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ECTOPIC PREGNANCY: INCIDENCE, RISK FACTORS, AND OUTCOMES IN A TERTIARY CARE CENTER – A PROSPECTIVE OBSERVATIONAL STUDY

Obstetrics & Gynaecology

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ABSTRACT

Background: Ectopic pregnancy (EP) is a life-threatening condition that occurs when a fertilized ovum implants outside the uterine cavity. Despite advancements in diagnostic and therapeutic modalities, EP remains a significant cause of maternal morbidity and mortality worldwide. **Methodology:** This prospective observational study aimed to investigate the incidence, risk factors, clinical presentations, and outcomes of ectopic pregnancies in a tertiary care center. Conducted at the Department of Obstetrics and Gynaecology, AIIMS, Rishikesh, the study included 66 cases diagnosed between January 2019 and June 2020. **Results:** Key risk factors included prior caesarean sections, abortions, and contraception use. Most cases presented with amenorrhea (92.42%), abdominal pain (87.8%), and vaginal bleeding (74.2%). Surgical management was predominant (72.72%), with salpingectomy being the most common procedure (87.7%). Medical management with methotrexate was successful in select cases (24.24%), and expectant management was rarely employed. **Conclusion:** This study underscores the importance of early diagnosis and intervention to improve maternal outcomes. Strengthening diagnostic capabilities, especially at primary care levels, and ensuring timely referral can significantly reduce the incidence of ruptured ectopic pregnancies.

KEYWORDS

Ectopic Pregnancy, Salpingectomy, Methotrexate, Expectant Management

INTRODUCTION

Ectopic pregnancy (EP) is defined as the implantation of a fertilized ovum outside the uterine cavity, with the fallopian tube being the most common site. The condition poses a significant risk to maternal health due to its potential for rupture, leading to haemorrhage and even death. EP accounts for approximately 2% of all recognized pregnancies globally, with varying incidence rates depending on diagnostic capabilities, healthcare access, and population-specific risk factors.[1]

Historically, the management of EP has evolved from surgical interventions to include medical and expectant management in specific cases. The introduction of transvaginal ultrasonography (TVS) and quantitative serum βhCG assays has revolutionized early detection. However, despite these advancements, delayed diagnosis remains common, especially in resource-limited settings.

This study aimed to address critical gaps in understanding the epidemiology and outcomes of EP in India, focusing on the incidence, clinical presentations, and management strategies employed at a Tertiary care center.

MATERIALS AND METHODS:

This hospital based prospective observational study was conducted in the Department of Obstetrics and Gynaecology, AIIMS, Rishikesh from January 2019 to June 2020. Study was started after obtaining approval from Institutional ethical committee (IEC). All women 18 years and above who were admitted and diagnosed with Ectopic pregnancy, willing for follow up and satisfying the inclusion and exclusion criteria were recruited after taking informed consent.

Based on previous studies, sample size was calculated by openepi software with absolute precision 10%, confidence level at 95%.

Patients with ectopic pregnancy were recruited from Gynaecology OPD or from Emergency department AIIMS, Rishikesh after screening for eligibility criteria. Once the patients were diagnosed with ectopic pregnancy, informed written consent was taken from the patients.

A detailed history and examination findings were noted from case records. Demographic details, parity, infertility duration, tubal pregnancy, prior ectopic, period of amenorrhoea, pain, bleeding, syncope were noted. Ultrasound findings such as free fluid, adnexal mass, gestational sac, fetal pole and cardiac activity were noted. Hemoglobin, β hCG levels, LFT, KFT levels were noted. Details of any surgery done and intra operative findings were noted down such as status of ectopic mass, size and site and type of procedure done such as Salpingectomy/ Salpingostomy. Patients planned for medical management were managed as per departmental protocol and findings were noted.

Patients planned for medical management were followed up with β hCG on day1, day4 and day7. Failure of medical management was described as increasing β hCG level or rupture during medical management. On the basis of response to Methotrexate in this study, patients managed medically were divided into two groups: successful medical management and failed medical management. Failed medical management cases were managed surgically.

Continuous variables were analysed as means and proportions, while categorical variables were expressed as percentages.

RESULTS

During the study period, a total 66 cases of Ectopic pregnancy cases were reported and the incidence was found to be 32.4 per 1,000 deliveries. The mean age of patients was 29.03 years, with the majority (40.77%) aged between 26 and 30 years. Multigravida women constituted 75.5% of cases.

