**ORIGINAL RESEARCH**

# An overview of ectopic pregnancy in tertiary care center

Dr. Shital T. Mehta[1], Dr. Silkey V. Mittal[2], Dr. Dhwani R. Rawal[3], Dr. Bina M. Raval[4], Dr. Dhruvi Patel R. Patel[5], Dhairya T. Mehta[6], Dr. Devang A. Rana[7],

[1]Associate professor, Department of Obstetrics and Gynaecology, SMT NHL MMC (SVPIMSR), Ahmedabad, Gujarat, India

[2]Third Year Resident, Department of Obstetrics And Gynecology, SMT NHL MMC (SVPIMSR), Ahmedabad, Gujarat, India

[3]Second Year Resident, Department of Obstetrics And Gynaecology, SMT NHL MMC (SVPIMSR), Ahmedabad, Gujarat, India

[4]Assistant Professor, Department of Obstetrics and Gynaecology, SMT NHL MMC (SVPIMSR), Ahmedabad, Gujarat, India

[5]Second Year Resident, Department of Obstetrics And Gynaecology, SMT NHL MMC (SVPIMSR), Ahmedabad, Gujarat, India

[6]First year MBBS student (B.J MEDICAL COLLEGE), Ahmedabad, Gujarat, India

[7]Assistant Professor, Department of pharmacology , SMT NHL MMC (SVPIMSR),Ahmedabad, Gujarat, India

**Corresponding author:**

Dr. Bina M. Raval, Assistant Professor, Department of Obstetrics and Gynaecology, SMT NHL MMC (SVPIMSR), Ahmedabad, Gujarat, India

Received: 22 May 2023 Accepted: 25 June, 2023

**ABSTRACT**:

**BACKGROUND**--Ectopic pregnancy is a devastating complication of human reproduction, with a global incidence of 1.5-2%. It poses the highest burden on maternal morbidity and mortality during the first trimester, ranging from 3.5% to 7.1%. Ectopic pregnancy jeopardizes a woman's life and future fertility by causing damage to the fallopian tubes and/or ovaries.

**AIMS AND OBJECTIVES--**This study aimed to investigate the demographic characteristics, risk factors, clinical features, management approaches, morbidity, and mortality associated with ectopic pregnancy.

METHODS--The study was conducted retrospectively at a tertiary care hospital in Ahmedabad, Western India, between August 2021 and March 2023. It included 36 women diagnosed with ectopic pregnancies. Detailed computerized records of these patients, who were admitted for ectopic pregnancy management, were analyzed after obtaining the necessary permissions. The study recorded the patients' medical history, clinical features, vital data, and findings from general, abdominal, and vaginal examinations. Previous pelvic pathology, pelvic surgery, and infertility treatments were also considered. The analysis focused on the diagnosis and management of ectopic pregnancies.

**RESULTS**--The main age group of presentation was 26-30 years, and the majority of patients (55.56%) were in their second pregnancy. The most common risk factors were a history of previous ectopic pregnancy (27.78%) and previous pelvic inflammatory disease (22.22%). Amenorrhea (61.11%) and abdominal pain (63.89%) were the most frequently reported symptoms. Signs of shock were observed in 5 out of 36 patients, all of whom were diagnosed with ruptured ectopic pregnancies. Abdominal tenderness (47.22%), guarding (11.11%), and cervical motion tenderness (68.9%) were significantly associated with ruptured ectopic pregnancies. Among the cases, 55.56% were ruptured tubal ectopic pregnancies, 33.33% were unruptured tubal ectopic pregnancies, and 8.33% were cesarean scar pregnancies. Medical management using methotrexate treatment was administered to 11.11% of patients.

**CONCLUSION**--It is crucial to consider ectopic pregnancy as a potential diagnosis in women of reproductive age presenting with lower abdominal pain, regardless of the presence or absence of amenorrhea or history of sterilization. Early diagnosis of ectopic pregnancy, through early-stage ultrasound scans and beta hCG tests, is important to prevent maternal morbidity and mortality. Timely intervention can significantly reduce the incidence of complications and improve outcomes.

