



ORIGINAL RESEARCH PAPER

Radio-Diagnosis

ROLE OF ULTRASOUND IN ECTOPIC PREGNANCY

KEY WORDS: Ectopic pregnancy (EP), Extrauterine G.sac, Salpingectomy, Oophorectomy, Hemoperitoneum.

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ABSTRACT

Introduction: Ectopic pregnancy (EP) is an implantation occurring outside the uterine cavity. Before introduction of diagnostic role of USG in ectopic pregnancy (EP) it was used to be mediate the time of surgery. Currently ultrasonography is regarded as the gold standard method for diagnosing ectopic pregnancy (EP). It may identify masses as small as 10 mm in diameter in the adnexa and details about character of the mass. It also evaluates the content of endometrial cavity and assess presence of free peritoneal fluid. Color flow Doppler technology may even further improve the accuracy of diagnosis. In present study we analysed diagnostic accuracy of trans abdominal USG in patients presented to tertiary care hospital with suspected ectopic pregnancy (EP). **Aims And Objectives:** To evaluate transabdominal USG features in ectopic pregnancy and correlate them with surgical findings. **Material And Method:** Amongst the patients referred to radiology department of our hospital from January 2022 to September 2022 for first trimester ultrasound, those with the suspected ectopic pregnancy and who underwent surgical treatment for ectopic pregnancies were enrolled. Transabdominal USG was performed preoperatively in all cases by Philips affinity 30 machine. **Result:** On transabdominal USG adnexal mass with pelvic fluid was found in 19 (66 %), Pelvic fluid without adnexal mass in 7 (24 %), mild hemoperitoneum in 9 (31 %), moderate hemoperitoneum in 9 (31 %), severe hemoperitoneum in 5 (17 %) and thickened endometrium in 2 (7 %) cases. Out of total Salpingostomy was performed in 2 (7 %), Salpingectomy was performed in 24 (83 %) and Salpingectomy with oophorectomy in 3 (10 %). USG Sensitivity was found 100 %, Specificity as 66.67 %, Positive Predictive value as 96.30 % and negative predictive value as 100 %.

Conclusion: A high level of suspicion, early diagnosis, and treatment enhance the chance for future reproduction. Early diagnosis is made possible by ultrasound. Therefore, ultrasounds should be performed to determine the viability and location of all early pregnancies.

INTRODUCTION

Ectopic is derived from Greek word "ektos" meaning "out of place". It is an implantation occurring outside the uterine cavity which is classified as tubal and non-tubal. Tubal is found in majority of cases (95%) whereas non-tubal only 5%. Non-tubal sites include uterine interstitium (cornual or angular), cervix, ovary and previous caesarean section scar. Ectopic pregnancy (EP) is an important cause of first trimester morbidity. Its worldwide incidence is now increasing for which possible contributing factors are Chlamydial infection, increasing utilisation of assisted reproductive technologies (ARTs) and increase in the caesarean section rate with increase in number of caesarean sections scar. First pregnancy which was conceived through IVF also resulted in ectopic pregnancy (EP).

Intra-uterine device (IUCD) users has an increased risk of ectopic pregnancy (EP) which is suspected when IUCD use is associated with irregular bleeding. Clinical presentations of ectopic pregnancy (EP) ranges from asymptomatic to massive intra-abdominal haemorrhage. Classic triad of amenorrhoea, vaginal bleeding and pelvic pain is observed. Shoulder tip pain may also be there due to intrabdominal bleeding as blood irritates diaphragm resulting in referred pain to the shoulder. Complication after an ectopic pregnancy also includes poor reproductive potential. Physicians should maintain attitude of high suspicion for ectopic pregnancy as early diagnosis and intervention may help to decrease

morbidity related to ectopic pregnancy especially in cases of women with damaged fallopian tubes, pelvic infection, smoking, assisted reproductive techniques who are at higher risk for ectopic pregnancy.

Historically, before the introduction of routine USG, diagnosis of ectopic pregnancy (EP) was used to be made intraoperatively. Diagnostic procedure for ectopic pregnancy has now been transformed by intraabdominal USG, which is regarded as the gold standard nowadays. Transvaginal ultrasonography identifies masses as small as 10 mm in diameter in the adnexa and also the details about character of the mass. It also evaluates the content of endometrial cavity and assess presence of free peritoneal fluid. In ectopic pregnancy in adnexa about 1/4th patients show a live embryo, 70 % show gestational sac, 90 % show complex mass and 60 % show free intraperitoneal fluid¹⁰.

