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THE ACCURACY OF PELVIC ULTRASONOGRAPHY IN DIAGNOSIS OF ECTOPIC PREGNANCY AND ITS SURGICAL MANAGEMENT

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ABSTRACT

Background: The word ectopic comes from the Greek word "ektopos" which means "out of place". Ectopic pregnancy is defined as implantation of the blastocyst outside the endometrial lining of uterus. It accounts for 1-2% of reported pregnancies. **Aim:** The purpose of the study is to evaluate the accuracy of ultrasonography for the detection of ectopic pregnancies and to study the clinical presentation and the surgical management of the ectopic pregnancies. **Methodology:** This was an observational prospective study conducted in the Post Graduate Department of Gynaecology and Obstetrics, S.M.G.S Hospital, GMC Jammu over a period of one year i.e. November 2019 to October 2020. Based on the selection criteria, patients with provisional diagnosis of ectopic pregnancy were studied randomly. Detailed history, clinical examination including general physical examination, per abdominal examination, per vaginum examination, urine pregnancy test, beta-hCG, transabdominal or transvaginal ultrasonography were conducted. **Results:** Maximum number of patients i.e. 33.5% were para 1. 23% had history of previous abortion. 92.5% patients had history of amenorrhea. Pain abdomen was observed in 89%. In ultrasonography, Majority of patients i.e. 80% had hemoperitoneum. Complex adnexal mass was seen in 60.5% patients. Salpingectomy was performed in 87% patients. Negative laparotomy was observed in 3% patients. **Conclusion:** In our present study, sensitivity of ultrasound in diagnosing ectopic pregnancy was found to be 100% with a positive predictive value of 97%.

Keywords: Ectopic Pregnancy, Ultrasonography, Laparoscopy, Laparotomy

INTRODUCTION

The word ectopic comes from the Greek word "ektopos" which means "out of place". Ectopic pregnancy is defined as implantation of the blastocyst outside the endometrial lining of uterus[(1)]**.** The incidence varies from 1 in 300 to 1 in 100 deliveries. [(2)].

Classification can be broadly divided into two main categories [(3)] i.e. tubal (95%) and non tubal (5%). The classic clinical presentation for ectopic pregnancy is described as a triad of amenorrhoea, followed by vaginal bleeding and pelvic pain [(1)]**.** However, the classic clinical findings are present in only 30% of presentations. Pelvic ultrasound has revolutionized the diagnosis of ectopic and is now considered the gold standard for the diagnosis of ectopic pregnancy[(4)]**.** Transvaginal ultrasonography may identify masses in the adnexa as small as 10

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 01, 2025

mm in diameter, provide more detail about the character of the mass, evaluate the contents of the endometrial cavity and assessment for the presence of free peritoneal fluid. Multiple parameters have sensitivity and specificity of 100% in diagnosis [(5)]**.** There is a correlation between threshold levels of hcg above which an intrauterine gestational sac is expected by ultrasonography in a normal pregnancy. Beta-hcg concentration of 1500 IU/L or more, an empty uterus on ultrasonography identified an ectopic pregnancy with 100% accuracy[(1)]**.** Beta-hcg with ultrasound together has therefore greatly facilitated the early diagnosis of ectopic pregnancy.

AIMS AND OBJECTIVES: To evaluate the accuracy of ultrasonography for the detection of ectopic pregnancies and to study the clinical presentation and the surgical management of the ectopic pregnancies in a tertiary care hospital.

MATERIALS AND METHOD

This study was conducted in the Post Graduate Department of Gynaecology and Obstetrics, S.M.G.S Hospital, GMC Jammu over a period of one year i.e November 2019 to October 2020.

STUDY TYPE: Observational

STUDY DESIGN: Prospective Study

INCLUSION CRITERIA:

- All patients suspected of having ectopic pregnancy by history and clinical examination and ultrasonography.
- Haemodynamically stable patients

EXCLUSION CRITERIA:

- Intrauterine pregnancy
- Ectopic pregnancy managed by expectant or medical line of treatment.
- Haemodynamically unstable patients

PATIENT SELECTION: Based on the selection criteria, patients with provisional diagnosis of ectopic pregnancy were studied randomly. Detailed history, clinical examination including general physical examination, per abdominal examination, per vaginum examination, urine pregnancy test, beta-hCG, transabdominal or transvaginal ultrasonography were conducted. The diagnosis of ectopic pregnancy was confirmed by direct observation by laparotomy or laparoscopy, which was taken as gold standard. The different surgical methods of treatment were noted and post-operative follow-up was done. An informed and written consent was taken from each patient for inclusion in the study.

POST PROCEDURE: The ultrasound findings were compared with the intra operative findings at laparotomy or laparoscopy and the accuracy of ultrasonography for the detection of ectopic pregnancies was noted.

STATISTICAL ANALYSIS

The data was collected and compiled in Microsoft Office Excel Worksheet, Windows 10 and the appropriate proportions and percentages were calculated. A 2×2 table was used to calculate sensitivity and positive predictive value of the ultrasonography in diagnosing ectopic pregnancy.