**KEYWORDS**-- Amenorrhea, Beta hCG, Ectopic Pregnancy, Ultrasonography.

## INTRODUCTION:

Ectopic gestation is characterized by the implantation of a fertilized ovum at a site outside the uterine cavity, whether intrauterine or extrauterine (1). It is a significant catastrophe in human reproduction and a major cause of maternal morbidity and mortality during pregnancy, with an incidence ranging from 3.5% to 7.1% (3). The worldwide incidence of ectopic pregnancy is approximately 1.5-2% (2). Various factors contribute to the increasing prevalence of ectopic pregnancies, including the rise in sexually transmitted diseases, the use of intrauterine contraceptive devices, pelvic inflammatory disease (PID) in developing countries, and the utilization of assisted reproductive technologies (ART). The incidence of ectopic pregnancy after ART conception is around 2-2.5% (4).

The term "ectopic" encompasses a broader range than "extrauterine" or "tubal" pregnancy, as it includes all forms of gestation occurring outside the uterine cavity. The most common tubal sites for ectopic pregnancies are the ampulla (55%), isthmus (25%), fimbrial (17%), and interstitial (2%) regions. Ectopic pregnancies can also occur in extra-tubal sites such as the uterus itself (cornual, cervical, previous cesarean scar, or rudimentary horn), ovary, broad ligament, abdominal cavity, and in cases of heterotopic pregnancy (5).

Cesarean scar pregnancy (CSP) is a specific type of ectopic pregnancy that implants in the myometrium at the site of a previous cesarean scar (6). The global increase in cesarean deliveries has led to a rise in CSP rates, with approximately 6.2 million cesarean deliveries performed annually worldwide (7). The use of Robson criteria for analyzing cesarean section rates can help prevent CSP. On average, there is an annual increase of 4.4% in the incidence of CSP (8). This condition poses potential dangers, including a higher risk of uterine rupture, severe bleeding, loss of future fertility, and maternal mortality. Methotrexate is the appropriate first-line medical treatment. Uterine curettage, which may not reach the gestational sac, can result in significant bleeding and should be avoided. Surgical removal can be performed through operative hysteroscopy or laparoscopy, depending on the location of the gestational sac. In cases where these methods are ineffective or unavailable, open surgical treatment with wedge resection should be considered, especially for women who present after rupture or lack facilities and expertise for operative endoscopy.

The etiology of ectopic pregnancy involves anatomical alterations, disruptions, or damage to the mucosal part of the fimbria or fallopian tube, hindering normal embryo transport. Other possible causes include inherent defects in the fertilized egg, delayed ovulation, and post-mature eggs that have a tendency to implant before reaching the uterus. Increased smooth muscle activity and muscular tone in the isthmus due to high estrogen levels can facilitate the retention of a fertilized ovum in the ampulla of the tube for several days. Elevated progesterone levels can reduce smooth muscle activity, decrease tubal peristalsis, and favor ectopic pregnancy. Thus, optimal estrogen-progesterone ratios are required for the transport of the fertilized ovum through the fallopian tube and its implantation within the endometrial cavity. The advent of high-resolution ultrasonography and beta hCG levels enables the earlier diagnosis of ectopic pregnancy before the development of life-threatening events (9-13). Transvaginal ultrasound (TVS) is the preferred investigation for symptomatic patients, with a sensitivity of 90.9% and specificity of 99.9%. The absence of an intrauterine gestational sac on TVS with beta hCG levels above 1500 IU is indicative of ectopic gestation. Ectopic pregnancy is one of the few obstetric emergency conditions that can be managed expectantly, medically, or surgically. Surgical methods remain the primary approach in the management of ectopic pregnancy, with laparoscopic surgery currently considered the gold standard (14).