This parameter has sensitivity and specificity of about 100 % in the diagnosis¹¹. There is role of [hCG concentration in identifying ectopic pregnancy through coupling with transvaginal ultrasonographic findings which facilitates greatly in its early diagnosis. Color flow Doppler technology may even further improve the accuracy of diagnosis¹². In present study we analysed diagnostic accuracy of transabdominal USG in patients presented to tertiary care hospital with suspected ectopic pregnancy (EP).

AIMS AND OBJECTIVES

1. To study clinical profile of patients with ectopic pregnancy
2. To evaluate USG features in ectopic pregnancy
3. To correlate USG features with surgical findings

MATERIAL AND METHOD

Amongst the patients referred to radiology department of our hospital from January 2022 to September 2022 for first trimester ultrasound, those with the suspected ectopic pregnancy and who underwent surgical treatment for ectopic pregnancies were enrolled. Informed consent was obtained from all participants. Ethical clearance of institution was taken prior to commencement of present study.

Inclusion criteria

Cases above 18 years Age with suspected ectopic pregnancy came for first trimester ultrasound up to 12 weeks.

Exclusion criteria

1. Age less than 18 years
2. Patients managed with medication
3. Patients not willing to give consent.

Procedure (Transabdominal USG)

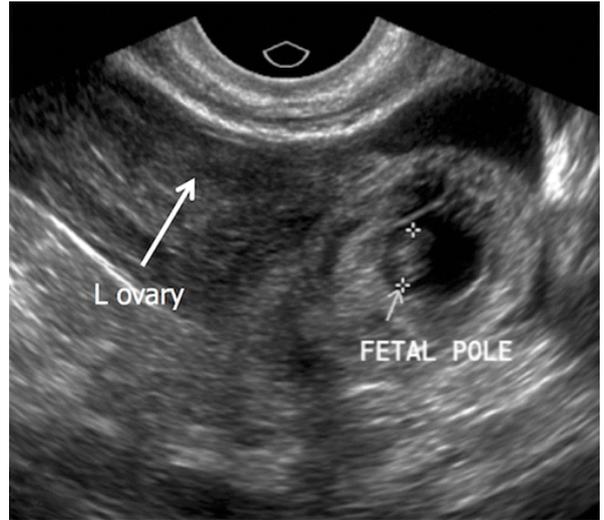
Transabdominal USG was performed preoperatively in all cases by Philips affinity 30 machine with transabdominal probe C6-2 for abdominal scanning. Pictures of uterus in a strictly midsagittal plane from the uterine cervix to the fundus and each ovary in their greater diameter were taken. In case of abnormal extra-uterine finding one or more picture are taken. All sonograms were again carefully reviewed for the purpose of study. Ectopic pregnancy was diagnosed if there was presence of fluid in pouch of douglus or extrauterine sac/ adnexal mass with no intrauterine gestational sac. Hemoperitoneum is classified as mild, moderate and severe. Patients clinical data, operative and USG findings were analyzed using Microsoft Excel. For statistical analysis sensitivity, specificity, positive predictive value and negative predictive value was calculated by SPSS version 16.

RESULT

Total 158 patients who came for first trimester USG with suspected ectopic pregnancy symptoms were evaluated. Out of them 29 cases were selected who underwent operative treatment for ectopic pregnancy.



ECTOPIC PREGNANCY RING OF FIRE APPEARANCE



ECTOPIC PREGNANCY IN LEFT ADNEXA SHOWING G. SAC WITH FETAL POLE

Table 1: Clinical Feature Distribution

Sr No	Clinical features	Number of cases N (%)
1	Amenorrhoea	12 (41 %)
2	Vaginal bleeding	15 (52 %)
3	Lower abdominal pain	20 (69 %)
4	Syncope	4 (14 %)
5	Shock	2 (7 %)

Table 1 shows clinical feature distribution amongst cases. Out of total 29 cases amenorrhoea was present in 12 (41 %), vaginal bleeding in 15 (52 %), lower abdominal pain in 20 (69 %), syncope in 4 (14 %) and shock in 2 (7 %)

Table 2: Ectopic Pregnancy Site Distribution

Sr No	Ectopic pregnancy site	Number of cases N (%)
1	Left Fallopian Tube	8 (28 %)
2	Right Fallopian Tube	21 (72 %)
Total		29 (100 %) 29 (100 %)

Table 2 shows ectopic pregnancy site. Right sided fallopian tube was involved in majority i.e 21 (72 %) cases followed by left sided fallopian tube in 8 (28 %) cases.