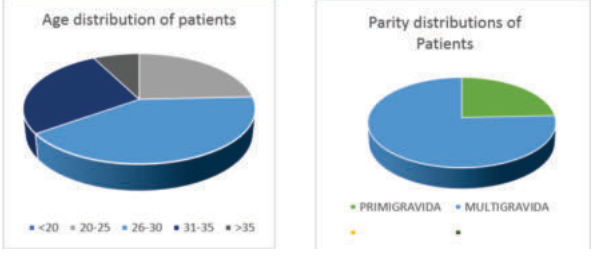


Figure 1: Demographic distribution

The classical triad of symptoms was present in 59.09% of cases, with amenorrhea being the most common symptom (92.42%). Other presentations included abdominal pain (87.8%) and vaginal bleeding (74.2%).

Table 1 Showing Clinical Presentation Of Ectopic Pregnancy

Clinical presentation	Number of Patients(n=66)	Total %
Symptoms		
1.Amenorrhea	61	92.42%
<6 weeks	11	16.66%
≥6 weeks	49	75.7%
No Amenorrhea	06	9.06%

2.Pain Abdomen	58	87.8%
3.Bleeding P/V	49	74.2%
4.Giddiness/Syncope	05	7.57%
Signs		
1.Abdominal distention	02	3.2%
2.Adnexal mass	08	12.12%
3.Cervical motion tenderness	36	54.54%
Examination findings		
1.Pallor present	28	42.42%
2.Pulse rate		
≥100 bpm	33	50%
<100 bpm	33	50%
3. Blood pressure		
≥90 /60 mmHg	63	95.45%
<90 /60 mmHg	03	04.55%

The most common risk factor was a history of caesarean sections (37.75%), followed by prior abortions (19.63%) and contraception use (7.55%). Two cases were associated with infertility treatments.

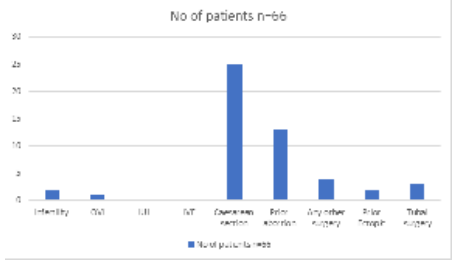


Figure 2: Risk factor for association of Ectopic pregnancy

Our study showed detection of adnexal masses in 96.96% of cases by Ultrasound and with free fluid in the pouch of Douglas in 69.69%. Most ectopic pregnancies were located in the fallopian tube (84.4%), particularly the ampullary region (74.2%).

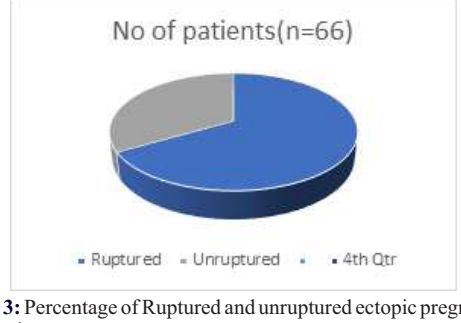
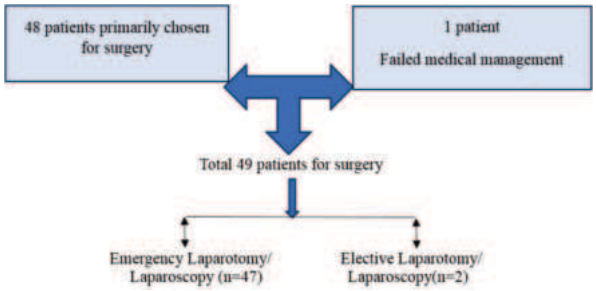


Figure 3: Percentage of Ruptured and unruptured ectopic pregnancy at presentation

Table 2: Site of ectopic pregnancy based on USG findings and Intraoperative findings

Site of Ectopic	No of patients(n=66)	Total%
Fallopian tube	56	84.4%
Ampulla	49	74.2%
Fimbriae	4	6.06%
Isthmus	1	1.51%
Cornua/Interstitial	2	3.03%
Ovary	1	1.51%
Caesarean scar pregnancy	6	9.09%
Rudimentary horn of uterus	1	1.51%
Broad ligament	1	1.51%
Cervix	1	1.51%

In our study after initial assessment, 2(3.03%) patients were planned for expected management, 16(24.24%) patients for medical management and 48(72.72%) patients for surgical management. In 1 patient of Caesarean scar pregnancy received intralesional Methotrexate injection and another 1 Caesarean scar pregnancy received intra cardiac KCI injection. Failure rate was noted at 0% for expectant management and 6.25% in medical management. 49 patients were managed by surgical methods.



Salpingectomy was done in 43(87.7%) patients. No salpingostomy was done.

6 patients were diagnosed as caesarean scar ectopic pregnancy and treated with medical management. Among 6 patients 5 patient were treated successfully and 1 patient on follow up found to be hemodynamically unstable and emergency laparotomy was done and diagnosed as ruptured caesarean scar ectopic pregnancy, treated with caesarean scar excision.