## METHODS:

This retrospective study was conducted at a tertiary care hospital in Ahmedabad, Western India, between August 2021 and March 2023. The study included 36 women diagnosed with ectopic pregnancies. Our institute serves patients from urban, semi-urban, and nearby rural areas. After obtaining the necessary permissions, detailed analysis was conducted on the computerized records of all women admitted for the management of ectopic pregnancy. The study documented the patients' medical history, clinical features, vital data, and findings from general, abdominal, and vaginal examinations. Additionally, past history of pelvic pathology, pelvic surgery, and infertility treatment was taken into account. The data collected was analyzed to evaluate the diagnosis and management of ectopic pregnancies. The inclusion criteria for this study comprised all patients presenting with a diagnosis of ectopic pregnancy. Statistical analysis was performed using appropriate software to analyze the obtained results.

**RESULTS**:

**Table 1 : Demographic characteristics of the patients**

| Variables | | NO. OF CASES | Present study(%) | Pritti et al[3] |
|---|---|---|---|---|
| **Age** | 21-25 years | 12 | 33.33% | 39.28% |
| | 26-30 years | 19 | 52.78% | 35.71% |
| | 31-35 years | 3 | 10.89% | 11% |
| | >35 years | 2 | 4% | - |
| **Parity** | PRIMIGRAVIDA | 5 | 13.89 | 43.87 |
| | SECOND GRAVIDA | 20 | 55.56 | 30.61 |
| | MULTIGRAVIDA (THIRD AND ABOVE) | 11 | 30.56 | 25.34 |

Above table shows, the maximum number of ectopic pregnancies in this study were seen between the age group of 26-30 years.

The majority of ectopic pregnancies 20 (55.56%) were observed in second gravida patients. 5(13.89%) cases of ectopic pregnancies were seen in primigravida patients.

**Table 2 : Table showing risk factors for ectopic pregnancy**

| RISK FACTORS | NO OF CASES | Present study (%) | Pritti et al (%)[3] |
|---|---|---|---|
| PREVIOUS ECTOPIC | 5 | 27.78 | 19.41 |
| PID | 4 | 22.22 | 2.04 |
| PREVIOUS HISTORY OF TB | 3 | 16.67 | 19.39 |
| INFERTILITY | 3 | 16.67 | 22.45 |
| PREV TUBAL SURGERY | 2 | 11.11 | 6.12 |
| IUCD | 1 | 5.56 | 10.2 |
| TOTAL RISK FACTORS | 18 | 100 | |

Majority of the cases (50%) 18 out of 36 ectopic pregnancies occurred with the presence of any known risk factors in our study.[15] Most common being previous ectopic pregnancy (27.78%) ,followed by PID (22.22%). PID causes damage of tubal mucosa and peritubal adhesions leading to hindrance in transportation of embryo.

**Table 3 : Signs and Symptoms at presentation**

| SIGNS AND SYMPTOMS | NO. OF PATIENTS | Present study (%) | Pritti et al (%)[3] |
|---|---|---|---|
| AMENORRHEA | 22 | 61.11 | 89.79 |
| ABDOMINAL PAIN | 23 | 63.89 | 46.93 |
| BLEEDING | 8 | 22.22 | 52.04 |
| PALLOR | 24 | 66.66 | - |
| LOWER ABDOMINAL TENDERNESS | 17 | 47.22 | 73.46 |
| SHOCK | 5 | 13.88 | - |
| DIZZINESS/SYNCOPE | 4 | 11.11 | - |
| GUARDING | 4 | 11.11 | 32.65 |
| OTHERS | 6 | 16.67 | - |

The classical triad of amenorrhea, abdominal pain and bleeding p/v was seen in many cases.[16]

24(66.66%) patients presented with pallor out of which 18(75%)patients were diagnosed with ruptured ectopic pregnancy, and amongst them 5 patients presented with characteristics of shock.

