

Role of Ultrasonography in Diagnosis of Ectopic Pregnancy with Clinical Analysis and Management in Tertiary Care Hospital

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Abstract

Purpose of the Study This study is undertaken to emphasize the role of ultrasonography in the diagnosis of ectopic pregnancy and clinical analysis of the same in a tertiary care referral hospital.

Methodology One hundred patients with provisional diagnosis of ectopic pregnancy were studied. Physical examination, urine pregnancy test, transabdominal scan using 5 MHz transducer or transvaginal ultrasonography of 7 MHz was done. The diagnosis of ectopic pregnancy was confirmed by direct observation by laparotomy or laparoscopy (which was taken as gold standard).

Results The study showed ectopic pregnancy was most common in gravida 2 and in age group 26–30 years with most of them having married life <10 years. One or more risk factors were found in 66 % of cases. 54 % of cases presented with acute symptoms, 14 % of cases in shock. Among clinical presentation pain abdomen, history of amenorrhea, bleeding per vaginum, abdominal tenderness, and cervical motion tenderness was most common. In

ultrasonography, complex mass in adnexa was present in 60 % of cases and hemoperitoneum in 50 %. 96 % of cases were tubal pregnancy with most of them tubal rupture. In 98 % of cases, radical surgery was done. Salpingectomy was the most common surgery done (90 %). There was no negative laparotomy in this study. There was no maternal mortality in this series.

Conclusions In all the 100 cases of ectopic pregnancy studied, the ultrasonography provided definitive diagnosis resulting in 100 % sensitivity and 100 % specificity, predictive value of positive test being 100 %. Ultrasonography done in earlier weeks of gestation had sensitivity of 96 % and false negative 4 %.

Keywords Ectopic pregnancy · Laparotomy · Laparoscopy · Ultrasonography

Introduction

The implantation of the blastocyst outside the endometrial lining of uterus is called as “Ectopic Pregnancy.” The incidence varies from 1 in 300 to 1 in 150 deliveries. Although overall incidence of ectopic pregnancy has increased, the risk of death from ectopic pregnancy has declined by 90 %.

Ectopic pregnancy is often proclaimed as “the great masquerader,” as the diagnosis is complicated by a wide spectrum of clinical presentation varying from

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asymptomatic cases to hemoperitoneum and shock. The classical triad of amenorrhoea, abdominal pain, and vaginal bleeding is seen in only 50 % of patients with ectopic pregnancy. A more common complication is the poor reproductive potential after an ectopic pregnancy. Physicians should maintain a high index of suspicion for ectopic pregnancy and should be cognizant of the importance of early diagnosis and early intervention. Hence, early diagnosis and treatment decrease both morbidity and mortality related to ectopic pregnancy.

Women who present with pain and bleeding in the first trimester, the differential diagnosis include normal early pregnancy, abortion, molar pregnancy, and ectopic pregnancy. The exact diagnosis can be made out with ultrasonography [1]. Women with damaged fallopian tubes, pelvic infection, smoking, assisted reproductive techniques are at higher risk for ectopic pregnancy. Even many women can develop an ectopic without any of the risk factors [2]. Increasingly, the ectopic pregnancy is diagnosed before the appearance of symptoms and signs due to wider availability of transvaginal sonography and serum β hcg estimation [3].

Pelvic ultrasound has revolutionized the diagnostic process of ectopic pregnancy and is now considered the gold standard for the diagnosis of ectopic pregnancy [4]. Transvaginal ultrasonography, in particular, may identify masses in the adnexa as small as 10 mm in diameter and can provide more detail about the character of the mass. At the same time, evaluate the contents of the endometrial cavity and assessment for the presence of free peritoneal fluid. In adnexa, a live embryo seen in up to a quarter of patients, gestational sac in 70 %, as complex mass in 90 % of patients with an ectopic pregnancy. Free intraperitoneal fluid is reported in 60 % of cases in transvaginal sonography. Echogenic or particulate fluid correlates with hemoperitoneum [5]. Multiple parameters have sensitivity and specificity of 100 % in the diagnosis [6].

There is a correlation between threshold levels of hcg above which an intrauterine gestational sac is expected by ultrasonography in a normal pregnancy (discriminatory zone). β hcg concentration of 1 500 IU/l or higher, an empty uterus on transvaginal sonography identified an ectopic pregnancy with 100 % accuracy. The coupling of hcg with transvaginal ultrasonographic findings has therefore greatly facilitated the early diagnosis of ectopic pregnancy. The advent of color flow Doppler technology may even further improve the accuracy of diagnosis [7]. Ectopic pregnancies had a typical eccentric leash of vessels on color Doppler. Three-dimensional ultrasound is emerging as a possible additional diagnostic tool for ectopic pregnancy.