Table 3: Hemoperitoneum Distribution

Sr No	Hemoperitoneum	Number of cases N (%)
1	≤ 500 (Mild)	9 (31 %)
2	≤ 1000 (Moderate)	9 (31 %)
3	> 1000 (Severe)	5 (17 %)
4	Absent	6 (21 %)
Total		29 (100 %)

Table 3 shows hemoperitoneum grading. Mild hemoperitoneum found in 9 (31 %), moderate hemoperitoneum in 9 (31 %) and severe hemoperitoneum in 5 (17 %) cases.

Table 4: Operative Procedure Distribution

Sr No	Operative procedure	Number of cases N (%)
1	Salpingostomy	2 (7 %)
2	Salpingectomy	24 (83 %)
3	Salpingectomy with oophorectomy	3 (10 %)
Total		29 (100 %)

Table 4 shows operative procedures performed in all 29 cases. Out of total Salpingostomy was performed in 2 (7 %), Salpingectomy was performed in 24 (83 %) and Salpingectomy with oophorectomy in 3 (10 %)

Table 5: USG Findings Distribution

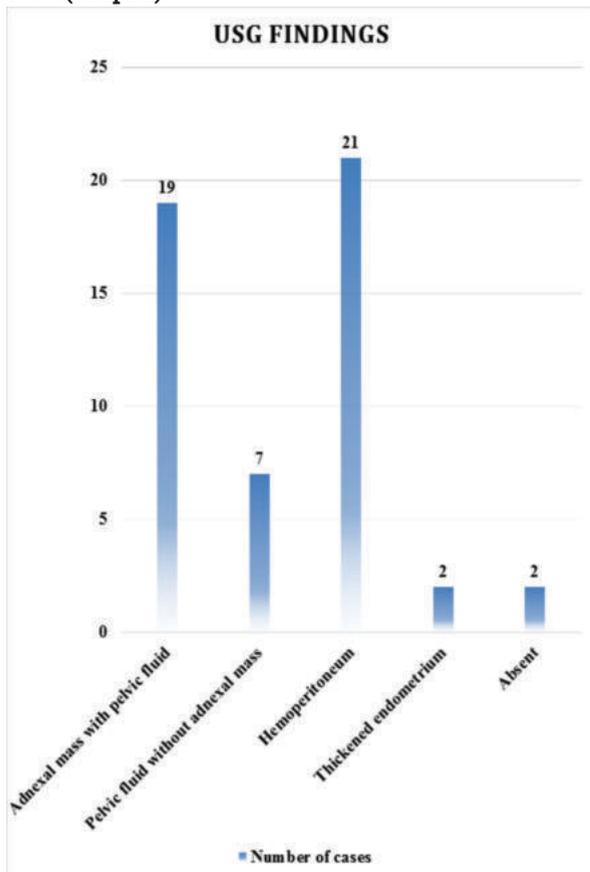
Sr No	USG findings	Number of cases N (%)
1	Adnexal mass with pelvic fluid	19 (66 %)
2	Pelvic fluid without adnexal mass	7 (24 %)
3	Hemoperitoneum	21 (72 %)
4	Thickened endometrium	2 (7 %)
5	Absent	2 (7 %)
Total		29 (100 %)

Table 5 shows transabdominal USG findings observed amongst total 29 cases. Adnexal mass with pelvic fluid was found in 19 (66 %), Pelvic fluid without adnexal mass in 7 (24 %), hemoperitoneum in 21 (72 %) and thickened endometrium in 2 (7 %) cases

Table 6: USG Diagnostic Efficiency Distribution

Sr No	USG diagnosis of EP	Intraoperative Diagnosis of EP		Total
		Present N (%)	Absent N (%)	
1	Present N (%)	26 (90 %)	1 (3 %)	27 (93 %)
2	Absent N (%)	0 (0 %)	2 (7 %)	2 (7 %)
Total		26 (90 %)	3 (10 %)	29 (100 %)
Sensitivity 100 % Specificity 66.67 % PPV 96.30 % NPV 100 %				

Table 6 shows transabdominal USG diagnostic efficiency by comparing USG findings with intraoperative findings. Sensitivity was found 100 %, Specificity as 66.67 %, Positive Predictive value as 96.30 % and negative predictive value as 100 % (Graph 1).



