

Obstetrics and Gynaecology
Section

Laparoscopic Management of Ectopic Pregnancy: A Case Series

PARUL BHUGRA¹, NIRMALA DUHAN², ROOPA MALIK³, REETU HOODA⁴, SAKSHI GUPTA⁵



ABSTRACT

Ectopic pregnancy is a significant cause of maternal morbidity and mortality in the first trimester. Laparoscopy plays a crucial role in the management of ectopic pregnancy. Eight cases of tubal ectopic pregnancies that were managed laparoscopically were retrospectively analysed. The mean age at presentation was 28.12±4.79 years. Pelvic pain was the most common symptom, present in all 8 patients (100%), followed by vaginal bleeding in 6 (75%) patients. Out of the eight ectopic pregnancies, 4 (50%) were ampullary, while 2 (25%) each were isthmic and interstitial pregnancies. Laparoscopic salpingectomy was performed in 4 (50%) patients, while salpingostomy was required in 3 (37.5%) patients. In 1 patient (12.5%), laparoscopy was converted into laparotomy. There were no complications in any of the patients. All patients were discharged on postoperative day two, except for the patient in whom laparoscopy was converted into laparotomy. The present study emphasises that laparoscopic management of ectopic pregnancy is associated with shorter operative time, reduced duration of hospital stay and is safe in expert hands.

Keywords: Ectopic pregnancy, Fallopian tubes, Laparoscopy, Salpingectomy, Salpingostomy

INTRODUCTION

Ectopic pregnancy occurs when a fertilised ovum becomes implanted in tissues other than the endometrium. Although approximately 80% of ectopic gestations are located in the ampullary segment of the fallopian tube, such pregnancies may also occur in other sites, such as the isthmus, fimbria, tubal interstitium, ovary, abdomen, previous caesarean scar and cervix [1]. Ectopic pregnancy results from any factor that interrupts the successful migration of the conceptus to the endometrium, such as tubal reconstructive surgery, the use of assisted reproductive techniques, prior ectopic pregnancy, or preceding pelvic inflammatory disease [2]. In the early stages, the symptoms and signs of ectopic pregnancy are often subtle or even absent. In the late stages, the classic triad consists of pain, delayed menstruation and vaginal bleeding or spotting. A high index of suspicion and more precise diagnostic techniques allow for early diagnosis and provide information regarding the location of the ectopic pregnancy [3]. Ectopic pregnancy can be managed either medically or surgically, depending on the clinical circumstances, the site of the ectopic pregnancy and the available resources [4].

In the present series, ages ranged from 20 to 35 years, with a mean age of 28.125±4.79 years. A total of 7 patients (87.5%) were multiparous and the mean parity was 1.125±0.63. The mean period of gestation was 7.92±1.65 weeks. Pelvic pain was the most common symptom, present in all 8 patients (100%), followed by vaginal bleeding in 6 (75%) cases. None of the patients had a history of previous ectopic pregnancy, tubal reconstructive surgery, or use of artificial reproductive techniques. Out of the eight ectopic pregnancies, 4 (50%) were ampullary, while 2 (25%) each were isthmic and interstitial pregnancies. Laparoscopic salpingectomy was performed in 4 (50%) patients, while salpingostomy was necessary in 3 (37.5%) patients. Of the two patients with interstitial pregnancy, one required cornual resection while the other underwent cornuostomy. Dilute vasopressin (20 IU in 200 mL saline) was injected locally to minimise blood loss. A number zero synthetic absorbable barbed suture with an end loop, using a 37 mm taper point half-circle needle, was used to suture the cornua. In 1 patient (12.5%), laparoscopy was converted into laparotomy because the patient became haemodynamically unstable. The mean operative time was 58.57±10.67 minutes. No significant postoperative morbidity was noted in any of the patients. All patients were discharged in stable condition on postoperative day two, except for the patient who underwent laparotomy, who was discharged on postoperative day seven in stable condition. The clinical features and imaging results are summarised in [Table/Fig-1]. The operative procedures performed are listed in [Table/Fig-2]. Magnetic Resonance Imaging (MRI) image of interstitial pregnancy is shown in [Table/Fig-3], while [Table/Fig-4] illustrates the operative procedures (cornuostomy and salpingostomy) that were carried out laparoscopically.

