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Original Research Article

Laparoscopic Management of Heterotopic Pregnancy Post IVF - ET: A Retrospective Analysis of Eight Rare Cases Operated by a Single Surgeon

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Abstract

Aim: The aim of this study was to analyse the clinical efficacy of laparoscopic surgery for women with heterotopic pregnancy post IVF – ET and their obstetric outcomes.
Material and Methods: We conducted a retrospective analysis of eight women who had undergone laparoscopic surgery by a single surgeon for heterotopic pregnancy post IVF – ET at a tertiary care hospital. The primary outcome was the feasibility and clinical efficacy of laparoscopic surgery for the treatment of heterotopic pregnancy and the secondary outcome was their obstetric outcomes post laparoscopic surgery.
Results: Eight women underwent laparoscopic salpingectomy for tubal heterotopic pregnancies post IVF - ET. There were no intraoperative or postoperative complications. Of these women, 06 delivered healthy babies, whereas remaining two women have ongoing pregnancies.
Conclusion: Laparoscopic surgery performed by experienced Gynae endoscopic surgeons is a feasible and beneficial surgical modality for treating heterotopic pregnancy with good obstetric outcome.
Keywords: Hetertopic pregnancy (HP), Laparoscopic salpingectomy, ART, IVF – ET, Obstetric outcomes.

1. Introduction

Heterotopic pregnancy is a rare and life-threatening condition which is defined as coexistent intrauterine and ectopic gestation. The risk of ectopic and heterotopic pregnancy is increasing due to the increased risk of multiple pregnancies with the aid of assisted reproductive technologies. Its incidence is known to be one in 8,000 to 30,000 in spontaneous conceptions increasing to a rate of 0.2% to 1% in gestations after assisted reproductive technologies [1, 2].

Infertile patients who undergo ART frequently have tubal factor infertility; tubal pathology happens to be one of the main causes of ectopic pregnancy. Therefore, since HP is no longer as rare as it once was, it is important to consider, especially when women conceive via ART treatment. The early diagnosis and treatment of HP is critical to avoid its life-threatening consequences including hypovolemic shock, fetal loss and maternal mortality. However, in its early stages, HP can be difficult to diagnose because there may also be an intrauterine pregnancy. Therefore, if a patient has risk factors for HP, it is very important to suspect the diagnosis [2, 3].

HP is ideally treated by removing the ectopic pregnancy, while maintaining the intrauterine pregnancy. Ectopic pregnancies can be removed surgically via laparotomy or laparoscopy. The success rate of pregnancies with favourable outcome after the surgery is between 58% and 70%. However, this successful management is confined to several case reports. Laparoscopic surgery performed by experienced surgeons is a feasible and beneficial surgical modality for treating heterotopic pregnancy [3,4].

The objective of this study was to analyze the clinical efficacy of laparoscopic surgery for women with heterotopic pregnancy post IVF – ET and their obstetric outcomes.

2. Materials and Methods

This retrospective analysis was performed on eight patients of heterotopic pregnancy post IVF - ET at a tertiary care centre from Nov 2015 to Oct 2016, who underwent laparoscopic management (laparoscopic salpingectomy) under general anaesthesia after written informed consents were obtained from the patients. All the cases of IVF were performed with long protocol of down regulation and controlled ovarian stimulation with recombinant FSH. They had undergone fresh embryo transfers (D2 embryos) and were given luteal support with Inj Micronised progesterone 100mg daily IM and vaginal Micronised progesterone 200 microgram 12 hrly. First ultrasound was performed on D21 post embryo transfer (ET) with serum beta HCG measurements of D18. Main diagnostic modality employed for the diagnosis was establishing co existing intrauterine and extrauterine gestational sacs by transvaginal sonography which was later confirmed on laparoscopy. All the patients were given pre operative single dose of Inj Cefotaxime 1 gm IV stat as prophylactic antibiotics followed by two more doses of the same antibiotics. All the surgeries were performed by the same surgeon.