In most cases, medical line of management with methotrexate is successful. Those who require surgical approach are women who are not suitable to or have failed medical treatment with methotrexate, heterotopic pregnancy, or hemodynamically unstable. Salpingostomy is preferred in women of reproductive age whereas salpingectomy is done in severely damaged tube, recurrent ectopic pregnancy in the same tube, uncontrolled bleeding after salpingostomy, large tubal pregnancy (>5 cm), or who have completed their family [8].

This study analyzes the various ultrasonography findings in ectopic pregnancy and management of the same in tertiary referral hospital.

Methodology

The present study was carried out in patients with ectopic pregnancy attending Vanivilas hospital and Bowring and Lady Curzon hospitals, Bangalore attached to Bangalore Medical College and research institute from October 2006 to September 2008.

Inclusion criteria: all patients suspected of having ectopic pregnancy by history and clinical examination and ultrasonography were included.

Exclusion criteria: intrauterine gestation and Ectopic pregnancy managed by expectant or medical line of treatment were excluded.

Data Collection Procedure

One hundred patients with provisional diagnosis of ectopic pregnancy were studied. Clinical examination, urine pregnancy test, transabdominal or transvaginal ultrasonography was done. The diagnosis of ectopic pregnancy was confirmed by direct observation by laparotomy/laparoscopy, which was taken as gold standard. The different surgical methods of treatment were noted and post-operative follow-up was done.

Results and Analysis

During the study period from October 2006 to September 2008, 100 patients suspected of ectopic pregnancy were studied. Peak age of incidence was 26–30 years (44 %), followed by patients in age group of 21–25 (28 %). 16 % patients were above 30 years and 12 % below 22 years. 2nd gravida were the most sufferers (38 %). Primi and 3rd gravida were 24 and 28 %, respectively. Least incidence was found in 4th and above (10 %) of the cases had married life <10 years.

Table 1 Distribution of cases by risk

Risk factors	No. of cases	%
Tubectomy	22	22
Tuboplasty	14	14
H/O prev ectopic pregnancy	6	6
Intrauterine contraceptive device	6	6
Infertility	20	20
History suggestive of PID	6	6
Previous LSCS	14	14
H/O abortion	8	8
Conceived after ovulation induction	4	4
No identifiable risk factors	34	34

Some patients had more than one risk factors

90 % of cases were referred with 58 % belonging to lower socioeconomic status. One or more risk factors were identified in 58 patients (66 %). The most common cause being post tubectomy. In post tubal sterilization procedures, most of them were following abdominal tubectomy (14 cases). In this study, all cases of ectopic pregnancy were following 3 years of sterilization. 4 cases were with consecutive ectopic pregnancy. Among 6 cases following IUCD, 4 had previous LSCS. In infertile patients, secondary infertility was common (14 cases) compared to primary infertility (Table 1).

Most of the cases in our study presented with acute symptoms (54 %) and 30 of them had hemoperitoneum more than 1000 ml. 14 cases presented with shock. The most common presentation being pain abdomen followed by amenorrhea and bleeding per vaginum. On examination, 48 % cases presented with pallor and 14 % of cases with shock. Most common clinical finding being abdominal tenderness and cervical motion tenderness (Table 2). 62 % of the cases had positive culdocentesis suggesting blood in the pelvic cavity. All the 100 cases had urine pregnancy test positive.

Most common ultrasonography finding was complex mass in the adnexa in 30 % of the cases; the complex adnexal mass was present with hemoperitoneum. In 4 cases, the adnexal mass was on the opposite side as confirmed by laparotomy (Table 3).

In all the 100 cases studied, ultrasonography provided the definitive diagnosis resulting in 100 % sensitivity and specificity. Predictive value of positive test being 100 %.

In 4 cases, the previous scan done 15 days prior had shown complete abortion with no evidence of extrauterine pregnancy. As the symptoms persisted, the repeat scan showed hemoperitoneum with adnexal mass. Hence, the earlier scan had sensitivity of 96 %, specificity 100 %, and false negative being 4 %. 96 % were tubal pregnancy.

Table 2 Clinical presentation analysis

	No. of cases	%
Symptoms		
Pain abdomen	88	88
Amenorrhea	86	86
Bleeding PV	60	60
Vomiting/nausea	22	22
Fever	6	6
Fainting attacks	2	2
Signs		
Pallor	48	48
Hypotension and shock	14	14
Abdominal tenderness	86	86
Guarding	14	14
Distension	24	24
Cervical motion tenderness	80	80
Fornicial tenderness	72	72
Mass in the fornix	32	32

Some patients had more than one clinical signs and symptoms

Table 3 Ultrasonographic findings

Ultrasonographic findings	No. of cases	%
Complex mass in adnexa (mixed echogenicity)	60	60
Cardiac activity in adnexa	16	16
Gestational sac in adnexa	8	8
Hemoperitoneum	50	50
Intrauterine pseudogestational sac	16	16

Some patients had more than one finding

Right being the most common site. Among tubal pregnancies, 48 % were tubal rupture (Table 4).

