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Original Research Article

Clinical analysis of ectopic pregnancies in a tertiary care center: a two-year retrospective study

Bhavesh B. Airao, Jahnvi M. Vyas*

Department of Obstetrics and Gynaecology, C.U. Shah Medical College, Surendranagar, Gujarat, India

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*Correspondence:

Dr. Jahnvi M. Vyas,

E-mail: jahnvivyas62@gmail.com

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ABSTRACT

Background: Ectopic pregnancy is defined as the implantation and development of blastocyst at a site other than the endometrial lining of the uterine cavity. With its incidence rising, there have been advances in its early diagnosis by Transvaginal sonography, B-Hcg assays and availability of medical and surgical management, thereby reducing mortality and morbidities.

Methods: 100 cases were reported in a span of 2 years. Incidence, causes, diagnosis, past history of infertility treatment, tubal ligation, B-Hcg level, hemoglobin level, USG findings were reviewed and the cases were managed accordingly.

Results: Incidence was 1/170 pregnancies and was highest between 25-30 years of age; more common in multigravida than primigravida; lower abdominal pain being the most common presenting complaint followed by bleeding per vaginum. Etiology-idiopathic>previous abortion>pelvic infection>infertility treatment>previous ectopic>previous pelvic surgeries. Tubal ectopic being the most common followed by cornual>ovarian>rudimentary horn>scar ectopic>abdominal ectopic. More than 2/3rd cases were ruptured ectopics yet most patients were vitally stable at the time of presentation and immediate laprotomy followed by salpingectomy was the preferred modality. Patients who were hemodynamically stable, had Gsac size <4 cm by TVS, B-hcg levels <10,000 U/ml and no free fluid in the pelvic cavity, were managed medically. Most patients required blood transfusion, other than that there was trivial morbidity and no mortality.

Conclusions: Most patients being vitally stable on presentation so timely diagnosis and management could prevent mortality and reduce the morbidities to a great extent.

Keywords: Amenorrhea, Ectopic pregnancy, Risk factors, B-Hcg, Salpingectomy

INTRODUCTION

An ectopic pregnancy is defined as the implantation and development of blastocyst at a site other than the endometrial lining of the uterine cavity. It is well recognised as a life-threatening emergency in early pregnancy. The incidence of EP is around 1-2% in most hospital based studies.¹⁻⁶

Diagnosis requires a high index of suspicion as the classic triad of amenorrhoea, abdominal pain and vaginal bleeding is not seen in all of the cases. Women may present with

non-specific symptoms, unaware of an ongoing pregnancy or even present with hemodynamic shock. The contribution of EP to the maternal mortality rates in developing countries including India is not precisely known, with data from few studies indicating 3.5-7.1% maternal deaths due to EP.^{7,8}

The purpose of this study was to appraise all the cases of EP managed at a tertiary care centre over a period of 2 years and, to determine the incidence, risk factors, clinical presentation, management and morbidity associated with EP.

METHODS

This retrospective study was conducted at C.U. Shah Medical College and Hospital, a tertiary care hospital in Gujarat. The study was approved by the Institute Ethics Committee. The case records of patients diagnosed with EP between March 2020 and April 2022 were retrieved from the medical records department. Total 100 patients were reported. Other characteristics like age, parity and risk factors for EP were noted. Hemoglobin level, B-Hcg level, mode of diagnosis, management modality, complications and need for blood transfusion and other morbidities were also recorded. The primary outcome measures studied were incidence of EP, their risk factors, mortality and morbidity in these women. Data was entered in MS excel spreadsheet and analyzed using SPSS software version 19.0. For categorical variables, data was compiled as frequency and percent.

RESULTS

Over the two-year period, 1694 pregnancies were diagnosed, among whom 100 pregnancies were ectopic. The incidence of EP was 5.9/1000 pregnancies or one in 170 pregnancies. Majority of the women were aged 25-30 years. The most common risk factors were previous abortion (20%), PID (11%) and previous caesarean section (9%). Among the women who underwent other pelvic surgery, 4 women had undergone tubal ligation.