CASE SERIES

Eight cases of laparoscopically managed ectopic pregnancies were reviewed, focusing on the age of the patients, parity, gestational age at presentation, history of previous ectopic pregnancy, examination findings, imaging reports, operative procedures undertaken, operative time, duration of hospital stay and any postoperative morbidity. All cases were confirmed histopathologically, which showed the presence of chorionic villi and/or fetuses in the submitted specimens.

S. No.	Age (in years)	Parity	Period of amenorrhoea (Wks)	Pelvic examination	Imaging (Ultrasound)
1.	34	G2P1L1	6 ⁺⁴	Uterus-multiparous size, a mass of 4×4 cm felt through left fornix	Uterus normal size and echotexture, a 4.1×3.7 cm mass present in left adnexa, ring of fire sign positive on doppler
2.	35	G3P2L2	11	Uterus-multiparous size, mass of 8×9 cm felt through left fornix	Uterus normal size, a G. sac with yolk sac with foetal pole in left adnexa CRL measuring 6 mm, mild free fluid in POD
3.	28	G3P2L2	7 ⁺²	Uterus-multiparous size, a mass of 4×4 cm in right fornix	Uterus and left adnexa normal, an inhomogeneous mass of 3×3.8 mm in right adnexa

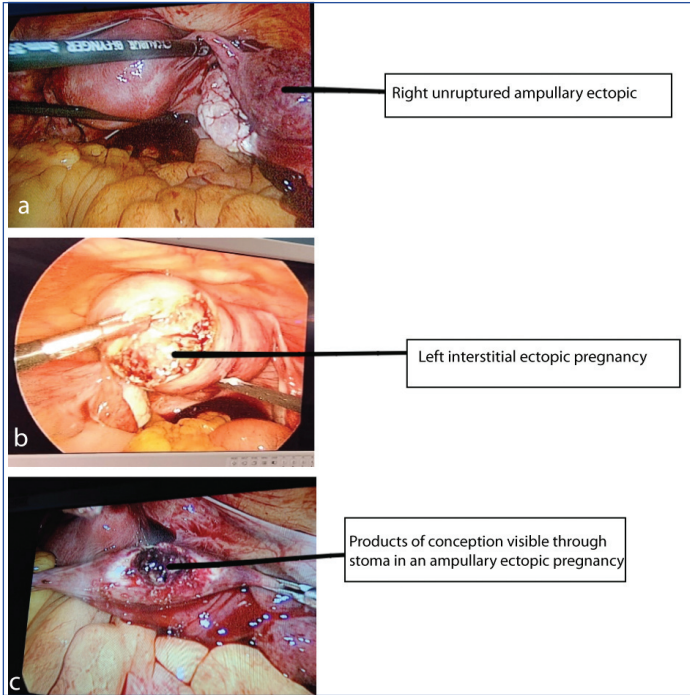
4.	30	G2P1L1	9 ⁺¹	Uterus-Normal size, a 5x5 cm tender mass felt through left fornix	A hyperechoic ring measuring 4 cm diameter surrounding anechoic sac found in left adnexa
5.	25	G1	6	Uterus enlarged to 10 weeks pregnancy size, bilateral fornix clear	G. sac with foetal node present, CRL measuring 3.3 mm without cardiac activity in right cornua
6.	25	G2P1L1	9	Uterus enlarged to 8 weeks size and deviated to right side, tenderness in right fornix present, no mass palpable in either fornix	Thick walled eccentrically placed G. sac with foetus having CRL of 13 mm (7+4 wk), cardiac activity present, closely abutting rim of myometrium measuring approximately 7 mm, possibly right cornual pregnancy MRI-eccentrically placed G.sac noted in right cornua separate from endometrial cavity suggestive of right interstitial pregnancy
7.	20	G2P1L1	7	Uterus normal size, bilateral fornix clear	An inhomogeneous mass of 3.2x2.2 cm in left adnexa suggestive of tubal ectopic in view of positive UPT status
8.	28	G3P1L1A1	7 ⁺³	Uterus normal size, bilateral fornix clear	A heteroechoic lesion measuring 2x1.6 cm (G. sac) with internal cystic area measuring 1x0.8 cm with intense vascularity on colour doppler suggestive of tubal ectopic pregnancy

[Table/Fig-1]: Showing clinical features and imaging results.