22 (61.1%) patients required blood transfusions in the form of packed cells, fresh frozen plasma and cryoprecipitate.

Lower abdominal tenderness was seen in 17(47.22%) patients of ectopic pregnancy out of which 14(38.88%) were diagnosed with ruptured ectopic pregnancy. While guarding was seen in 4(11.11%) ectopic pregnancies in our study.

**Table 4 Ultrasonography findings**

| FINDINGS | | | NO. OF CASES (%) | TOTAL NO. OF CASES (%) |
|---|---|---|---|---|
| **Ruptured** | **SITE OF TUBAL ECTOPIC** | AMPULLARY | 7(19.44%) | 19 (52.78%) |
| | | ISTHMAL | 11(30.55%) | |
| | | INTERSTITIAL | 1(2.77%) | |
| **Unruptured** | **SITE OF TUBAL ECTOPIC** | AMPULLARY | 9(25%) | 10 (27.78%%) |
| | | ISTHMAL | 1(2.77%) | |
| | | INTERSTITIAL | - | |
| **Scar Ectopic** | **RUPTURED** | | 1(2.77%) | 3 (8.33%) |
| | **UNRUPTURED** | | 2(5.56%) | |
| **Adnexal mass** | | | | 2 (5.56%) |
| **Heterotopic** | | | | 2 (5.56%) |

Out of 36 cases, 19(52.78%) cases were that of ruptured tubal ectopic pregnancy and the most common site was Isthmus(30.50%) . 10(27.78%) cases were that of unruptured tubal ectopic pregnancy and the most common site was Ampulla (55.17%).3(8.33%) cases were reported of scar ectopic pregnancy and were managed by laparotomy. 2(5.56%) cases were diagnosed as adnexal masses, of which one case was later diagnosed as chronic unruptured tubal ectopic pregnancy and the other case was that of tubal abortion presenting as mass in POD.

2(5.56%) cases were that of heterotopic pregnancy with both cases of intrauterine pregnancy coexisting with tubal pregnancy, one tubal pregnancy was ruptured while in other cases tubal pregnancy was unruptured.

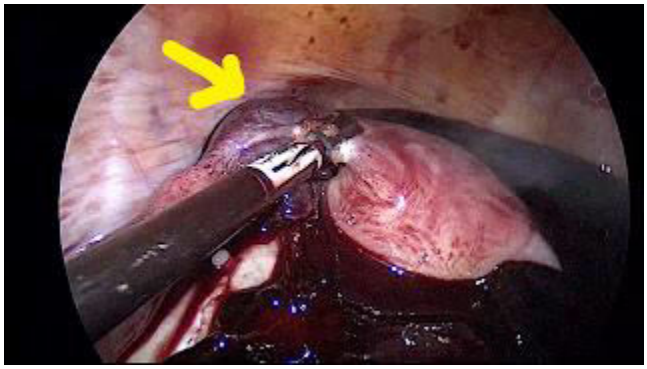

**Figure 3 : Intraoperative ruptured tubal ectopic pregnancy.**

**Figure 4 : Rupture of Cesarean scar pregnancy.**

**Table 5: Medical vs Surgical management and its association with levels of serum Beta hCG levels**

| BETA HCG LEVELS (IU/ml) | MEDICAL MANAGEMENT ONLY | SURGICAL MANAGEMENT ONLY | SURGERY AFTER FAILURE OF MEDICAL MANAGEMENT |
|---|---|---|---|
| <5000 | 2 (25%) | 4 (50%) | 2 (25%) |
| 5000-10000 | 0 | 5 (100%) | 0 |
| >10000 | 0 | 3 (100%) | 0 |

Out of the total 36 ectopic pregnancies, 20 patients were ruptured ectopic pregnancy diagnosed clinically and confirmed by USG and were directly shifted for surgical management. Beta hCG levels were done in 16 patients and from that , 2 patients whose beta hCG was below 5000 IU/mL, were medically managed keeping view of the clinical history, vital stability and laboratory investigations. All patients whose beta hCG levels were above 5000 IU/mL were managed surgically.