All patients suspected to have heterotopic pregnancy were planned diagnostic laparoscopy followed by definitive laparoscopic surgery. Pre operative Hb and blood demands were confirmed before each surgery. The details of procedure, operating time and hospital stay were noted. Laparoscopic procedures were performed in the semilithotomy position. Through a supra-umbilical incision, trocar and cannula were introduced followed by introduction of a 10mm laparoscope. After confirmation of the diagnosis, 10 mm and 5mm punctures were made in the left lower and middle quadrants using direct visualisation and transillumination. Salpingectomy was performed by stepwise desiccation and cutting of the mesosalpinx with harmonic forceps with bipolar forceps in stand by for securing haemostasis. Surgery was different than the routine ectopic pregnancies with no vaginal manipulation of uterus and minimal disturbance to the uterus intraoperatively. Surgical specimens were removed through the 10 mm left lower quadrant trocar sleeve. The pelvis was copiously irrigated with saline at the end of each procedure.

3. Results

The study had majority of the patients from 31 – 35 years of age (62.5%) with mean age of 30.125 years. Number of D2 embryos (fresh IVF cycle) transferred in majority of the patients were two (75%). Mean gestational age at diagnosis was 07 weeks 05 days. 87.5% of patients had single intrauterine gestation coexisting with ectopic tubal pregnancy (62.5% Rt tubal vs 37.5% Lt tubal). Abdominal pain was the main presenting complaint of the patients (62.5%) while 25% of the patients were clinically asymtomatic (Table 1, 2, 3).

Table 1: Age Profile of Patients

Age	Number of Patients	Percentage
21 - 25	01	12.5%
26 - 30	02	25.0%
31- 35	05	62.5%

Table 2: Number of Embryos transferred (D2)

Number of Embryos Transferred	Number of Patients	Percentage
02	06	75%
03	02	25%

Table 3: Clinical Characteristics of Patients with Heterotopic Pregnancy

Clinical Characteristics	No. of Patients
Total No. of patients	08
Mean Age	30.125 years
Mean Gestational Age at Diagnosis	07 weeks 05 days
Intrauterine Pregnancy	
1. Singleton	07 (87.5%)
2. Twin	01 (12.5%)
Clinical Presentation	
1. Abdominal Pain	05 (62.5%)
2. Vaginal Bleeding	02 (25%)
3. Haemoperitoneum	03 (37.5%)
4. Asymptomatic	02 (25%)
Site of Ectopic Pregnancy	
1. Rt Tubal	05 (62.5%)
2. Lt Tubal	03 (37.5%)
Pelvic Adhesions	05 (62.5%)

All the patients underwent laparoscopic salpingectomies for the management of heterotopic pregnancy, with one patient had twin intrauterine gestation while the rest of the patients had single intrauterine gestations. Haemoperitoneum was there in 37.5% patients with mean intraoperative blood loss of 166.5 ml. Moderate to severe pelvic adhesions were encountered in 05 patients (62.5%) with endometriosis in 03 cases. Mean duration of surgery was 45 mins with average hospital stay of 03 days. Blood transfusion was required in 02 patients with haemoperitoneum. There was no intraoperative or postoperative complications associated with surgery. (Table 4)

Table 4: Surgical Outcomes following Laparoscopic Salpingectomies

Management	
1. Laparoscopic Salpingectomy	08 (100%)
2. Mean Blood Loss	166.5 ml
3. Mean Duration of Surgery	45 mins
4. Mean Hospital Stay post	03 days

Surgery	
5. Blood Transfusion	02 cases (25%)
6. Post Operative Complications	Nil

Post laparoscopic salpingectomies, 06 of the patients (75%) had term live birth babies (04 Normal deliveries vs 02 Caesarean sections) while 02 of the patients have ongoing uneventful pregnancies at 24 weeks and 26 weeks gestations respectively. Heterotopic triplets with twin intrauterine gestation had normal vaginal delivery at term. There was no incidence of post operative miscarriage. (Table 5)

Table 5: Obstetric Outcomes following Laparoscopic Salpingectomies

Obstetric Outcomes	
1. Normal Deliveries (Live Birth)	04 (50%)
2. Caesarean Section (Live Birth)	02 (25%)
3. Continuing Pregnancy	02 (25%)
4. Preterm Delivery	Nil
5. Post Operative Miscarriage	Nil

Figure 1: Transvaginal USG of Heterotopic Pregnancy (Rt)

Figure 2: Transvaginal USG of Heterotopic Pregnancy (Rt)