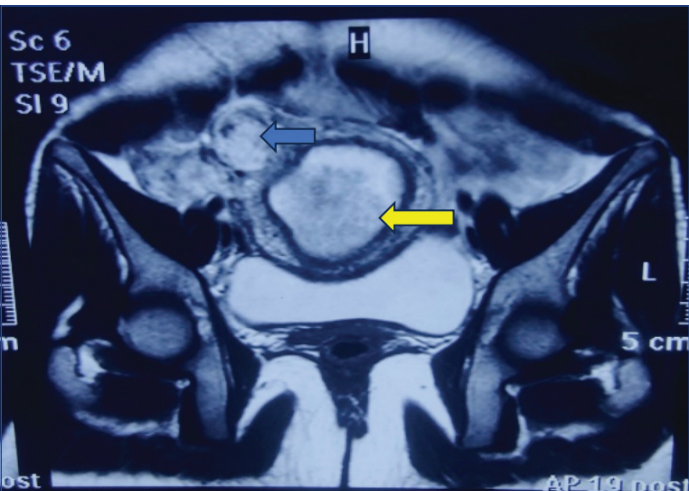
cm: Centimeter; mm: Millimeter; G. sac: Gestational sac; POD: Pouch of douglas; MRI: Magnetic resonance imaging; CRL: Crown rump length; weeks: Weeks; UPT: Urine for pregnancy test

S. No.	Operative findings	Location	Type of surgery
1.	Uterus and right tube normal size, left tubal ectopic of 6x5 cm	Ampulla	Left salpingectomy with Cu -T 380A insertion
2.	Uterus and right tube normal, 8x9 cm left-sided unruptured tubal ectopic, haemoperitoneum-100 mL	Ampulla	Left salpingectomy with right sided fallope ring application
3.	Uterus and left tube normal, right-sided tubal mass of 5x5 cm	Isthmus	Right salpingectomy and left falope ring insertion
4.	Haemoperitoneum -1L, Left ruptured tubal ectopic of 7x6 cm with foetus and placenta in the abdominal cavity	Isthmus	Laparoscopy converted into laparotomy, Left salpingectomy and abdominal lavage
5.	8x8 cm mass of left unruptured interstitial pregnancy	Left tubal interstitium	Left Cornuostomy and removal of products of conception
6.	6x7 cm right unruptured interstitial pregnancy	Right tubal interstitium	Excision of right cornua and right tube
7.	4x2 cm left-sided unruptured tubal ectopic, haemoperitoneum-120 mL	Ampulla	Salpingostomy
8.	3x2 cm unruptured right tubal ectopic with early abortion, haemoperitoneum- 150 mL	Ampulla	Salpingostomy

[Table/Fig-2]: Showing operative findings and their surgical management.



[Table/Fig-4]: Laparoscopic images of (a) Right unruptured ampullary pregnancy along with small amount of haemoperitoneum in Pouch of Douglas (b) Left cornuostomy in progress; Coagulation being done with help of bipolar vessel sealer (after injecting vasopressin myometrium is coagulated and incised for retrieval of products of conception) (c) Salpingostomy in progress (a 1-2 cm linear opening is created on border opposite to mesosalpinx for removal of products of conception).



[Table/Fig-3]: Axial MRI image showing right interstitial pregnancy (blue arrow) and yellow arrow shows uterine cavity.

