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ORIGINAL ARTICLE

Successful Outcome after Laparoscopic Management of Heterotopic Pregnancy: Experience at Tertiary Care Hospital in Bangladesh

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Abstract

Background: Heterotopic pregnancy refers to the simultaneous occurrence of intrauterine and extrauterine (usually tubal) gestations, a rare but potentially life-threatening condition. Its management poses significant clinical challenges, requiring prompt diagnosis and individualized treatment to preserve maternal health and, if possible, the intrauterine pregnancy. **Objective:** The aim of this study was to investigate the clinical outcome of laparoscopic surgery for women with heterotopic pregnancy. **Methodology:** This was a retrospective observational study to see the clinical outcome of 8 patients with intrauterine and tubal pregnancy undergoing laparoscopic operation. The products of ectopic pregnancy were removed laparoscopically. **Results:** The median operation time was 12 minutes, and the average blood loss was 25 ml. There were no postoperative complications. The wounds recovered well in all cases. Among these women, 6 delivered at term whereas 2 failed to continue their pregnancies, one had an abortion after 8 days of the surgery and another one had an abortion due to preterm premature rupture of the membrane at 15 gestational weeks. **Conclusion:** Laparoscopic surgery is an effective technique in successful management of heterotopic pregnancy. *[Journal of Current and Advance Medical Research, July 2024;11(2):68-72]*

Keywords: Heterotopic pregnancy; laparoscopic surgery; intrauterine pregnancy; tubal pregnancy

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Introduction

Heterotopic pregnancy (HP) is defined as the coexistence of intrauterine and ectopic pregnancy. It may also be referred to as a combined ectopic pregnancy, multiple-sited pregnancy, or coincident pregnancy. It was considered a rare event. The incidence is approximately 1 in 30,000 pregnancies in spontaneous pregnancies; in recent years, the incidence has increased to up to 1.0% of cases. The incidence of heterotopic pregnancy is increasing because of the increasing tubal ligation factor, infertility, and infertility treatments such as ovulation induction and assisted reproductive techniques[3-4]. Once an ectopic pregnancy ruptures, massive hemorrhage can lead to more than three-

quarters of the first-trimester death[5]. Ruptured ectopic pregnancy is one of the outcomes of delayed diagnosis or misdiagnosis; early and accurate diagnosis is crucial for an opportune intervention of a potentially life-threatening condition. For patients with an intense need for preserving the intrauterine pregnancy, continuing the intrauterine pregnancy and removing the ectopic embryo completely are vital, and it is a challenge for clinicians.

Ectopic pregnancy of HP can be treated by potassium chloride injection and/or methotrexate in the gestational sac, laparoscopic surgery, and laparotomy. However, conservative management may cause infection, internal hemorrhage, persistence of adnexal mass, fetal toxicity, and drug allergy. About 55.0% of HP patients after conservative treatment need surgery. Laparotomy is the treatment method for hemodynamically unstable patients with severe pelvic adhesion, but it has more complications, such as high-volume pelvic hemorrhage, pelvic adhesion, intrauterine embryo abortion, PID, and so on. Recently, laparoscopy has been used to treat HP and has gradually replaced laparotomy with the advantage of good operative field exposure, less postoperative pain, shorter length of hospital stays, and fewer complications. The objective of this work was to describe our experience, investigate the laparoscopic surgical techniques, and their value in the treatment of HP.

Methodology

Study Settings and Population: This retrospective review was undertaken of 08 cases of HP which were diagnosed via serum β-HCG (human chorionic gonadotropin) level with ultrasound and treated by laparoscopic surgery at Central police hospital and Taqwah Specialized Hospital, Dhaka, Bangladesh, from July 2017 to July 2019. Data about patients' age, gravidity, the current pregnancy, gestational age, symptoms, serum β-HCG level, and general appearance on ultrasound were available from a retrospective review of the hospital and outpatient medical records. Gestational age was calculated either according to the last menstrual period or from ultrasound. All ectopic embryos were located in the fallopian tubes.

Study Procedure: A total of 8 patients underwent partial salpingectomy on the affected side to reduce the occurrence of persistent postoperative EP or recurrence rate and protect ovarian function. One patient with a ruptured EP underwent salpingectomy because of massive bleeding. To minimize the effects of the anesthetic drugs on the fetus, general anesthesia was initiated after the preparations for the operation were completed. Patients were under endotracheal general anesthesia with propofol, fentanyl, and midazolam. Blood pressure, transcutaneous oxygen saturation, electrocardiograms, and carbon dioxide (CO2) pressure were monitored continuously.