The classic triad of amenorrhoea, vaginal bleeding and lower abdominal pain was present in 47 (47%) cases. Acute abdominal pain was the most common complaint, seen in 79 (79%) women; although a history of preceding amenorrhoea was present in 91 (91%) women. The other

symptoms at presentation were nausea, vomiting and syncope. Cervical motion tenderness was elicited on pelvic examination in 63% cases.

A spot urine pregnancy test was performed in all cases and was found to be positive in 100% cases. A diagnosis of EP was made on clinical findings in 61 (61%) women. However, ultrasonography was useful in making the confirmatory diagnosis in all cases (the classic “ring of fire” appearance). Ultrasonography and urine pregnancy test was conclusive in all cases. The mean gestational age at diagnosis was 7 weeks. The site of ectopic was fallopian tubes in 83 cases (83%).

Patients who were hemodynamically stable, had a gestational sac size measuring less than 4cm by transvaginal ultrasonography, serum beta hCG (human Chorionic Gonadotropin) levels less than 10,000 U/ml and no free fluid in the pelvic cavity, were managed medically. Ability for regular follow-up was ensured before medical treatment. 7 (7%) women were managed medically with methotrexate. 4 of them had a single dose of methotrexate, while 2 needed a multiple dose regimen. 1 of the 7 women required surgery following failed medical management. Among the 93 women managed surgically, 71 were ruptured at the time of diagnosis, with hemoperitoneum seen intraoperatively. Mean hemoglobin at admission was 9.6 ± 1.9 g/dl. More than half of the women needed blood transfusion (78%) and three women had developed trivial blood transfusion reactions like shivering, tachycardia, fever which were managed with medications. No serious complications were reported. Mean duration of hospital stay was 4 to 6 days. No deaths were noted. Abdominal wound infection was seen in four cases.

Table 1: Patient characteristics.

Characteristics	N (%)
Age (18-42 years)	
18-25	24
26-30	51
31-35	21
>35	4
Parity	
0	10
1	48
2	22
3	14
≥4	6
Risk factors	
History of abortions (≥1)	20 (36.4)
History of previous caesarean section	9 (16.36)
History of ectopic pregnancy	5 (9)
History of tubal surgeries	4 (7.27)
History of Pelvic inflammatory disease	11 (20)
History of infertility treatment taken	6 (10.9)
Symptoms	
Amenorrhea	91

Continued.

Characteristics	N (%)
Vaginal bleeding	56
Lower abdominal pain	79
Triad	47
Signs	
Hemodynamic shock	22
Abdominal tenderness	78
Cervical motion tenderness	63
Diagnostic modality	
Clinical	61
Ultrasonography	100
Laparoscopy (diagnostic and therapeutic)	21
Sites	
Tubal	83
Cornual	4
Scar	3
Rudimentary horn	6
Ovarian	3
Abdominal	1

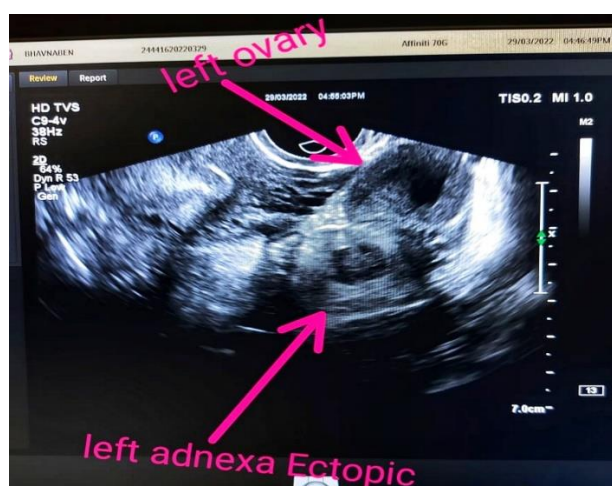


Figure 1: Hypoechoic mass in the left adnexa diagnosed as ectopic pregnancy.