RESULTS

In our study, the majority i.e. 43% patients were in the age group of 30-36 years with a mean age of 28.29 years ranging from 18 to 42 years (table 1).

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 01, 2025

TABLE 1: AGE WISE DISTRIBUTION OF PATIENTS

AGE (in years)	N	%
18 to 24	38	19
24 to 30	69	34.5
30 to 36	86	43
36 to 42	5	2.5
>42	2	1
TOTAL	**200**	**100**

MEAN AGE	SD	RANGE
28.29 YEARS	4.76	18 TO 42

Table 2 depicts that the maximum number of patients i.e. 33.5% were para 1. 29% patients were para 2. 25.5% patients were nulliparous and 18.5% patients were para 3. Only 3.5% patients were para 4.

TABLE 2: PARITY WISE DISTRIBUTION OF PATIENTS.

PARITY	N=200	%
0	51	25.5
1	67	33.5
2	58	29
3	17	8.5
4	7	3.5

Maximum number of patients i.e. 23% had history of previous abortion. History of PID was in 9.5% patients. (table 3).

Table 3: DISTRIBUTION OF CASES BY RISK FACOTRS

RISK FACTOR	N	%
h/o PID	19	9.5
PREVIOUS LSCS	31	15.5
PREVIOUS ECTOPIC	8	4
PREVIOUS ABORTION	46	23
IUCD	6	3
INFERTILITY	8	4
UTERINE ANOMALY	2	1
TUBECTOMY	3	1.5
CONCIEVED AFTER OVULATION INDUCTION	2	1

Table 4 depicts that 92.5% patients had history of amenorrhea. Pain abdomen was observed in 89%. Only 3.5% had history of syncopal attacks.

TABLE 4: CLINICAL PRESENTATION ANALYSIS: SYMPTOMS

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 01, 2025

SYMPTOMS	N	%
PAIN ABDOMEN	178	89
AMENORRHEA	185	92.5
BLEEDING PER VAGINA	100	50
NAUSEA	47	23.5
VOMITING	47	23.5
SYNCOPAL ATTACK	7	3.5

Among various signs noticed, maximum i.e. 77.5% (155/200) patients had abdominal tenderness. Cervical motion tenderness was observed in 61% (table 5).

TABLE 5: CLINICAL PRESENTATION ANALYSIS: SIGNS

SIGNS	N	%
PALLOR	95	47.5
HYPOTENSION	52	26
ABDOMINAL TENDERNESS	155	77.5
GUARDING	31	15.5
CERVICAL MOTION TENDERNESS	122	61
MASS IN FORNIX	62	31
ABDOMINAL DISTENSION	52	26

Majority of patients i.e. 80% had hemoperitoneum. Complex adnexal mass was seen in 60.5% patients. Gestational sac in adnexa was seen in 20% patients (table 6).

TABLE 6: DISTRIBUTION OF PATIENTS BASED ON ULTRASOUND FINDINGS

USG FINDINGS	N	%
COMPLEX MASS IN ADNEXA	121	60.5
GESTATIONAL SAC IN ADNEXA	40	20
CARDIAC ACTIVITY IN ADNEXA	36	18
HEMOPERITONEUM	160	80
INTRAUTERINE PSEUDOGESTATIONAL SAC	1	0.5
NEGATIVE LAPAROTOMY/LAPAROSCOPY	6	3

Table 7 depicts that laparotomy was performed in 97% (194/200) patients and laparoscopy was done in 3% (6/200) patients.

TABLE 7: TYPE OF SURGERY

TYPE OF SURGERY	N	%
LAPAROTOMY	194	97%
LAPAROSCOPY	6	3%
TOTAL	200	100%

As per table 8, fallopian tube was involved in 93%. Ovarian pregnancy was seen in 3% patients and 1% had pregnancy in rudimentary horn. However 3% patients had negative laparotomy/ laparoscopy and no ectopic pregnancy was found at the time of surgery.

TABLE 8: LAPAROTOMY FINDINGS ACCORDING TO SITE.

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 01, 2025

SITE	N	%
TUBAL	186	93
AMPULLA	136	68
ISTHMUS	21	10.5
INTERSTITIAL	8	4
FIMBRIAL	9	4.5
OVARY	6	3
RUDIMENTARY HORN	2	1
NEGATIVE LAPAROTOMY/LAPAROSCOPY	6	3

Majority of patients i.e. 60.5% had right sided tubal involvement. Left sided tube was involved in 36.5% patients (table 9).

TABLE 9: LAPAROTOMY FINDINGS ACCORDING TO SIDE.

SIDE	N=200	%
RIGHT	121	60.5
LEFT	73	36.5
NEGATIVE LAPAROTOMY/LAPAROSCOPY	6	3

Majority of patients i.e. 69.5% had tubal rupture at the time of laparotomy. Tubal abortion was observed in 18.5%. Only 9% patients had unruptured ectopic pregnancy (table 10).

