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Minimally invasive management of ectopic pregnancy

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Abstract

Objectives: To assess the minimally invasive management and postoperative period in patients hospitalized with a suspicion of ectopic pregnancy.

Materials and Methods: 106 women who underwent a typical laparoscopic surgery due to ectopic pregnancy, from 2018 to 2020, were included in the study. The diagnosis was based on the patient's history, gynecological examination, transvaginal ultrasound findings and β hCG concentration.

Results: The most common symptom at admission was abnormal uterine bleeding (70.1%). The typical symptoms of amenorrhoea, abnormal bleeding and pain were present in only 26% patients. The ampulla of the Fallopian tube was the most frequent site of implantation in ectopic (59.7%). Salpingectomy was performed in 53.5% of the cases, while salpingotomy in 35%. The postoperative period was generally uneventful in the majority of patients.

Conclusions: Early diagnosis is key in facilitating safe utilization of more conservative management in the hope of preserving tubal function and reproductive potential.

Keywords: Ectopic pregnancy, laparoscopy, salpingectomy, salpingotomy, ultrasound

Introduction

An ectopic pregnancy can be defined as an extrauterine pregnancy in which a fertilized ovum implants outside the uterine cavity. It occurs in 2% of all pregnancies and mostly affects the young women who desire future fertility^[1, 2].

Theoretically, those factors which impede the migration of the products of conception to the uterine cavity may predispose a woman to develop an ectopic gestation. These may be tubal epithelial intrinsic anatomic defects, hormonal factors, or the pathologic conditions affecting the normal tubal functioning.

The fallopian tube is the most common extrauterine location, which accounts for about 98% of all ectopic gestation^[3]. The women with ectopic pregnancies have increased risk of infertility and recurrent ectopic pregnancy in addition to the complications of life threatening hemorrhage. The incidence of ectopic pregnancy reaches 1.3-2% of all pregnancies. Ectopic pregnancy is the leading cause of maternal mortality during the first trimester accounting for almost 9- 13% of all maternal deaths related to pregnancy^[4, 5]. However, over the last 20 years the mortality rate due to ectopic pregnancy has decreased from 16 to 3/10000 but still the rate continues to be very high in developing countries - for example in Cameroon mortality reaches 100 to 300 per 10000 pregnancies^[4].

The different risk factors for ectopic pregnancy should be elicited like prior ectopic pregnancy, current use of an intrauterine device, prior tubal ligation, and IVF (Table 1). However, over 50% of women do not have an identifiable risk factor for ectopic pregnancy and are asymptomatic before tubal rupture^[6].

Biochemical tests (human chorionic gonado-trophin β serum concentration) and transvaginal ultrasound findings are the main investigations and basic tools in diagnosing ectopic pregnancy.

The objective of this study was to assess the diagnostic process, laparoscopic treatment and postoperative period in those patients who were hospitalized with a suspicion of ectopic pregnancy in our hospital.

Materials and Methods

The study group consisted of 106 women who underwent laparoscopic surgery due to ectopic pregnancy, from 2018 to 2020.

The diagnosis was based on the patient's history, gynecological examination, transvaginal sonography findings and serum β hCG concentration. Laparoscopic procedure was performed typically in general anesthesia. A retrospective review was undertaken of all the cases of ectopic pregnancies from June 2018 to June 2020. 53 cases of ectopic pregnancy with histologic confirmation were identified. Institutional Review Board approval was obtained to extract data from the patients' medical records of the hospital. The case notes of all these 53 cases were further reviewed regarding the clinical presentation, diagnosis, surgical details, treatment success, and length of the hospital stay. The Telephonic interviews were conducted in December 2021 enquiring about their subsequent pregnancy outcomes if any, resulting in at least an 18-month follow-up of fertility outcome after laparoscopic management of ectopic pregnancy. All the cases of laparoscopic management of these cases were performed with video recording. Following the laparoscopic setup, the patient was placed in steep Trendelenburg position. Pneumoperitoneum was created using the Verres needle. A 10-mm laparoscope was inserted subumbilically and two 5.5-mm trocars were inserted in the suprapubic region and lateral to the inferior epigastric vessels. Following the confirmation of the ectopic pregnancy, vasopressin (dilution of 1:40) was injected at the base of the cornual ectopic pregnancy into the myometrium. Monopolar point diathermy needle with cutting current of about 30 W was used for either laparoscopic wedge resection or cornuostomy for cornual pregnancies exceeding 3 cm. The linear salpingotomy whenever performed must be as nontraumatic as possible. The most common technique is monopolar electrosection, because it is the easiest and cheapest method. To preserve the tubal vascularization the linear salpingotomy must be performed along the antimesenteric border. The salpingotomy must be carried out at the internal part of the hematosalpinx as the trophoblast is located there and the distal part generally contains the clots. The incision should be marked over the ectopic pregnancy, reaching the proximal (medial) portion of the hematosalpinx [7].

The products of conception present at the unusual site are then released from the tube using a combination of hydrodissection with irrigating solution under high pressure and gentle blunt dissection with a suction irrigator. Depending upon the size of the conceptus, it was either removed as piecemeal or placed in a retrieval bag and removed under direct vision through the 10-mm subumbilical port from a lateral 5.5-mm port. Peritoneal drain was not routinely used.

Salpingectomy is the standard procedure of choice if the tube is non salvagable (Ruptured or otherwise disrupted), bleeding is uncontrolled, or the gestation appears too large to be removed with salpingostomy. Salpingectomy is required in those women who have either contraindications to methotrexate therapy or have completed childbearing.