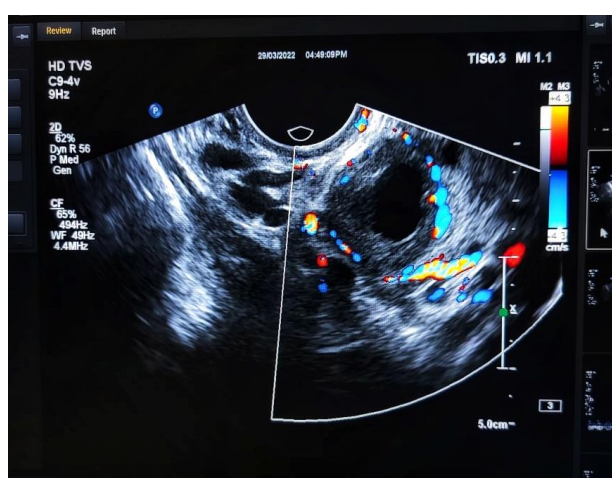


Figure 2: Classic “RING OF FIRE” appearance on colour Doppler of ectopic pregnancy.

Table 2: Morbidities following ectopic pregnancy (n=100).

Morbidity	N	%
ICU admission	0	0
Bowel injury	0	0
Wound infection	4	4
Blood transfusion reactions	3	3

DISCUSSION

EP accounts for 3.5-7.1% of maternal mortality in India.^{7,8} The incidence of EP was 1 per 170 pregnancies i.e. 0.58% in our study. This is in agreement with most studies from developing countries where incidence ranged from 0.56-1.5%.^{1-3,5,6,9,10} It is a significant cause of mortality in the first trimester. Timely referral to a higher centre is imperative in order to reduce mortality and morbidity.

The classical triad of abdominal pain, amenorrhoea and vaginal bleeding was seen in 47% of our cases. Other studies have reported this triad to be present in 28-95% women, clearly indicating that this is not a presenting feature in most cases.^{1,11,12} A history of amenorrhoea was present in 91% of our cases, but this may not come to light unless specifically enquired into.

Mean gestational age at diagnosis of EP was 7.1 weeks in our study. Women may be unaware of an ongoing pregnancy and hence may not anticipate a pregnancy complication. Such women are most often seen first at a primary health centre or by a general practitioner.

In our study, history revealed presence of at least one risk factor in 55% of the women, similar to other studies.^{1,12,13} Among the risk factors, previous abortion was the most common (20%), followed by pelvic surgeries (13%) in our

study. Studies from various regions have reported a similarly high incidence of previous abortions. As per an article published on ectopic pregnancy analysis in a tertiary care center in south India, among the risk factors, previous pelvic surgery was the most common (37.5%), followed by previous abortions (36.1%) in our study. The reason for previous pelvic surgery being the most common risk factor in that study was attributed to the high caesarean section (33.6%) and tubal sterilisation (57.4%) rates in their state.²⁴ Singh et al, also reported prior tubal surgery as the most common (40%) risk factor in their study which is again a reflection of their high acceptance (57.4%) of tubal sterilisation as a method of family planning.^{1,24} Hence a pregnancy test must be performed in all cases irrespective of their sterilisation status. Pregnancy must not be ruled out in women on such pretext.

PID is an important risk factor for ectopic pregnancy but this being a retrospective study, precise data couldn't be found that's why the percentage attributed to it being a risk factor are arbitrary. History of pelvic inflammatory disease (PID) was seen in 11% of our patients.

Although clinical examination may raise suspicion of an EP, relying on clinical signs and symptoms alone would have missed the diagnosis in 33% of our cases. Ultrasonography was useful in diagnosing most of these cases. Culdocentesis, abdominal paracentesis and laparoscopy were used frequently in the past to aid diagnosis, but have been replaced by ultrasonography due to its non-invasive nature.^{3,5,6,14} Availability of point of care ultrasonography is of utmost importance in avoiding delay in diagnosis. This may not require gynaecologic specialists as physicians in community practice may be able to acquire comparable skills as residency graduates through a two-week intensive ultrasonography-dedicated training.

