity of organ, consistency, its extent and size. At the same time sonographic evaluation of other abdominal organs can provide further clues to diagnosis and associated pathologies. The development of trans vaginal ultrasound has played an important role for detailed evaluation of the same. Development of Gray scale technique, high frequency and focus transducers and real time scanning have further increased the versatility and accuracy of the scanning.

Prior to advent of ultrasound, the diagnosis of gynaec pathologies used to depend on physical examinations, plain X-rays, invasive contrast procedures; but most of the time, surgery was the final clue for correct diagnosis. Recently ultrasound, has become widely acceptable and available and therefore surgical interventions are well avoided in many cases which may well respond well to conservative approach.

MATERIALS AND METHODS

The study includes 50 cases of adnexal pathologies diagnosed on Ultrasound during study period (6 months) at Radiology department, PDU Medical College, Civil Hospital, Rajkot. All patients were evaluated clinically and subjected to imaging.

Imaging was done with following machines-

- My lab 50 esaoate with convex probe (frequency of 2.5 to 6.6 MHz), linear probe (frequency 7.5 to 12 MHz) & trans vaginal probe (frequency 5 to 7.5 MHz).
- My lab 20 esaoate with convex probe (frequency of 2.5 to 6.6 MHz), linear probe (frequency 7.5 to 12 MHz) & trans vaginal probe (frequency 5 to 7.5 MHz).
- Philips IU 22 with convex probe (frequency of 2 to 5 MHz), linear probe (frequency 3 to 9 MHz), linear probe (frequency 5 to 17 MHz) & trans vaginal probe (frequency 5 to 9 MHz).

Methodology

- The details of the procedure were explained to the patient.
- Detailed history was taken.

- Sonographic examination of pelvic region was performed on high end ultrasound and Doppler machines.

The results were analysed and studied with clinopathological correlation.

RESULTS AND DISCUSSION

Total no of patients studied was 50. The mean age in study population was 41.7 years. The minimum age was 9 years while the maximum was 78 years.

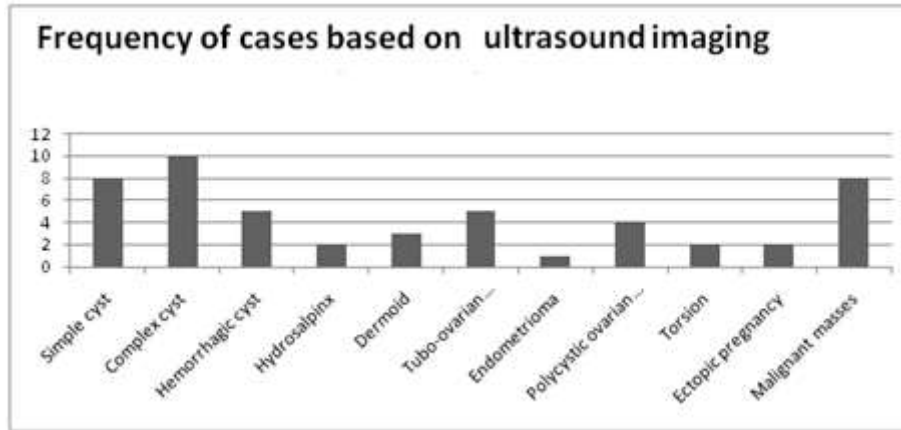


Fig. 1: Frequency of cases based on ultrasound imaging

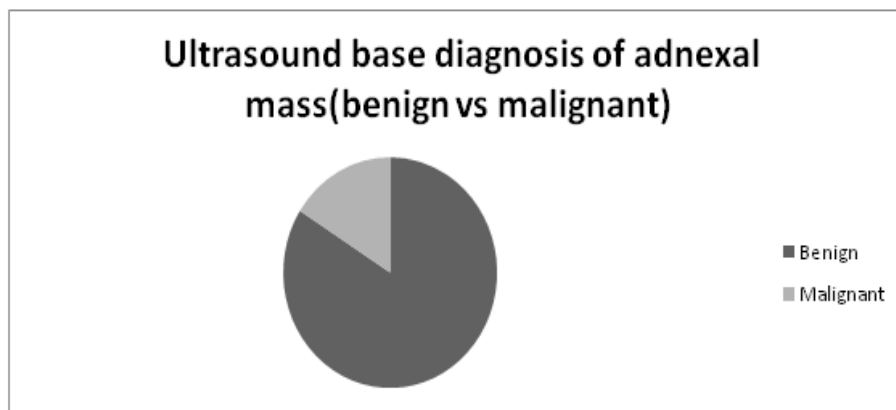


Fig. 2: Ultrasound base diagnosis of adnexal mass (benign vs malignant)