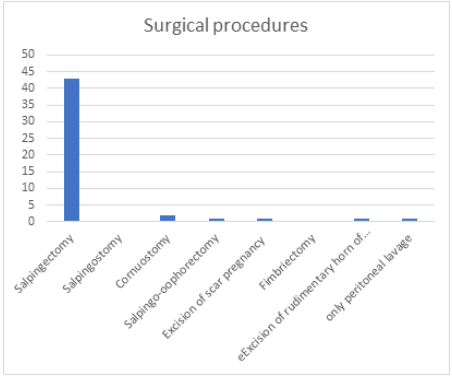


Figure 4: Surgical procedures performed

One patient was diagnosed as ovarian pregnancy and treated by ovariotomy.

Two patients were diagnosed as cornual pregnancy. among them 1 patient was underwent laparotomy and cornuostomy and one patient underwent laparoscopic cornuostomy.

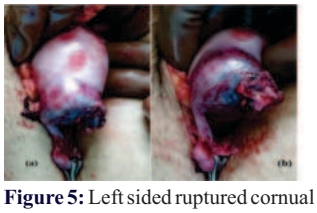


Figure 5: Left sided ruptured cornual ectopic
Figure 6: Laparoscopic view of surgically treated cornual pregnancy

DISCUSSION

The observed hospital-based incidence rate of ectopic pregnancy was 32.4 per 1000 deliveries. This elevated rate can be attributed to the tertiary care nature of the study center, where a significant number of cases were referrals from lower-tier health facilities, including complicated and ruptured ectopic pregnancies. Most patients were aged 26–30 years, consistent with the reproductive peak in women, mirroring trends in other studies.

The findings of this study align with global trends, emphasizing the significant burden of ectopic pregnancies on maternal health. The high incidence of ruptured cases highlights the need for improved early diagnostic capabilities, particularly at primary and secondary healthcare levels.

Author (year)	Incidence rate (per thousand deliveries)
Majhi et al (2007)	6.2
Dow Ek et al (2005)	12.2
Pradhan P et al (2006)	44

Sindhura et al (2017)	34.9
Our study	32.4

Risk Factor Analysis

Authors (year)	Most common risk factor
Sindhura et al (2017)	Infertility, previous abortion and IUCD All 18.98%
Shah et al (2005)	Infertility (23.6%)
Ayaz et al (2013)	Previous pelvic surgery (29.5%)
Our study	Previous caesarean section (37.75%)

The association of prior caesarean sections and abortions with EP underscores the role of surgical trauma in predisposing women to tubal implantation. The study also highlights the increasing contribution of ART to the incidence of ectopic pregnancies, particularly in the form of heterotopic pregnancies.

The classic triad of symptoms—amenorrhea, abdominal pain, and vaginal bleeding—was present in only 59.09% of patients, reaffirming the diagnostic challenges associated with EP. Pain abdomen (87.8%) emerged as the most common symptom, followed by amenorrhea (75.7%) and bleeding per vaginum (74.2%). Similar findings were reported by Khan et al, where the most common symptom at presentation was amenorrhoea of greater than 4 weeks (98.03%), followed by abdominal pain (96.07%) and bleeding per vaginum (80.39%). Dizziness and vomiting were observed in 54.11% and 30.58% patients respectively.[2]

In a study by Wakankar et al [3] the Triad of symptoms in ectopic pregnancy was noted in 53.84% of patients, which is similar to our study. The overlap of symptoms with other gynaecological conditions underscores the need for heightened clinical suspicion and robust diagnostic tools.

In this study, at admission sonography findings were adnexal mass in 87.3% patients, free fluid in 69.69% patients, gestational sac seen in 40.90% patients, fetal pole and cardiac activity seen in 9.09% and 3.03% of patients respectively. Right sided adnexal mass present in 37.87% and left sided adnexal mass present in 51.51% of patients. Mass was present in previous LSCS scar site in 9.09% of patients and in cervical region in 1.51% of patients. In study done by Sindhura et al found right sided mass in 69.92% of patients and left sided mass in 30.37% of the patients.[4]

Ganitha et al reported that ultrasound was able to diagnose 80% of ectopic pregnancy cases. Extra-uterine gestational sac, hemoperitoneum and adnexal mass were noted in 14%, 60% and 80% of cases respectively.[5] In a study by Gaddagi et al, ultrasound revealed heterogenous mass in 40.5% of cases and fluid in pouch of Douglas in 83.8% of cases.[6] Shetty et al reported adnexal mass in 60% of cases, hemoperitoneum in 50% cases and gestational sac in 8% of cases.[7] Naseem et al found adnexal mass in 76% cases, hemoperitoneum in 50% cases and gestational sac in adnexa in 5.6% of cases.[8]

The study employed a multimodal approach to managing EP, including expectant, medical, and surgical methods. The predominance of surgical management (72.72%) over medical (24.24%) and expectant (3.03%) management reflects the advanced presentation of most cases. Among surgically managed cases, salpingectomy was the most common procedure (87.7%), emphasizing the importance of immediate intervention in life-threatening ruptures.