Most of the cases (93%) were managed surgically and a salpingectomy was performed. A case of scar ectopic pregnancy was found to have ruptured uterus with gross hemoperitoneum, with unstable vitals following which uterus was resutured at the site of rupture and compression stitches were taken. A recent study concluded that laparoscopic surgical management was not better than a laparotomy in terms of the tubal patency and intrauterine pregnancy rates.¹⁵ Most studies reported a similarly high rate of surgical management.^{2,3,6,9,16} In contrast, surveys from the United Kingdom by Taheri et al, and van den Berg et al, reported a falling trend in the number of cases managed surgically (98% to 62% and 50% to 27% respectively), over the last two decades.^{17,18} This was attributed to the establishment of early pregnancy assessment units (EPAU) where EP is likely to be diagnosed at an early stage when medical management is still plausible.

The fallopian tubes were the most common seat of EP (83%). Most studies reported a higher incidence of EP in

the right tube.^{1,3,6,10,19} while we found 55.4% of tubal ectopic pregnancies on the left side. In developing countries, majority of patients are diagnosed after tubal rupture. Our centre being a tertiary level referral centre, 76% of the women had ruptured ectopic pregnancies and presented with a hemoperitoneum, while some studies have reported 70-100% of ectopic pregnancies which were ruptured at diagnosis, mostly due to late referrals. Seventy eight (78%) women needed blood transfusion, which was similar to that in other studies.^{2,9,10,16} Udigwe et al, reported a 94.4% need for blood transfusion, as all women presented with a ruptured ectopic pregnancy and underwent a laprotomy and salpingectomy. Mean duration of hospital stay was 5±3 days. Udigwe et al, similarly reported that 94.4% of their patients had a hospital stay of less than 6 days, while 5.6% of the women needed prolonged hospitalization up to 14 days.³

There were no deaths due to EP during the period of our study. Maternal mortality due to EP was reported to be between 0% and 1.3% in various studies.^{2,3,5,6,9,16} Mortality is mostly due to hemorrhage following rupture of the EP due to delayed referrals and diagnosis. National Institute for Health and Clinical Excellence has estimated that two-thirds of maternal deaths due to ectopic pregnancies in the UK may have been associated with inadequate care.²⁰

Prevention and treatment of PID and encouraging women to undergo an early transvaginal ultrasonography to confirm the location of pregnancy is likely to prevent late diagnosis. This will also allow medical management or fertility sparing conservative surgical management. Setting up early pregnancy assessment units has been shown to result in higher quality and cost-effective care, and to have a positive effect on early pregnancy care in the UK.¹⁸ Future studies are required to evaluate usefulness of such EPAUs and feasibility of setting them up in India.

Ultrasonography being the mainstay for evaluating EP, its availability at the point of care will also help majority of patients by allowing safe and timely discharge of patients presenting to emergency departments with clinical suspicion of an EP.²¹ Future research may be directed at assessing the impact of training doctors at primary and secondary levels of healthcare with two-week intensive ultrasonography courses, on the mortality and morbidity associated with EP.

Horne et al, suggested the use of serum placental growth factor (PGF) to differentiate between intrauterine and ectopic pregnancies and concluded that serum PIGF was undetectable in women with tubal ectopic pregnancies and reduced, or undetectable, in miscarriage compared to viable intrauterine pregnancies.²² Cabar et al, attempted to correlate the levels of serum vascular endothelial growth factor (VEGF) and ultrasonographic features in EP and concluded that serum VEGF was raised in ectopic pregnancies with cardiac activity.²³ Future studies are required to assess clinical utility of these markers.

Limitations

Our study is limited by its retrospective nature. Further, we were unable to estimate the duration of delay in diagnosis and referral and its effect on morbidity.

CONCLUSION

Culdocentesis and laparoscopy have been superseded by non-invasive transvaginal ultrasonography and highly sensitive and accurate beta hCG assays for diagnosis of EP. Timely diagnosis and management in early pregnancy units with point of care ultrasonography can reduce the morbidity and mortality due to ectopic pregnancy. In conclusion, identifying underlying risk factors, availability of point of care ultrasound, complimented by availability of beta hCG assay and timely intervention will help reduce the morbidity and mortality due to EP.

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