DISCUSSION

Ectopic pregnancy (derived from the Greek word “ektopos”, meaning “out of place”) is a significant cause of maternal morbidity and mortality worldwide [1]. The incidence of ectopic pregnancy in India is reported to be approximately 0.91% to 2.3% [5,6]. The incidence is about 2% in women undergoing assisted reproductive techniques [1]. There is a rising trend in the incidence due to increasing risk

factors such as: a) an increase in the prevalence of sexually transmitted diseases causing tubal infection and damage; b) legal abortions; c) conception via assisted reproductive technology; d) a rise in the popularity of contraceptives that predispose to ectopic pregnancy in cases of method failure; e) tubal surgery, including salpingostomy for tubal pregnancy and tuboplasty for infertility; and f) the availability of better diagnostic modalities, e.g., the earlier diagnosis of some ectopic pregnancies that would have resolved spontaneously [7,8].

In the present series, the mean age of the patients was 28.125±4.79 years. Murphy AA et al., reported the mean age as 28.2±6.1 years [9]. The mean gestational age and parity were 7.92±1.65 weeks and 1.125±0.63, respectively. In a study reported by Ding DC et al., the mean gestational age and parity were 6±1.3 weeks and 0.87±1.3 [10]. The clinical features of ectopic pregnancy depend on whether it is unruptured or ruptured. The classic symptoms of unruptured ectopic pregnancy include pelvic/abdominal pain, amenorrhoea/ delayed menses and vaginal bleeding. Pelvic and abdominal pain is the most frequently experienced symptom of ectopic pregnancy, seen in 95% of cases. Amenorrhoea of 5-8 weeks, a few days of delayed periods, or slight bleeding on the expected date of the menstrual period is present in 75% of cases. Irregular vaginal bleeding is observed in 70% of cases [1].

If a woman of reproductive age presents with amenorrhoea, abdominal pain and bleeding, a urine pregnancy test is indicated. If the report is positive, Transvaginal Sonography (TVS) with serial serum Human Chorionic Gonadotrophin (β -HCG) measurement is the most valuable diagnostic aid [11]. The presence of an extrauterine yolk sac, embryo, or foetus on TVS confirms ectopic pregnancy. An empty uterus or pseudosac in the uterine cavity, along with an inhomogeneous complex adnexal mass, a gestational sac in the adnexa surrounded by a hyperechoic ring (Bagel sign), increased vascularity at the ectopic gestation site (ring-of-fire pattern) on colour Doppler and fluid in the cul-de-sac may be indicative of ectopic pregnancy [1,3]. If the ultrasound is inconclusive, MRI may assist in diagnosis [3,12,13].

Direct visualisation of the fallopian tubes and pelvis by laparoscopy offers a reliable diagnosis in most cases of suspected ectopic pregnancy, particularly when there is confusion with other pelvic lesions. Other advantages of laparoscopy include: a) the ability to readily transition to definitive operative procedures at the same time and b) the possibility of directly injecting a chemotherapeutic agent into the ectopic mass when medical management is chosen [2,3].

Once diagnosed, ectopic pregnancies can be managed either medically with Methotrexate (MTX) or surgically. Because ectopic pregnancy is potentially a life-threatening condition, careful patient selection is essential. Good candidates for medical management of ectopic pregnancy are patients who exhibit the following features: being haemodynamically stable, having low serum HCG (<5000 IU/ml), a small mass (<3.5 cm), an unruptured mass, no embryonic cardiac activity, certainty that there is no intrauterine pregnancy, willingness to follow-up and no known sensitivity to MTX [14]. Serial HCG estimation is conducted weekly after administering MTX until the levels fall to non pregnant levels.

Surgical management is imperative in clinical scenarios of haemodynamic instability, suspected ruptured ectopic pregnancy and in conditions contraindicating the use of MTX [14]. Laparoscopy has been found to be superior to laparotomy in terms of blood loss, operative time, convalescence, postoperative analgesia requirements, consequent need for medical resources and cost [9,15-18].

During laparoscopy, salpingectomy, salpingostomy and salpingotomy can be performed as required for each patient. Salpingectomy is indicated when the fallopian tube cannot be salvaged due to damage or when recurrent ectopic pregnancy occurs in the same tube. Salpingostomy is indicated for the removal of a small unruptured pregnancy, usually less than 2 cm in length and located in the distal third of the fallopian tube. Salpingotomy, which is seldom performed today, is essentially the same procedure as salpingostomy; however, the incision is closed with a delayed absorbable suture. There is no difference in prognosis between suturing or not suturing the incision [1,3].