Surgical Procedure: Patients were placed in supine position, once CO2 pneumoperitoneum created the head end was lowered to approximately 15 degrees (15 Trendelenburg position). A 1 cm incision was made just above the umbilicus. The primary puncture was made by a 10 mm trocar-cannula and laparoscope was inserted. The abdomen was inflated with CO2 and maintained pressure at 10 mm Hg. Under direct visualization of the videolaparoscopy, 5 mm and 10 mm ancillary ports were introduced for instruments in the left lower quadrant. During the intraoperative, 2 cases were found with severe pelvic adhesions, and then the fourth 5 mm port was added in the right lower quadrant. Both sides of the mass (gestational sac) and mesosalpinx were grasped and then the mass was cut off using a ligature. In one case, the EP was ruptured, and then salpingectomy was performed. The proximal portion of the fallopian tube and mesosalpinx were also removed. The abdomen was rinsed with normal saline till clear at the end of the procedure. During the procedure, manipulation of the uterus was minimal and special attention should be taken to avoid irritating the ovary in a hyperstimulation state. Operations were finished as soon as possible.

Follow-up and Outcomes Measures: All of the vitals were normal during the postoperative period. Follow-up ultrasonography was done after 2 weeks of surgery, thereafter asked to attend for a routine antenatal check-up. Data were extracted from immediate postoperative record sheets and from obstetric records.

Statistical Analysis: Statistical analysis was performed by Windows-based software named as Statistical Package for Social Science (SPSS), version 22.0 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Continuous data were expressed as mean, standard deviation, minimum, and maximum. Categorical data were summarized in terms of frequency counts and percentages. Every effort were made to obtain missing data.

Ethical Consideration: All procedures of the present study were carried out in accordance with the principles for human investigations (i.e., Helsinki Declaration 2013) and also with the ethical guidelines of the Institutional Research Ethics.

Formal ethics approval was granted by the local ethics committee. Participants in the study were informed about the procedure and purpose of the study and the confidentiality of information provided. All participants consented willingly to be a part of the study during the data collection periods. All data were collected anonymously and were analyzed using the coding system.

Results

Eight patients underwent laparoscopic surgery for heterotopic pregnancy. Of these women, 6 patients had conceived by ovulation induction with clomiphene and letrozole, and two patients had spontaneous pregnancy (Figure I).

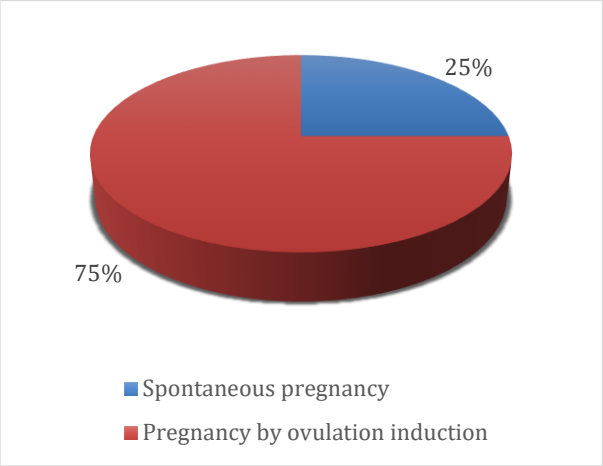

Figure I: Distribution of Study Population (n=8)

About 3 patients had a history of previous adnexal surgery. The median age, gravidity, and gestational age at the time of laparoscopic operation were 28.25 years (range, 24–34 years), 2 (range, 1–3), and 6+5 gestational weeks which was range, 5+, 6+, 8 gestational weeks respectively (Table 1).

Table 1: Gestational Age at Diagnosis (n= 8)

Gestational Age at Diagnosis	Frequency	Percent
5+ weeks	3	37.5
6+ weeks	3	37.5
7 weeks	1	12.5
8+ weeks	1	12.5
Total	**8**	**100.0**

All patients were diagnosed by transvaginal ultrasound: gestational sacs were visible in 5 cases, while the others showed an adnexal mass. About 5 cases' ectopic embryos were located in the ampullary part of the fallopian tube, 2 cases were found in the isthmus, and 1 case was in the interstitium. This was really a very serious issue during the management of the patients (Table 2).

Table 2: Location of Ectopic Pregnancy during Diagnosis (n=8)

Location of Tubal Pregnancy	Frequency	Percent
Ampullary Part of the Fallopian Tube	5	62.5
Isthmus	2	25.0
Interstitium	1	12.5
Total	**8**	**100.0**

Six (75.0%) women carried their pregnancies to term. Among the women who delivered, five women underwent cesarean deliveries, and one woman delivered vaginally. Two women failed to maintain their pregnancies. One had a missed abortion eight days after surgery. The other had a miscarriage due to preterm premature rupture of membrane at 18 weeks (Table 3).

Table 3: Outcome of Intrauterine Pregnancy after Laparoscopic Management of Tubal Pregnancy (n= 8)

Outcome of Pregnancy	Frequency	Percent
More than 36 Weeks	6	75.0
Pre-PROM	1	12.5
Missed abortion	1	12.5
Total	**8**	**100.0**

Discussion

Heterotopic pregnancy is usually a serious emergency and potentially life-threatening condition for the woman and the intrauterine pregnancy. Many predisposing factors causing heterotopic pregnancy are identical to those predisposing to ectopic pregnancy[7]. First, there are ovulation factors such as multiple ovulation or ovulation hyperstimulation syndrome caused by using drugs for ovulation induction, application of drugs (controlled ovarian hyperstimulation: COH). The probability of the occurrence of HP is significantly higher in COH-associated pregnancy than in non-COH pregnancy. Second, ectopic pregnancy is associated with in vitro fertilization and embryo transfer (IVF-ET). And for IVF-ET, the meaningful risk factors for HP included a history of ectopic pregnancy, abortion history, and OHSS[8]. Third, tubal factor is the most prominent risk factor related to ectopic pregnancy.