TABLE 10: LAPAROTOMY FINDINGS AACORDING TO MODE OF TERMINATION OF TUBAL PREGNANCY.

MODE OF TERMINATION OF TUBAL PREGNANCY	N=194	%
UNRUPTURED	18	9
TUBAL ABORTION	37	18.5
TUBAL RUPTURE	139	69.5

Maximum patients i.e. 87% underwent salpingectomy. Salpingoopherectomy was done in 6.5%. Fimbriectomy was performed in only 2.5% patients. Tubectomy of the other tube was done in 34.5% patients (table 11).

TABLE 11: DISTRIBUTION OF PATIENTS ACCORDING TO TREATMENT MODALITIES

TREATMENT	N	%
FIMRBRIECTOMY	5	2.5
SALPINGECTOMY	174	87
SALPINGOOPHERECTOMY	13	6.5
TREATMENT FOR OTHER TUBE		
TUBECTOMY	69	34.5
SALPINGECTOMY	0	00

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 01, 2025

SALPINGOOPHERECTOMY	0	0

In the present study, 200 patients were diagnosed as ectopic pregnancy on the basis of ultrasound findings, out of which only 97% patients were found to have ectopic pregnancy on the basis of laparotomy and laparoscopy findings. 3% patients were diagnosed wrongly (false positive) on the basis of ultrasound findings and negative laparotomy was done.
Therefore, sensitivity of ultrasound in diagnosing ectopic pregnancy was found to be 100% with a positive predictive value of 97% (table 12).

TABLE 12: 2×2 TABLE TO COMPARE ULTRASONOGRAPHY AND SURGICAL FINDINGS

	DISEASE	**NOT DISEASE**	**TOTAL**
USG+	**194**	**6**	**200**
USG-	**0**	**0**	**0**
TOTAL	**194**	**6**	**200**

SENSITIVITY=194/194*100=100%
POSITIVE PREDICTIVE VALUE=194/200*100=97%
SPECIFICITY=0%
NEGATIVE PREDICTIVE VALUE=0%

DISCUSSION

In our study, the majority i.e. 43% patients were in the age group of 30-36 years with a mean age of 28.29± 4.76 years. This is similar to study of Tahmina S *et al.* (6) where 51.4% patients were in the age group between 21-30 years with a mean age of 29.67 ± 6 years. 33.5% patients in our study were para 1. 29% patients were para 2 and least incidence was found in para 4 and above. Similar findings were found in the study conducted by Nahar K *et al.* [7] where 38% of the patients were para 1. 92.5% patients had amenorrhea as the most common symptom in the present study. Similar findings were found in the studies done by Tahmina S *et al.* [6] where majority i.e. 93% patients presented with amennorhea and Dasari U [8] where 90.4% patients presented with amenorrhea. In our study, hemoperitoneum was the most common ultrasound finding which was found in 80% patients which is comparable to study conducted by Shetty VH *et al.* [1]. Laparotomy was performed in 97% patients which is comparable to the study conducted by Dasari U [8] where 92.5% underwent laparotomy.
Maximum patients underwent laparotomy in our study because of late presentation with complications of tubal rupture and hemoperitoneum. In our study, fallopian tube was the most common site of ectopic pregnancy seen in 93% patients. Maximum patients i.e. 69.5% had tubal rupture at the time of surgery. This was similar to study conducted by Shetty VH *et al.* [1] where the maximum patients (48%) had tubal rupture. In our study, salpingectomy was the most common surgical procedure done for management of ectopic pregnancy in 87% (174/200) patients which is comparable to the study conducted by Njingu AE *et al.* [9] where 95.6% patients under went salpingectomy as the most common surgical procedure. This finding was most likely because of most of the patients presented with tubal rupture at the time of admission. In our present study, 200 patients were diagnosed as ectopic pregnancy on the basis of ultrasound findings, out of which only 97% patients were found to have ectopic pregnancy on the basis of laparotomy or laparoscopy findings. 3% patients were diagnosed wrongly on the basis of ultrasound findings and negative laparotomy was done. Therefore, sensitivity of

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 01, 2025

ultrasound in diagnosing ectopic pregnancy was found to be 100% with a positive predictive value of 97%. Similar findings were found in the study conducted by Cacciatore B *et al.* [10] where the ultrasound had a sensitivity of 93% and positive predictive value of 98%,
Similar findings were found in the study conducted by Shetty VH *et al.* [1] where the ultrasound was 100% sensitive with a positive predictive value of 100%.

CONCLUSION

Ectopic pregnancy still remains one of the major causes of maternal morbidity and mortality. Pelvic ultrasonography with or without the use of serum markers has become the mainstay in the first-line evaluation of women suspected of having an ectopic pregnancy. It serves as single most, non-invasive, diagnostic test. . It can be considered as the gold standard in the diagnosis of ectopic pregnancy.

DECLARATION

Conflict of interests: The author declare that they have no conflict of interest.
Ethical standards: The study was performed after approval from the institutional ethical committee.
Informed consent: A written informed consent was taken from each patient for inclusion in the study.

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