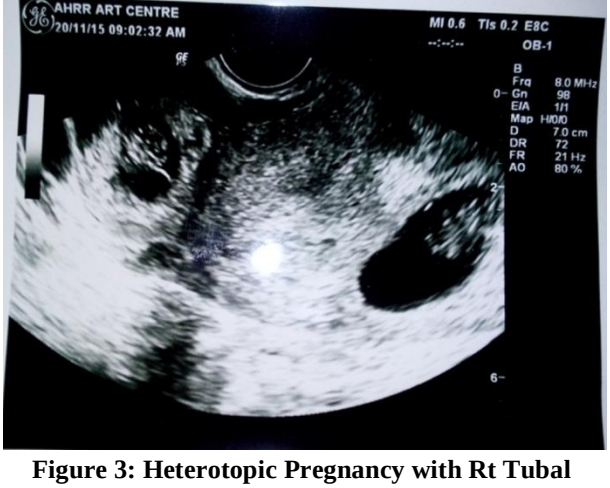


Figure 3: Heterotopic Pregnancy with Rt Tubal Ectopic and Hyper stimulated Rt Ovary

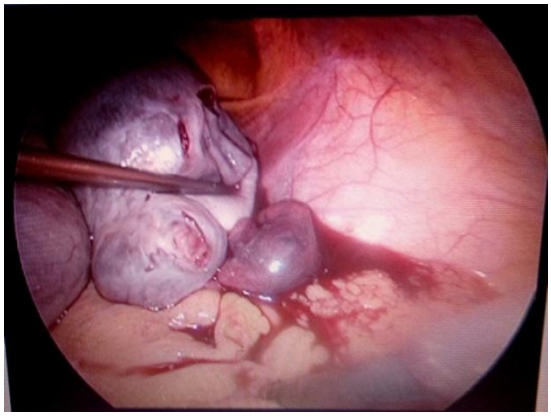
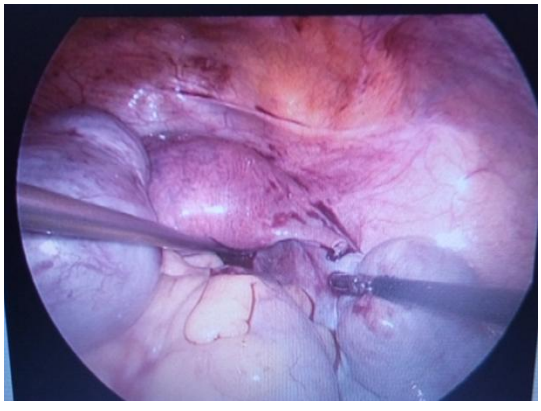


Figure 4: Post op view of Rt Salpingectomy and Hyper stimulated Ovaries



4. Discussion

Heterotopic pregnancies are rarely encountered in everyday clinical practice. However, the extended use of ART procedures nowadays has increased the ectopic and subsequently the heterotopic pregnancy (HP) rates. This clinical entity represents a potentially life-threatening condition for the woman and the intrauterine pregnancy. Factors predisposing to HP are identical to those predisposing to ectopic pregnancy: factors related to IVF like large number of transferred embryos, a transfer near the uterine horn, excessive pressure on the syringe and deep insertion of the catheter during transfer, the quality of the embryos, asynchrony between embryo and endometrium, the hormonal milieu at the moment of transfer, the use of gonadotropins, the amount of fluid used as media for the embryos, and also adhesions related or not related to endometriosis and pelvic inflammatory disease (PID), advancing maternal age, previous history of ectopic pregnancy and smoking [8].

In the present study the mean ages of the patients were 30.125 years and mean gestational age on diagnosis of heterotopic pregnancy was 07 weeks 05 days on transvaginal ultrasound. Wang *et al* in their study on misdiagnosis and delayed diagnosis for ectopic and heterotopic pregnancies after in vitro fertilization and embryo transfer found that ruptured ectopic pregnancy occurred in 28 patients due to initial misdiagnosis or

delayed diagnosis. Related factors fell in 3 categories: (1) clinician factors: misunderstanding of patients' medical history, insufficient training in ultrasonography and unawareness of ectopic and HP; (2) patient factors: noncompliance with medical orders and lack of communication with clinicians; (3) complicated conditions of ectopic or HP: atypical symptoms, delayed elevation of serum β-hCG level, early rupture of cornual EP, asymptomatic in early gestation and pregnancy of unknown location. All the factors were interwoven, contributing to the occurrence of ectopic and HP. It was concluded that complicated conditions are more likely to affect the diagnosis accuracy of ectopic / HP after IVF-ET. Transvaginal ultrasonography should be performed at 5 weeks of gestation. Intensive follow-up including repeated ultrasonography and serial serum β-hCG tests should be performed in patients with a suspicious diagnosis at admission [9,10].