Table 1: Age wise incident of benign & malignant adnexal lesions

Age of the patient (years)	Ultrasound based diagnosis	
	Benign	Malignant
0-10	1	-
10-20	5	-
20-30	10	-
30-40	7	-
40-50	7	-
50-60	4	1
60-70	5	3
70-80	3	4
Total	42	8

The benign adnexal pathologies are more common than malignant. Prevalence of malignancy is higher in older ages (especially above 50). The sensitivity & specificity of ultrasound was proved to be very high in detection of adnexal pathologies. Even twisted ovarian cyst & ruptured ectopic pregnancy was correctly diagnosed on ultrasound & Doppler study, which was

confirmed peroperatively. 3 cases diagnosed as benign on ultrasound turned out to be low grade malignant on histo-patho findings. Bilateral lesions were observed in 4 cases.

Ovarian cancer is becoming one of the most common cause of death now a days. Sometimes false aggressive

surgeries are done in the benign cases while some malignant cases are not properly diagnosed. So in our study, Diagnosing adnexal pathologies & its characterisation based on ultrasound provides the major help in management. In study population, the main symptoms were : pelvic pain, abdominal swelling ,uterine bleeding and infertility.

Simple cyst

A simple cyst in the ovary should meet the same criteria as a simple cyst in any organ: anechoic, thin wall, and distal acoustic enhancement. It has been suggested that simple cysts of less than 3 cm do not require follow up [1]. Only a small percentage, generally less than approximately 10%, increase in size [2]. In many conditions, a simple cyst that remains less than 5 cm in size is managed with follow-up ultrasound [1, 3]. If the cyst becomes larger than 5 cm or changes appearance, surgery is usually warranted [1, 4]. Of those cysts treated surgically, the majority are serous cystadenomas [5].

Complex cyst

Simple cyst with internal septations & sometimes echoes detectable on ultrasound were diagnosed as complex cysts. The patient should be put on follow up ultrasound to check its size & vascularity of septations, which suggest chances of conversion into malignancy [4].

Hemorrhagic cyst

Hemorrhagic cysts occur commonly in premenopausal women. The patient may present for medical care because of acute pain [6]. Hemorrhagic cysts often have internal echoes with a pattern of fine inter digitating lines [6] and are believed to be caused by fibrin strands that result when clot hemolyzes [1, 6]. This reticular or fishnet pattern due to fibrin strands & retracting clot (solid echoes with a concave margin) was found highly reliable sign. Absence of flow on Doppler in solid echoes is suggestive of benign nature, however follow up is suggested.

Hydrosalpinx

Hydrosalpinx should be considered when one encounters a tubular cystic mass that is not a vessel [7]. Incomplete septations may be seen, which, in a hydrosalpinx, likely represent the wall of the distended tube as it folds on itself. One may also encounter small nodular-appearing areas along the wall of a hydrosalpinx, referred to as beads-on-a-string which are probably due to abnormal endosalpingeal folds [8].

Dermoid

Hyperechoic areas within a cystic adnexal lesion are common sonographic finding in dermoids . This feature is believed to be caused by a mixture of hair and sebum [9, 11]. The terminology used to describe this hyperechoic area is variable and includes dermoid plug [12], Rokitansky protuberance [12], densely echogenic

tubercle [13, 14], echogenic nodule or mass [10, 15], hyperechoic solid component [16] and regional bright echoes [10]. The presence of distal acoustic shadowing, often originating in the hyperechoic area, further increases the likelihood of a dermoid [10, 15]. Most ovarian teratomas are benign. Malignant transformation is reported to occur in 1% to 3% of ovarian teratomas, but this is based mostly on pathological series. Dermoids are more prone to undergo torsion [16].

Tubo-ovarian abscess

The ultrasound appearance of abscess is variable, but they usually have a cystic component [17, 18] and may have septations, thick walls, internal echoes, and/or seemingly solid areas. The appearance overlaps with other lesions including neoplasms and hemorrhagic cysts. The presence of an associated pyosalpinx, is a suggestive sonographic finding [17, 18]. Adjacent lymphadenopathy with free fluid in pelvis is seen in most cases. Severe probe tenderness can be elicited.

Endometrioma

Endometriomas typically have homogeneous low- to medium-level internal echoes [19]. The appearance of hemorrhagic cysts and endometriomas overlaps[19] in a small percentage of cases, but endometriomas tend to have more homogeneous internal echoes as opposed to the more heterogeneous and reticular pattern in hemorrhagic cysts. This homogeneous appearance has sometimes been referred to as a ground glass appearance [9].