Among surgically managed patients 45(91.3%) had emergency laparotomy, 1 patient had elective laparotomy, 2(4.08%) patients had emergency laparoscopy and 1 patient had elective laparoscopy. Intraoperatively 67.3% patients were found to have ruptured ectopic, 20.4% unruptured, 2.045 tubal abortion and 10.28% had chronic ectopic pregnancy.

During surgery, the most common site of ectopic was ampulla 77.5%, followed by fimbriae 8.16%, cornual 4.08%, isthmus 2.04%, ovary 2.04%, caesarean scar pregnancy 2.04%, rudimentary horn of uterus 2.04% and broad ligament 2.04%.

In a study done by Bouyer et al, ectopic pregnancy sites were interstitial 2.4%, isthemic 12.0%, ampullary 70.0%, fimbrial 11.1%, ovarian 3.2%, and abdominal 1.3%. no cervical pregnancies were observed.[9]

In another study, ectopic pregnancy site were Ampullary 74.68%, fimbrial 7.59%, isthamus 8.86%, ovary 3.37%, cornual 3.79%.[4]

While the fallopian tube remained the predominant site (84.4%), the study also documented cases of caesarean scar pregnancy (9.09%) and rare sites such as the cervix, broad ligament, and rudimentary uterine horn. The increasing prevalence of caesarean scar pregnancies is alarming, reflecting rising caesarean delivery rates globally. These cases often necessitate a multidisciplinary approach due to their potential for catastrophic bleeding and the challenges associated with their surgical management.

Among surgically managed patients, 26(53.06%) patients had blood loss <500 ml and 20(40.81%) had blood loss of 500-1000 ml. Two patients had blood loss of <1500 ml and 1 patient had blood loss of more than 2 litres. Blood transfusion was given for 29 patients. 9 patients required 1 packed cell transfusion, 12 patients required 2 packed cell transfusion, 3 patients needed 3 packed cell transfusion and 3 patients needed more than 4 packed cell transfusion.

In our study Expectant was successful in 100% patients. Average ß hCG value were 1220.5 mIU/ml in patients managed with expectant management. A study done by Rodrigues et al reported 49% success rate of expectant management.[10] In another study success rate of expectant management was 71%. [11] In few other studies with smaller sample size, success of expectant management was 100%. In our study high success rate was noted due to small sample size, early diagnosis and lower initial ß hCG level.

In this study success rate was 93.75% of patients treated with Methotrexate. A meta-analysis of non-randomized studies revealed an 89% overall success rate of Methotrexate (1181 of 1327 cases treated); multiple dose regime was more successful than single dose regime (93% versus 88%) but caused more side effects.[12]

In a study done by Vaswani et al reported that the optimum cut off for β hCG level of 6000 mIU/ml on day 1 and falling β hCG between day 1-4 can be considered as good predictors of success of medical management with Methotrexate irrespective of doses. Similarly adnexal mass of 3cms and duration of amenorrhoea < 6 weeks were found to be good predictor of success of medical management.[13]

The findings of this study align with global and national trends in the epidemiology and management of ectopic pregnancies. The observed preference for salpingectomy in ruptured cases, the efficacy of methotrexate in selected cases, and the diagnostic utility of β-hCG and ultrasonography are consistent with published data (ACOG, 2018). However, the high proportion of ruptured EP cases and the relatively low uptake of laparoscopic procedures reflect the unique challenges of resource-limited settings, including delayed referrals and limited surgical expertise.

Strengths And Limitations

This study's strengths lie in its prospective design and the comprehensive -evaluation of risk factors, clinical presentations, and outcomes across a diverse patient population in a tertiary care center. However, the study has several limitations. The single-center design limits generalizability, and the small sample size may have constrained the statistical power to detect less common associations. Additionally, long-term reproductive outcomes following different management strategies were not assessed, leaving a gap in understanding the impact of treatment on future fertility.

CONCLUSION

Ectopic pregnancy remains a significant public health challenge, particularly in resource-limited settings. Early diagnosis and timely intervention are crucial to reducing morbidity and mortality. Strengthening primary healthcare systems, improving access to diagnostic tools, and increasing awareness among healthcare providers can significantly improve outcomes. Future research should focus on optimizing management protocols and evaluating long-term reproductive outcomes following ectopic pregnancies.

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