Initially 4 patients were started on medical management by Inj. methotrexate by following strict criteria. 2 cases were managed successfully by medical management, in other 2 cases medical management failed and hence a decision of surgical management was undertaken.

**Table 6 : Surgical Management of ectopic pregnancy**

| OPERATIVE PROCEDURE DONE | Present study | Pritti et al (%)[3] |
|---|---|---|
| LAPAROTOMY | 30 (83.34%) | 75.90 |
| LAPAROSCOPIC SALPINGECTOMY U/L | 3 (9.02%) | 2.409 |
| SALPINGOSTOMY | 1(2.94%) | 2.409 |
| **TOTAL** | **34 (100%)** | |

30 patients underwent laparotomy, out of them- 27 underwent unilateral open salpingectomy and rest of 3 patients underwent laparotomy for cesarean scar pregnancy.

Surgical management is imperative in the clinical scenario of a ruptured ectopic pregnancy. Laparotomy (unilateral salpingectomy) was the most common mode of management

**DISCUSSION**:

This retrospective study was conducted between August 2021 and March 2023, involving 36 patients with ectopic pregnancies at a tertiary healthcare center. The study revealed that the most common age group for presentation was 26-30 years, with the majority of patients (55.56%) being second-time pregnant. Half of the patients (50%) had known risk factors, with a history of previous ectopic pregnancies (27.78%) and pelvic inflammatory disease (22.22%) being the most common risk factors.

The most commonly encountered symptoms in this study were amenorrhea (61.11%) and abdominal pain (63.89%). The classical triad of abdominal pain, amenorrhea, and vaginal bleeding was found in only 22.22% of cases. Seventy-five percent of the patients presented with varying degrees of pallor, and signs of shock were observed in 5 out of 36 patients, all of whom were diagnosed with ruptured ectopic pregnancies. Abdominal tenderness, guarding, and cervical motion tenderness were significantly associated with ruptured ectopic pregnancies. The most common site for ectopic pregnancy was the ampulla (44.44%), and the most common site for ruptured ectopic pregnancy was the isthmus (30.50%).

Out of the 36 cases, 19 (52.78%) were diagnosed as ruptured tubal ectopic pregnancies, 10 (27.78%) as unruptured tubal ectopic pregnancies, and 3 (8.33%) as cesarean scar pregnancies. Serum beta hCG levels below 5000 IU/ml were associated with unruptured ectopic pregnancies. Conservative medical management with methotrexate injection was performed in 4 patients with unruptured ectopic pregnancies, but 2 of them required surgical management due to inadequate response to methotrexate and persistent high beta hCG levels with a ruptured ectopic mass. Laparoscopic management was conducted in 9.02% of cases, while laparotomy was performed in 91.67% of patients. Sixty-one percent of patients required blood transfusion in the form of packed red cells, cryoprecipitate, and fresh frozen plasma. No mortality was reported in this study.

**CONCLUSION**:

Ectopic pregnancy is a devastating complication of human reproduction, imposing a significant burden on maternal morbidity and mortality during the first trimester. It poses a serious threat to a woman's life and future fertility by damaging the fallopian tubes and ovaries. Early diagnosis of ectopic pregnancy is crucial to prevent unnecessary maternal morbidity and

mortality. This can be achieved by promoting early registration for antenatal care, encouraging early ultrasound scans and beta hCG testing. Additionally, with the increasing rate of cesarean sections, ruling out cesarean scar pregnancies is important to reduce complications. The treatment approach for ectopic pregnancy has evolved from radical surgery to more conservative approaches, including medical and conservative management. However, despite the availability of early diagnostic tools, a significant number of cases still presented as surgical emergencies or experienced failure of medical management. Therefore, it is important to consider ectopic pregnancy as a potential diagnosis in any woman of reproductive age presenting with lower abdominal pain, regardless of amenorrhea or sterilization history. Timely diagnosis and prompt treatment can significantly reduce morbidity and mortality. Gynecologists should maintain a high index of suspicion, ensure early diagnosis, and facilitate timely referrals to minimize the impact of this catastrophic condition. Increasing incidence rates of ectopic pregnancies should serve as a warning and prompt efforts for early diagnosis and timely intervention to decrease maternal morbidity and mortality.