Polycystic ovarian disease

Patient presents with infertility, dermatological problems & sometimes lower abdominal pain. Ultrasound shows enlarged bilateral ovaries with multiple follicles arranged in periphery, forming 'necklace appearance' [13]. However hormonal evaluation is required for confirmation.

Torsion

Patient generally presents with acute abdominal pain. Torsion is more common in dermoid and mostly seen on right side. The affected ovary becomes enlarged & twisting of pedicle is noted. On Doppler imaging twisting is seen as 'whirlpool sign' [9]. In some cases mild free fluid in pelvis is also noted.

Ectopic pregnancy

Patient presents with classic triad of amenorrhoea, bleeding PV & acute abdominal pain with positive urinary pregnancy test [15]. Ultrasound shows empty uterus (without gestational sac). Trans vaginal ultrasound is the method of choice. It shows fetal poles with cardiac pulsation (if alive) in one of the adnexal region. In case of ruptured ectopic only tubo-ovarian mass with fluid collection in pelvis is noted [10].

Malignant mass

Patient generally presents with post menopausal bleeding, lump, weight loss & abdominal pain. Ultrasound shows presence of adnexal solid or mixed solid & cystic masses with internal septations. The lesion shows vascularity on Doppler study with mean values of RI 0.3 & PI 4 [14]. Associated findings are ascites, invasion of adjacent organs (bowels & uterus), distant organ metastasis (mostly liver), omental & peritoneal deposits [9].

CONCLUSION

The clinical parameters were not sufficient & have low sensitivity in differentiating malignant and benign masses. From above discussion, we conclude that the ultrasound and colour doppler imaging are excellent modalities in describing the nature of adnexal pathologies; more over they are cheap, non-invasive and less time consuming. However histopathology examination remains the gold standard. Our results show that analysis of the lesion characteristics and calculation of Doppler and vascular indices for adnexal masses are useful tools in excluding the possibility of malignancy with a high specificity. It has proved to be very useful for management purpose & also for pre operative evaluation. Before arrival of particular diagnosis, clinical & pathological correlation must be done. However, further imaging like contrast enhanced CT & MR are required in some cases for better evaluation.

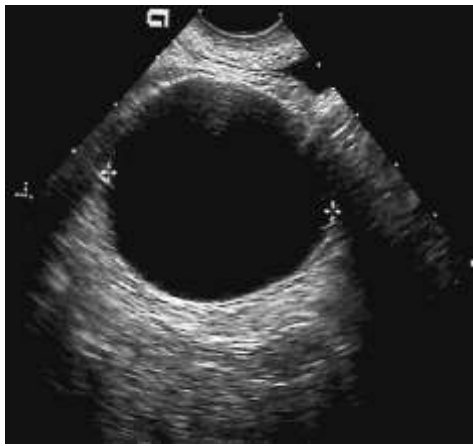


Fig. 3: Trans vaginal ultrasound shows purely anechoic thin walled- Simple adnexal cyst

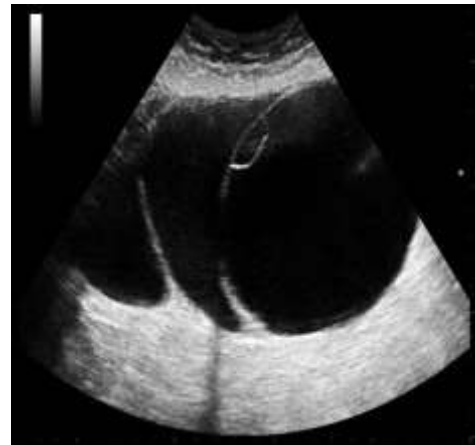


Fig. 4: Transabdominal Ultrasound shows cystic lesion with internal thin septations- Complex cyst septations

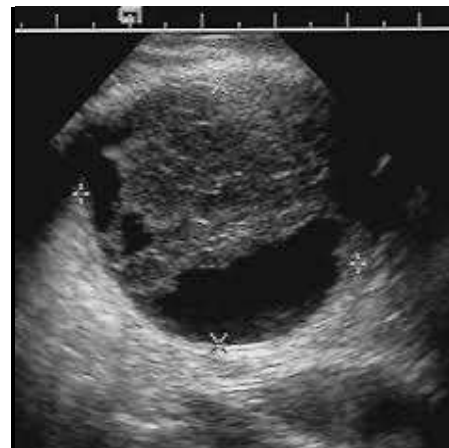


Fig. 5: Trans abdominal ultrasound shows adnexal cyst with internal echogenic material- Hemorrhagic cyst