The diagnosis of HP is elusive and challenging due to the co-existence of the viable intra uterine pregnancy (IUP) which can generate an appropriate increase in the level of β-hCG. Thus the diagnostic value of hCG measurement is limited in cases with HP and the diagnosis is mainly dependent on the findings of TVS [10, 11]. In a retrospective study that included a total of 184 HPs following IVF-ET, 174 were diagnosed by TVS while 10 cases were missed. The three main types of ultrasonographic findings were: visualisation of extrauterine gestational sac in 57.3%, adnexal mass in 25.4% and ring sign in 17.2% of cases. The sensitivity and specificity of TVS in the diagnosis of HP was 92.4% and 100% respectively with positive and negative predictive values of 100% and 99.9%, respectively [12].

Most cases of HP are missed on initial presentation, which could be due a false sense of security provided by the sonographic finding of a viable intra uterine pregnancy with failure to inspect the adnexa fully or the HP being too small to identify [10]. The amount of fluid in the cul-de-sac can assist in the diagnosis of HP. One study found that patients with abnormal cul-de-sac fluid were five times more likely to have HP as patients without it. Causes of misdiagnosis include misidentification of an HP as a corpus luteal cyst or due to mirror image artefact on TVS due to the patient having a full bladder during the process, which causes reflection of a viable IUP on a different part of the image and could be mistakenly diagnosed as HP [12, 13].

In the present study all the eight patients underwent Laparoscopic salpingectomy with no intraoperative or post operative complications. Average duration of surgery was 45 mins with mean blood loss of 166.5 ml. Mean hospital stay was 03 days and two of the patients of haemoperitoneum required blood transfusion.

Yu *et al* in their retrospective analysis on 25 heterotopic pregnancies found that 80% of patients underwent surgical treatment (35% laparoscopic salpingectomy, 65% laparotomy), and 20% of patients underwent medical treatment with local injection of methotrexate (MTX) or MTX in combination with potassium chloride (KCl) into ectopic sites such as the cervix or interstitium. 88% of patients delivered live infants without congenital anomalies, and three patients (all of whom underwent surgical treatment) miscarried. Routine transvaginal ultrasound examination at approximately 6-7 weeks of gestation could facilitate the diagnosis of HP, although repeat ultrasound is necessary to avoid misdiagnosis. Prompt diagnosis and correct treatment, including local injection of MTX or MTX in combination with KCl into various ectopic sites, led to favourable prognoses [5, 14].

The clinical management of HP aims to remove the ectopic pregnancy without disturbing the viable intrauterine pregnancy. Currently, there is no general consensus on the treatment of HP and the majority of data about its clinical management derive from case reports. Surgical treatment by laparotomy or laparoscopy, injection of feticides with or without fetal reduction by embryo aspiration under ultrasound guidance and expectant management have all been used and reported to be successful in the elimination of the ectopic and preservation of ongoing intrauterine pregnancy. The selection of treatment protocol depends on the gestational age at diagnosis, the clinical condition of the patient, the site of ectopic implantation and the experience of the treating physician. In a number of studies, the success rate for rescuing the viable IUP was about 66% with the remainder ending in early or late miscarriage [5,10]. In the present study following laparoscopic salpingectomies, the success rate of rescuing the viable intrauterine pregnancy was 100% with nil complication rates.

Although the evidence on laparoscopy is neither robust nor based on randomised controlled trials, based on our results and the review of the literature, the treatment of complicated adnexal masses by laparoscopic surgery during the first trimester of pregnancy appears to be a safe procedure for the mother as well as for the foetus. It is important to highlight, however, a possible bias of publications since complicated cases might be unpublished. Specific considerations regarding surgical technique should be taken into account by the team in order to minimize complications. In conclusion, laparoscopic surgery is a safe and feasible option for the treatment of heterotopic pregnancy with good obstetric outcome [6,7, 14].

5. Conclusions

Laparoscopic surgery performed by experienced Gynae endoscopic surgeons is a feasible and beneficial surgical modality for treating heterotopic pregnancy with good obstetric outcome. The surgical treatment of HP does not appear to affect the rates of early pregnancy loss or live birth. However, more data are needed to clarify the pregnancy outcomes after HP.

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