Graph 1: USG findings

DISCUSSION

Present cross-sectional study was performed in radiology department of our hospital from January 2022 to September 2022 in suspected ectopic pregnancy patients during their first trimester visit, who further underwent surgical treatment

for ectopic pregnancy. Transabdominal USG was performed preoperatively in all cases. Patients clinical data, operative and USG findings were analyzed and result showed out of total 29 cases of ectopic pregnancy, amenorrhoea was present in 12 (41 %), vaginal bleeding in 15 (52 %), lower abdominal pain in 20 (69 %), syncope in 4 (14 %) and shock in 2 (7 %) (Table 1). Right sided fallopian tube was involved in majority i.e. 21 (72 %) cases followed by left sided fallopian tube in 8 (28 %) cases (Table 2). On transabdominal USG adnexal mass with pelvic fluid was found in 19 (66 %), Pelvic fluid without adnexal mass in 7 (24 %), mild hemoperitoneum in 9 (31 %), moderate hemoperitoneum in 9 (31 %), severe hemoperitoneum in 5 (17 %) and thickened endometrium in 2 (7 %) cases (Table 5). In similar study by Thapa N Bet al (2016)¹³ positive finding of an adnexal mass with mid-to-large amount of free fluid was present in 15 cases (83.3 %). Among our 18 study cases, sonography showed a mild haemorrhage in 7(38.9%) cases, moderate haemorrhage in 9 (50.0%) and severe haemorrhage in 2 (11.1%) cases. Thickened endometrium was noted in one patient.

In present study out of total Salpingostomy was performed in 2 (7 %), Salpingectomy was performed in 24 (83 %) and Salpingectomy with oophorectomy in 3 (10 %) (Table 4). In similar study by Thapa NB et al (2016) they found Salpingectomy was done in the majority (83.3%) of patients and salpingostomy was done in 11.1% patient. Deeba et al (2014) observed rate of salpingectomy and salpingostomy 89.8% and 4.3% respectively. Higher rate of salpingectomy could be because of late presentation of enrolled patients with rupture ectopic which can be avoided if the cases would have been diagnosed before rupture of the tube. Decision to perform a salpingostomy or salpingectomy is often made intraoperatively based on the extent of damage to the affected and contra-lateral tubes but it is also dependent on the patient's history of previous ectopic pregnancy and wish for future fertility and the skill of the surgeon.

In present study USG Sensitivity was found 100 %, Specificity as 66.67 %, Positive Predictive value as 96.30 % and negative predictive value as 100 % (Table 6). In similar study by Thapa NB et al (2016) they found sensitivity of TAS as 100% and specificity as 99.9%. Positive predictive value and negative predictive value of as 94% and 100% respectively. Nahar et al (2013) in their study comparing diagnostic accuracy of TAS and TVS in 30 patients with suspected ectopic pregnancy found sensitivity and specificity as 73.1% and 92.3% respectively and Positive predictive value and negative predictive value as 95% and 30% respectively. Malik et al (2015) in 100 patients study found sensitivity of 82.3%, specificity of 93.3%, positive predictive value 98.5% and negative predictive value 48.2%.

A life-threatening gynecologic issue called an ectopic pregnancy need prompt treatment. An ectopic pregnancy must be ruled out in any sexually active women of reproductive age who report with lower abdominal pain, vaginal bleeding, or both. It is necessary to perform a qualitative urine dipstick test for beta-hCG (urinary pregnancy test).

This test is rapid, simple, and sensitive. It is 99 percent sensitive at a urine beta-hCG level higher than 25 IU/L¹⁸. A negative urine pregnancy test nearly always indicates that a woman does not have an ectopic pregnancy. However, if it is positive the woman should have a USG scan. USG is important in cases of high-risk ectopic pregnancy and is recommended by RCOG¹⁹. Combined use of beta-hCG and USG scan may have an improved sensitivity and specificity of diagnosing ectopic pregnancy instead of each alone which could significantly decrease the need for invasive tests and unnecessary laparoscopies/ laparotomies. A symptomatic lady with a positive urine pregnancy test should additionally have an ultrasound scan to diagnose ectopic pregnancies.

CONCLUSION

One of the obstetric emergencies that has long-term morbidity is ectopic pregnancy. Therefore, a high level of suspicion, early diagnosis, and treatment enhance the chance for future reproduction. Early diagnosis is made possible by ultrasound. Therefore, ultrasounds should be performed to determine the viability and location of all early pregnancies. It is regarded as the gold standard for ectopic pregnancy diagnosis. It performs the most comprehensive non-invasive diagnostic test.

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