In 98 % of cases, radical surgery was done. Salpingo oophorectomy was done in 6 cases. 2 cases were of ovarian pregnancy. In 14 % of cases, salpingectomy was done in opposite tube (Table 5). 8 % of cases had prior history of dilatation and evacuation as a result of faulty diagnosis. 2 cases were following failed medical line of treatment. There was no maternal death in this series. No negative laparotomy in this series.

Discussion

Incidence of ectopic pregnancy in this study was 1 in 143 which is comparable to other Indian studies of Arora et al. (1 in 160) [9] and Arup et al. (1 in 161) [3]. The peak age of incidence was 26–30 years and majority was gravid 2 or less; it is consistent with study by Arup et al. 66 % of cases had one or more risk factors similar to study by Arup et al.

Table 4 Laparotomy findings

Laparotomy findings	No. of cases	%
Site		
Tubal	96	96
Ampulla	76	76
Isthmus	12	12
Interstitial	4	4
Fimbrial	4	4
Ovary	2	2
Secondary abdominal	2	2
Side		
Right	60	60
Left	40	40
Mode of termination of tubal pregnancy (<i>n</i> = 96)		
Unruptured	8	8
Tubal abortion	42	44
Tubal rupture	46	48
Pelvic pathology		
Adhesions	10	10
Hydrosalpinx	12	12
Corpus luteum	6	6
Pelvic haematocele	4	4

Table 5 Treatment modalities

Treatment	No. of cases	%
Treatment for ectopic		
Milking	2	2
Fimbriectomy	2	2
Salpingectomy	90	90
Salpingo-oophorectomy	6	6
Treatment for other tube		
Tubectomy	8	8
Salpingectomy	14	14
Salpingo-oophorectomy	4	4
Anesthesia		
General	38	38
Spinal	62	62

In their study, most common was tubal pregnancy, and salpingectomy was the treatment in majority (81.9 %) which is comparable with our study (90 %). Study by

Adhikari et al. [10] shows similar findings with our study. Most common ultrasonography finding being complex adnexal mass (61 %), with our study showing 60 %. But in our study, half of these cases had echogenic fluid in the cul de sac. Study done by Naseem et al. [6] showed sensitivity and specificity of 100 % in the diagnosis of ectopic pregnancy by ultrasonography.

Conclusion

Ectopic pregnancy is one of the obstetric emergencies with long-term morbidity and mortality. Hence, high degree of suspicion, early diagnosis, and treatment improves the future reproductive potential. Ultrasonography helps in early diagnosis. Hence, all early pregnancies should undergo Ultrasonography for viability and site of pregnancy. It can be considered as the gold standard in the diagnosis of ectopic pregnancy. It serves as single most, non-invasive, diagnostic test. It can be even used as single alone test.

Conflict of interest None.

References

- Levine D. Ectopic pregnancy. *Radiology*. 2007;245(2):385–97.
- Seeber BE, Barnhart KT. Suspected ectopic pregnancy. *Obstet Gynecol*. 2006;107(2 Pt 1):399–413.
- Majhi AK, Roy N, Karmakar KS, et al. Ectopic pregnancy: an analysis of 180 cases. *J Indian Med Assoc*. 2007;105(6):308–14.
- Bignardi T, Alhamdan D, Condous G. Is ultrasound the new gold standard for the diagnosis of ectopic pregnancy? *Semin Ultrasound CT MR*. 2008;29(2):114–20.
- David AN, Lyndon MH. *Transvaginal ultrasound*. Mosby. 105–132.
- Naseem I, Bari V, Nadeem N. Multiple parameters in the diagnosis of ectopic pregnancy. *J Pak Med Assoc*. 2005;55(2):74–6.
- Ramanam RV, Gajaraj J. Ectopic pregnancy: the leash sign. A new sign on transvaginal Doppler ultrasound. *Acta Radiol*. 2006;47(5):529–35.
- Al-Sunaidi M, Tulandi T. Surgical treatment of ectopic pregnancy. *Semin Reprod Med*. 2007;25(2):117–22.
- Arora R, Rathore AM, Habeebullah S, et al. Ectopic pregnancy: changing trends. *J Indian Med Assoc*. 1998;96(2):53–7.
- Adhikari S, Blaivas M, Lyon M. Diagnosis and management of ectopic pregnancy using bedside transvaginal ultrasonography in the ED: a 2 year experience. *Am J Emerg Med*. 2007;25(6):591–6.