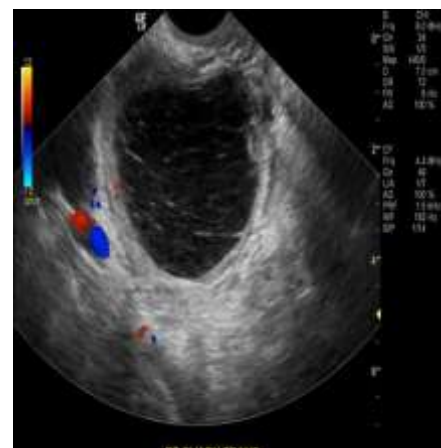


Fig. 6: Transvaginal ultrasound shows cystic lesion & reticular pattern but no internal vascularity - Hemorrhagic cyst



Fig. 7 (Patient A) Trans abdominal ultrasound shows cyst with echogenic content posterior acoustic shadow- Dermoid (Rokitansky protuberance)



Fig. 10: Transvaginal ultrasound shows cystic mass with elongated tubular configuration & internal septations-Hydrosalpinx



Fig. 8 (Patient B): Trans abdominal ultrasound shows cyst with echogenic content posterior acoustic shadow- Dermoid (Rokitansky protuberance)

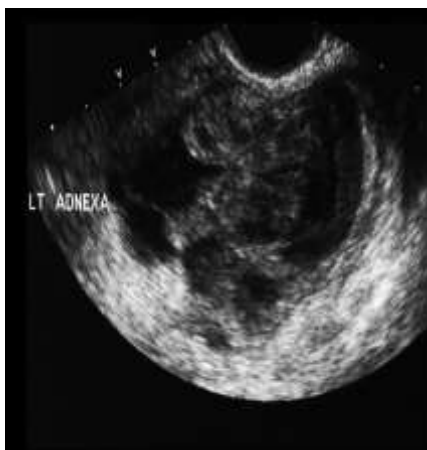


Fig. 11: Transvaginal ultrasound shows adnexal cyst with internal echoes, solid material & septations- Tubo-ovarian abscess

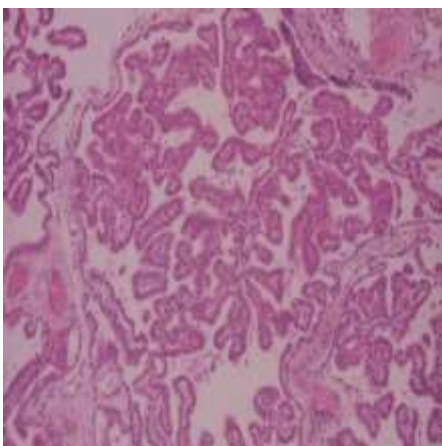


Fig. 9: Cells forming papillae-Dermoid histological confirmation



Fig. 12: Trans abdominal ultrasound shows high level internal homogenous echoes-Endometrioma



Fig. 13: Transvaginal ultrasound shows enlarged ovary with multiple peripherally arranged follicles- Polycystic ovarian disease



Fig. 16: Trans abdominal ultrasound shows echogenic solid-cystic adnexal mass –possibly malignant

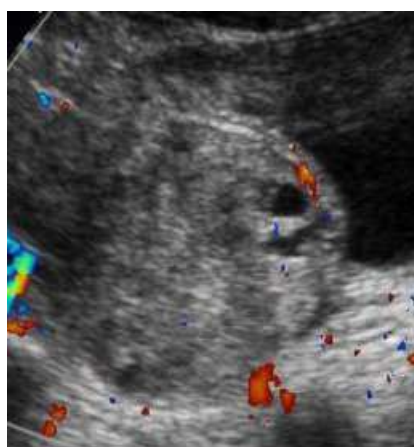


Fig. 14: Trans abdominal ultrasound shows ovarian torsion with absent internal vascularity. Post operative- infracted ovary

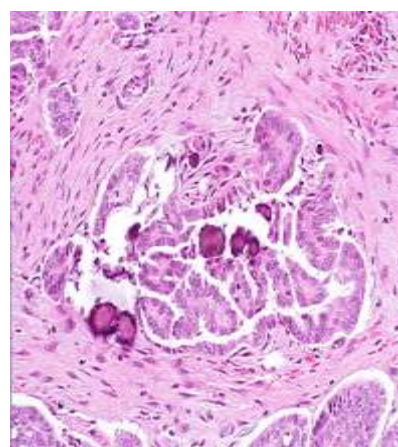


Fig. 17: Papillary pattern with high nuclear: cytoplasmic ratio- Serous cystadenocarcinoma on histology



Fig. 15: Transvaginal ultrasound shows normal uterus with echogenic fetal poles in adnexa- Ectopic pregnancy

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