In the present case series, the authors performed salpingectomy in 4 (50%) patients and salpingostomy in 3 (37.5%) patients. In 1 (12.5%) patient, laparoscopy was converted to laparotomy because the patient became haemodynamically unstable during the procedure. In a study reported by Duggal BS et al., salpingostomy was the most common procedure, performed in 53.33% of patients, followed by salpingectomy (23.33%), lavage and suction of pelvic haematocoele (16.67%) and desiccation of the corpus luteum in 6.67% of cases [19]. In the present study, the average operative time was 58.57 ± 10.67 minutes and there was no significant postoperative morbidity. The average duration of hospital stay was around two days ($n=7$). These parameters were compared with the literature, which shows almost similar results [Table/Fig-5] [9,10,20]. The variable operative time reported in studies might be explained by the differing levels of experience of the operating surgeons.

S. No.	Study	Operative time (min)	Hospital stay (Days)	Postoperative morbidity
1.	Dubuisson JB et al., [20]	37 (15-40)	2	1 (DVT)
2.	Murphy AA et al., [9]	118 ± 30	26 ± 19 (hours)	2 (blood transfusion and endometritis)
3.	Ding DC et al., [10]	73.2 ± 26.8	2.7 ± 0.6	Nil
4.	Present study	58.57 ± 10.67	2	Nil

[Table/Fig-5]: Comparison of operative time, hospital stay and postoperative morbidity among different studies [9,10,20].
DVT: Deep vein thrombosis

CONCLUSION(S)

Ectopic pregnancy continues to contribute significantly to maternal morbidity and mortality. A high degree of suspicion and an awareness of ectopic pregnancy among clinicians are essential for diagnosing this condition and its pre-rupture state. There is a high frequency of misdiagnosis and delays by physicians. Early diagnosis, aided by the use of beta-HCG, TVS and laparoscopy, has significantly improved the management of ectopic pregnancy. Surgical procedures such as salpingectomy, salpingostomy and salpingotomy may be required in patients with ectopic pregnancy. In line with the literature, the present case series emphasises that laparoscopic management of ectopic pregnancy is associated with reduced operative time, shorter hospital stays and less or no postoperative morbidity. If operative management of ectopic pregnancy is indicated, laparoscopic management may be the safest, most effective and beneficial procedure.