Early diagnosis of HP is defined before 7 weeks of gestation or before the rupture of HP[9]. The early diagnosis of heterotopic pregnancy is quite arduous due to the absence of clinical symptoms. Adnexal torsion, hemorrhagic corpus luteum, ovarian cyst, tubo-ovarian abscess, and appendicitis can mimic ectopic pregnancy symptoms[10]. Ultrasonographic evaluation is the gold standard for diagnosis, with findings of a second gestational sac or complex mass in addition to the intrauterine pregnancy[11]. The detection rate of heterotopic pregnancy with transvaginal ultrasound scans can vary from 41.0% to 84.0% cases[12]. The possibility of HP should be suspected in women undergoing assisted reproduction techniques, use of ovulation induction drugs, and presenting with acute lower abdominal pain, peritoneal irritation, and hypovolemic shock. In high-risk patients, especially those who underwent an ART treatment, a transvaginal ultrasound scan should be performed at 5 weeks of gestation (18 days after ET) to diagnosis[9]. And a study suggests that 21 days after implantation, if the serum HCG level >1000 mIU/ml, then it is suspected as a multiple pregnancy or HP[13]. When the blood β- HCG level is significantly higher than that in a singleton pregnancy, while the ultrasonography detects a single intrauterine pregnancy, even though the ultrasonography does not show any adnexal mass, or the unconfirmed exact localization of pregnancy, HP should be highly considered. Intensive follow-up, including repeated ultrasonography and serial serum β-HCG test, should be performed. However, someone considers that the diagnostic role of β-HCG levels in heterotopic pregnancy is debatable[12]. Ultrasound examination, combining serial serum β-HCG tests, is an important way to diagnose heterotopic pregnancy.

Anesthesia management of laparoscopic surgical treatment for HP: Teratogenic effects of anesthesia drugs often capture our attention. Although there are no known teratogenic effects from the use of commonly administered anesthetic agents at standard concentrations at any gestational age[14], certain precautions should be undertaken to minimize adverse effects. Anesthesia was commenced after the disinfection process and the preparation of all the laparoscopic surgical instruments. Anesthetic drugs which make minimal adverse effects on the fetus should be used. In this group, propofol, fentanyl, and midazolam were used for anesthesia. Fentanyl provides a rapid onset, cardiovascular stability, and has a short half-life. Combination of propofol, fentanyl, and midazolam was used frequently in IVF patients with a relatively low risk for adverse effects on oocyte and embryo quality and pregnancy rates[15-18]. A review of non-obstetric surgery involving pregnant women between 4 and 20 gestational weeks suggested anesthesia between 4 and 20 gestational weeks was safe[19-20].

Safety, feasibility, and skills of laparoscopic surgical treatment for HP: The management of heterotopic pregnancy aims to remove the extrauterine pregnancy completely, while being as minimally invasive as possible to preserve the normal development of the intrauterine pregnancy. Favorable perioperative management and prophylactic treatment should be given on time in case of miscarriage. No standard surgical management protocol has yet been established but laparoscopic surgery is accepted as the standard treatment for the surgical management of ectopic pregnancy in many studies[21]. The advantages of laparoscopic surgery were proved, including good operative field exposure, fewer surgical wounds, less intraoperative blood loss, less postoperative pain, shorter hospitalization and quicker return to regular activity. Laparoscopic surgery has the added benefits in the pregnant patient of less uterine manipulation, potentially leading to a decreased rate of miscarriage and preterm labor. In this group, there were no major intraoperative or postoperative complications. We believe these results prove that laparoscopic surgery for ectopic pregnancy of HP is safe, feasible, and effective, although additional investigations are needed. Regarding the pressure of pneumoperitoneum, some reports suggested that intra-abdominal insufflation pressures be maintained at less than 12 mmHg to avoid worsening pulmonary physiology in gravid women[22]. In this group, the patients' intraperitoneal pressure was set at 10 mmHg and all newborns were normal. Mechanical stimulation of the uterus and ovaries should be minimized to prevent miscarriage and avoid the endocrine changes.

Conclusion

In conclusion, heterotopic pregnancy is no longer a rare event due to the history of PID, widespread and increasing use of ART and induction of ovulation. Laparoscopic surgery performed by an experienced surgeon is feasible and safe for the treatment of heterotopic pregnancy and is worth being advocated.

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None

Conflict of Interest
We declare that we have no conflict of interest.

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Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. As this was a prospective study the written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

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