Results

106 patients, aged 18-42 (average 29.3 ± 4.9 age), hospitalized due to ectopic pregnancy suspicion, were included in the study. In the study group 45 women (43%) had never been pregnant before. The remaining 61 (57%) had previously undergone one or more miscarriages (24 patients-22%) and / or spontaneous vaginal delivery (39 women-36%) or cesarean section (7 patients-7%).

The symptoms reported by patients were analyzed (table 1) and it was found that the abnormal uterine bleeding was the most frequent symptom approx 70% of all the symptoms. The typical triad of the symptoms- amenorrhoea, abnormal bleeding and

pain were present in only 26% of ectopic pregnancies. However, all of cases had elevated serum β hCG concentration.

Table 1: The symptoms reported by patients from the study group

Symptoms	N = 106	%
Abnormal uterine bleeding	74	70.1
Abdominal pain	60	57.3
Amenorrhoea	58	55.0
Sudden acute pain in the lower abdomen	4	4.3
Fainting	3	2.4
Peritoneal signs	7	6.6
No clinical manifestation	1	0.2

The most frequent site of ectopic pregnancy implantation was the ampulla of the Fallopian tube - 63 (59.4%) cases. A bulged and completely destroyed tube was found in 20 women (18.9%). Other kinds of ectopic localizations of pregnancy were less in frequency: 8 women (7.5%) had isthmic pregnancy, 6 (5.7%) - infundibular pregnancy, 1 (0.9%) had an intramural one, 8 (7.5%) had ampullar abortion diagnosed at the time of operation.

Table 2: Treatment analysis of performed procedures

Performed procedures	%
Salpingectomy	53.8
Salpingotomy	35
Tissue removal	3.7
Ovum expression	7.1
Subtotal hysterectomy	0.5

Table 2 shows the treatment analysis in the operated women. Salpingectomy was the most frequently performed procedure (57 patients - 53.8%). Salpingotomy was in the second place (37 women - 35%). All the patients who had ampullar abortion, the tissues were removed from the abdominal cavity. In 4 cases of infundibular pregnancy (3.7%) the tissues of conceptus were expressed into the pelvic cavity and afterwards removed. One patient with intramural pregnancy underwent with subtotal hysterectomy, while the other had methotrexate injected into the ovum at the time of laparoscopy.

Discussions

Taking minimal assess management into consideration several risk factors of failure must be discussed. Beside demographic factors, the obesity, history of previous laparotomies, laparoscopies, or any inflammatory conditions of small pelvis and the presence of free fluid in the pelvic region is now thought to be very important as risk factors [8]. Hsu *et al.* [9] claim that the free fluid greater than 7 cm in any dimension is related to a significant risk of intraperitoneal haemorrhage, however, it is not the only risk factor which is predictive of laparoscopic surgery failure, the concentration of serum β hCG exceeding 5000mIU/ml can be correlated with a higher predictive value of intraperitoneal haemorrhage.

Nowadays, laparoscopy is the preferred method of treatment for ectopic pregnancies. The major contraindication to laparoscopic surgery is the hemodynamic instability [10]. Classical abdominal surgeries are generally more preferred in such cases [11]. However, Canis *et al.* [12], Li *et al.* [13], Lo *et al.* [11] and Takeda *et al.* [14] do not consider the hemodynamic shock to be a contraindication to endoscopic treatment. Takeda *et al.* [14] and Li *et al.* [13] both prefer the method of autotransfusion while such a procedure is being performed during massive intraperitoneal haemorrhage. Li *et al.* [13] performed autotransfusion in 95% of

women who were being operated on during haemorrhagic shock and none of them required blood transfusion in the postoperative period.

The literature widely discusses the problems of intra-mural pregnancy^[15]. Both women in our study group who had such a pregnancy had a uterine corn removed, one of them after earlier unsuccessful methotrexate administration. According to Canis *et al.*^[12] intramural localization of pregnancy is itself an indication for pharmacological treatment as long as the patient is clinically stable. Chan *et al.*^[16] described a successful laparoscopic treatment of such a pregnancy, in which the uterine Corn was incised and trophoblast evacuated. A second-look laparoscopic evaluation of such patient after six months period showed completely normal uterus. Besides the intramural pregnancy, the abdominal, cervical and ovarian pregnancies have also indications of pharmacological management. Methotrexate administration moreover is used in persistent ectopic pregnancy and as a prophylaxis in such a condition where there is a problem being encountered while trophoblast removal.

Fujishita *et al.* discussed the problems of suturing the fallopian tubes after the incision and trophoblast removal. However, after three months interval there was no shown advantage of such management on second-look laparoscopy^[5]. Orazi *et al.* described the importance of intraperitoneal lavage and trophoblast removal in an endo-bag^[17].

In conclusion, awareness of the possibility of an ectopic pregnancy is most critical for early detection and subsequent management. Prompt diagnosis and proper treatment also plays an important role in the preservation of fertility after an ectopic pregnancy. The increased knowledge of risk factors among clinicians and proper patient education have led to an early and accurate diagnosis of ectopic pregnancy. Although surgical intervention has been the gold standard of ectopic management, medical treatment of unruptured ectopic pregnancy has emerged as a safe and effective alternative. Laparoscopic surgery remains the “gold standard” in majority of women with such condition.

Conflict of Interest

Not available.

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