**REFERENCES**:

1. Jones HW, Rock JA. Te Linde's operative gynecology. Lippincott Williams & Wilkins; 2015.
2. Brüggmann D, Kollascheck J, Quarcoo D, Bendels MH, Klingelhöfer D, Louwen F, Jaque JM, Groneberg DA. Ectopic pregnancy: exploration of its global research architecture using density-equalising mapping and socioeconomic benchmarks. BMJ open. 2017;7(10):e018394.
3. Attri P, Gupta A, Vij A, Gupta B. A clinical study of the incidence, management and outcome of ectopic pregnancy. Int J Clin Obstet Gynaecol. 2020;4(3):219-26.
4. Weiss A, Beck-Fruchter R, Golan J, Lavee M, Geslevich Y, Shalev E. Ectopic pregnancy risk factors for ART patients undergoing the GnRH antagonist protocol: a retrospective study. Reprod Biol Endocrinol. 2016;14:1-8.
5. Bouyer J, Coste J, Fernandez H, Pouly JL, Job-Spira N. Sites of ectopic pregnancy: a 10 year population-based study of 1800 cases. Hum Reprod. 2002;17(12):3224-30.
6. Betrán AP, Torloni MR, Zhang JJ, Gülmezoglu AM, Aleem HA, Althabe F, Bergholt T, De Bernis L, Carroli G, Deneux-Tharaux C, Devlieger R. WHO statement on caesarean section rates. BJOG. 2016;123(5):667.
7. Gibbons L, Belizán JM, Lauer J, Betrán AP, Merialdi M, Althabe F. The global numbers and costs of additionally needed and unnecessary caesarean sections performed per year: overuse as a barrier to universal coverage. World Health Report Background Paper. 2010;30:1-31.
8. Winder S, Reid S, Condous G. Ultrasound diagnosis of ectopic pregnancy. Australas J Ultrasound Med. 2011;14(2):29-33.
9. Weiss A, Beck-Fruchter R, Golan J, Lavee M, Geslevich Y, Shalev E. Ectopic pregnancy risk factors for ART patients undergoing the GnRH antagonist protocol: a retrospective study. Reprod Biol Endocrinol. 2016;14:1-8.
10. Stovall TG, Ling FW. Single-dose methotrexate: an expanded clinical trial. Am J Obstet Gynecol. 1993;168(6):1759-65.
11. Dighe M, Cuevas C, Moshiri M, Dubinsky T, Dogra VS. Sonography in first trimester bleeding. J Clin Ultrasound. 2008;36(6):352-66.
12. Ong S, Wingfield M. Increasing incidence of ectopic pregnancy: is it iatrogenic? Irish Med J. 1999;92(5):364-5.
13. Patel S, Desai A. Study of diagnosis and management of ectopic pregnancy. Int J Reprod Contracept Obstet Gynecol. 2019;8(6):2465-71.
14. Lozeau AM, Potter B. Diagnosis and management of ectopic pregnancy. Am Fam Physician. 2005;72(9):1707-14.
15. Attri P, Gupta A, Vij A, Gupta B. A clinical study of the incidence, management and outcome of ectopic pregnancy. Int J Clin Obstet Gynaecol. 2020;4(3):219-26.
16. Tahmina S, Daniel M, Solomon P. Clinical analysis of ectopic pregnancies in a tertiary care center in Southern India: a six-year retrospective study. J Clin Diagn Res. 2016;10(10):QC13.