REFERENCES

- [1] Sharma JB. Ectopic pregnancy. In: Sharma JB (eds). Textbook of Gynecology. 2nd ed. New Delhi: Arya Publishing Company; 2022. Pp. 294-308.
- [2] Konar H. Hemorrhage in early pregnancy. In: Konar H (eds). DC Dutta's Textbook of Obstetrics. 9th ed. New Delhi: Jaypee; 2018. Pp.151-88.
- [3] Ectopic pregnancy. In: Cunningham FG, Leveno KJ, Bloom SL, Dashe JS, Hoffman BL, Casey BM, et al. eds. William's Obstetrics. 25th ed. New York: McGraw Hill education; 2018. Pp.371-87.
- [4] Voedisch AJ, Cahill EP. Early pregnancy loss and ectopic pregnancy. In: Berek JS, eds. South Asian Edition of Berek and Novak's Gynecology. 16th ed. New Delhi: Wolters Kluwer; 2020. Pp. 814-34.
- [5] Verma ML, Singh U, Solanki V, Sachan R, Sankhwar PL. Spectrum of ectopic pregnancies at a tertiary care center of Northern India; A retrospective cross-sectional study. Gynecol Minim Invasive Ther. 2022;11:36-40.
- [6] Ranji GG, Usha Rani G, Varshini S. Ectopic pregnancy: Risk factors, clinical presentation and management. J Obstet Gynaecol India. 2018;68:487-92.
- [7] Dhawale ER, Shelmohakar RK. Laparoscopic management of ectopic pregnancy: Case series. Int J Med Res Prof. 2020;6:113-15.
- [8] Nalini N, Singh KA, Singh N, Kumari A. Clinical profile, risk factors and outcome of ectopic pregnancy in a tertiary care hospital: A prospective Indian study. Cureus. 2023;15:e49483. Doi: 10.7759/cureus.49483.
- [9] Murphy AA, Nager CW, Wujek JJ, Kettel LM, Torp VA, Chin HG. Operative laparoscopy versus laparotomy for the management of ectopic pregnancy: A prospective trial. Fertil Steril. 1992;57:1180-85.
- [10] Ding DC, Chu TY, Kao SP, Chen PC, Wei YC. Laparoscopic management of tubal ectopic pregnancy. JSLS. 2008;12:273-76.
- [11] Hoffman BL, Schorge JO, Halvorson LM, Hamid CA, Corton MM, Schaffer JL, (eds). Ectopic Pregnancy. In: William's Gynecology. 4th ed. New York: McGraw Hill; 2020. Pp. 161-78.
- [12] Ajjammanavar V, Jayashree S, Gobinathan A, Siddesh A. Laparoscopic management of uncommon presentations of ectopic pregnancy: A case series. World J Lap Surg. 2022;15:90-93.
- [13] Alagbe OA, Adeniyi TO, Abayomi OA. Interstitial ectopic pregnancy: A case report. Pan African Med J. 2017;28:135.
- [14] ACOG Practice Bulletin No. 4: Medical management of ectopic pregnancy. Obstet Gynecol. 2008;111:1479-85.
- [15] Lundorff P, Thorburn J, Hahlin M, Kallfelt B, Lindblom B. Laparoscopic surgery in ectopic pregnancy. A randomized trial versus laparotomy. Acta Obstet Gynecol Scand. 1991;70:343-48.
- [16] Brumsted J, Kessler C, Gibson C, Nakajima S, Riddick DH, Gibson M. A comparison of laparoscopy and laparotomy for the treatment of ectopic pregnancy. Obstet Gynecol. 1988;71:889-92.
- [17] Gray DT, Thorburn J, Lundorff P, Strandell A, Lindblom B. A cost-effectiveness study of a randomized trial of laparoscopy versus laparotomy for ectopic pregnancy. Lancet. 1995;345:1139-43.
- [18] Hajenius PJ, Mol F, Mol BW, Bossuyt PM, Ankum WM, Vander Veen F. Interventions for tubal ectopic pregnancy. Cochrane Database Sys Rev. 2007;2007:CD000324.

[19] Duggal BS, Tarneja P, Sharma RK, Rath RK, Wadhwa RD. Laparoscopic management of ectopic pregnancies. MJAFI. 2004;60:220-23.

[20] Dubuisson JB, Aubriot FX, Cardone V. Laparoscopic salpingectomy for tubal pregnancy. Fertil Steril. 1987;47:225-26.

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Obstetrics and Gynaecology, Pt. BD Sharma, PGIMS, Rohtak, Haryana, India.
2. Senior Professor, Department of Obstetrics and Gynaecology, Pt. BD Sharma, PGIMS, Rohtak, Haryana, India.
3. Professor, Department of Obstetrics and Gynaecology, Pt. BD Sharma, PGIMS, Rohtak, Haryana, India.
4. Professor, Department of Obstetrics and Gynaecology, Pt. BD Sharma, PGIMS, Rohtak, Haryana, India.
5. Junior Resident, Department of Obstetrics and Gynaecology, Pt. BD Sharma, PGIMS, Rohtak, Haryana, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Parul Bhugra,
49/9J, Residential Area, Medical Campus, Rohtak-124001, Haryana, India.
E-mail: parul01kalra@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Feb 13, 2025
- Manual Googling: Mar 27, 2025
- iThenticate Software: Mar 29, 2025 (15%)

ETYMOLOGY: Author Origin

EMENDATIONS: 6

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: Feb 12, 2025

Date of Peer Review: Feb 27, 2025

Date of Acceptance: Mar 31, 2025

Date of Publishing: May 01, 2025