Ectopic Pregnancy: Laparoscopic Conservative Treatment and Laparoscopic Salpingotomy

Bassim Alsadi

ABSTRACT

Objective: Whether a laparoscopic salpingostomy should be done or a salpingectomy for surgical treatment of ectopic pregnancy.

Materials and methods: Literature examining and review the impact of recent advances in the diagnosis and laparoscopic conservative treatment of ectopic tubal pregnancy. Articles published in English language using the following search engines: Medline, Pubmed, Medscape, and Cochrane Database of Systematic Reviews.

Results: The choice of salpingostomy or salpingectomy relies upon many factors and includes shared decision-making between the surgeon and patient. Laparoscopic surgery remains the “gold standard” in majority of women.

Conclusion: There is some evidence to suggest that future fertility outcomes are slightly improved after tubal conservation at surgery in comparison with salpingectomy. As the incidence of ectopic pregnancy continues to rise in a population that will likely desire future fertility, 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 is an extrauterine pregnancy in which a fertilized ovum implants outside the uterine cavity. Ectopic implantation occurs in 2% of all pregnancies and often affects young women who desire future fertility.1,2

Theoretically, factors that impede migration of the conceptus to the uterine cavity may predispose a woman to develop an ectopic gestation. These may be intrinsic anatomic defects in the tubal epithelium, hormonal factors that interfere with normal transport of the conceptus, or pathologic conditions that affect normal tubal functioning.

Ectopic pregnancy occurs when the developing blastocyst becomes implanted at a site other than the endometrium of the uterine cavity. The most common extrauterine location is the fallopian tube, which accounts for 98% of all ectopic gestations.3

In addition to the immediate risks of life threatening hemorrhage and those related to its treatment, women with ectopic pregnancies have a subsequent increased risk of infertility and recurrent ectopic pregnancy.

Ectopic pregnancy remains the leading cause of maternal morbidity and occasionally mortality in the first trimester of pregnancy especially in the developing countries, for example, 1–3% all ectopic in Cameroon.4

Avoidance of tubal damage is the best strategy to prevent ectopic pregnancies and maintain reproductive potential.

The prevalence of ectopic pregnancy among women with symptoms such as first trimester bleeding, pain, or both ranges from 6 to 16%,5 and the physical findings depend on whether tubal rupture has occurred.

Women with intraperitoneal hemorrhage present with significant abdominal pain and tenderness, along with various degrees of hemodynamic instability. However, women without rupture may also present with pelvic pain or vaginal bleeding, or both.6–8 Ectopic pregnancy may also be asymptomatic.

In a retrospective study of 2,026 pregnant women who presented to the emergency department with first trimester vaginal bleeding and abdominal pain, 376 (18%) were diagnosed with ectopic pregnancy. Of these 376 women, 76% had vaginal bleeding and 7% had abdominal pain.9 In a population-based registry of ectopic pregnancy from France, the incidence of rupture was 18%.10

There has been a rise in the incidence because of a dramatic increase in sexually transmitted disease, use of intrauterine device for contraception, and iatrogenic-induced complications which result from an increase in the administration of in vitro fertilization (IVF).

Risk factors for ectopic pregnancy should be elicited, including prior ectopic pregnancy, current use of an intrauterine device, prior tubal ligation, and IVF (Table 1). However, over 50% of women are asymptomatic before tubal rupture and do not have an identifiable risk factor for ectopic pregnancy.11

A population-based French study identified four factors that increased the risk of rupture when an ectopic pregnancy was suspected: (1) never having used contraception, (2) history of tubal damage and infertility, (3) induction of ovulation, and (4) high level of human chorionic gonadotropin (hCG, at least

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The overall rate of tubal rupture in this series was 18%.

Prompt diagnosis and proper treatment may also play a role in the preservation of fertility after an ectopic pregnancy. The increased knowledge of risk factors among clinicians and proper patient education have enabled an early and accurate diagnosis of ectopic pregnancy.

Awareness of the incidence of different types of ectopic pregnancy is most critical for early detection (Table 2).

In one series of 1,800 surgically treated cases, the distribution of sites was ampullary (70%), isthmic (12%), fimbrial (11.1%), ovarian (3.2%), interstitial (2.4%), and abdominal (1.3%) (Fig. 1).

Anatomy of the Fallopian Tube

The oviduct or tube is approximately 10–12 cm long. The intramural or interstitial portion of the tube is approximately 1 cm long, traverses through the myometrium, and opens in the endometrial cavity. This is the opening through which the sperm travel to the oviduct and the embryo enters the cavity. It is also a highly vascular area and makes conservative surgical management more difficult.

### Table 1: Risk factors for ectopic pregnancy

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Odds ratio</th>
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<tbody>
<tr>
<td><strong>High risk</strong></td>
<td></td>
</tr>
<tr>
<td>Previous ectopic pregnancy</td>
<td>9.3–47</td>
</tr>
<tr>
<td>Previous tubal surgery</td>
<td>6.0–11.5</td>
</tr>
<tr>
<td>Tubal ligation</td>
<td>3.0–139</td>
</tr>
<tr>
<td>Tubal pathology</td>
<td>3.5–25</td>
</tr>
<tr>
<td><em>In utero</em> DES exposure</td>
<td>2.4–13</td>
</tr>
<tr>
<td>Current IUD use</td>
<td>1.1–45</td>
</tr>
<tr>
<td><strong>Moderate risk</strong></td>
<td></td>
</tr>
<tr>
<td>Infertility</td>
<td>1.1–28</td>
</tr>
<tr>
<td>Previous cervicitis (gonorrhea, chlamydia)</td>
<td>2.8–3.7</td>
</tr>
<tr>
<td>History of pelvic inflammatory disease</td>
<td>2.1–3.0</td>
</tr>
<tr>
<td>Multiple sexual partners</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Smoking</td>
<td>2.3–3.9</td>
</tr>
<tr>
<td><strong>Low risk</strong></td>
<td></td>
</tr>
<tr>
<td>Previous pelvic/abdominal surgery</td>
<td>0.93–3.8</td>
</tr>
<tr>
<td>Vaginal douching</td>
<td>1.1–3.1</td>
</tr>
<tr>
<td>Early age of intercourse (&lt;18 years)</td>
<td>1.1–2.5</td>
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</tbody>
</table>

DES, diethylstilbestrol; IUD, intrauterine device


### Table 2: Incidence of different types of ectopic pregnancy

<table>
<thead>
<tr>
<th>Type</th>
<th>Incidence (%)</th>
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<tbody>
<tr>
<td>Ampullary</td>
<td>70</td>
</tr>
<tr>
<td>Isthmic</td>
<td>12</td>
</tr>
<tr>
<td>Fimbrial</td>
<td>1.1</td>
</tr>
<tr>
<td>Interstitial</td>
<td>2.4</td>
</tr>
<tr>
<td>Ovarian</td>
<td>3.2</td>
</tr>
<tr>
<td>Intra-abdominal</td>
<td>1.3</td>
</tr>
<tr>
<td>Cervical</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>


The isthmus of the tube is approximately 4–6 cm in length and its lumen is approximately 1–2 mm until it gets to the ampulla where it enlarges.

The ampulla is the longest segment of the tube and makes up approximately two-thirds of the total length. Beneath the mucosa of the ampullary portion of the tube, there is a series of large blood vessels mostly veins originating from the uterine/ovarian supply to the tube. These become engorged at the time of ovulation to bring the fimbriae closer to the ovary. They can also be problematic during surgical treatment for an ectopic pregnancy. These vessels travel in a thick longitudinal muscle layer. The lumen of the tube is wider here and the mucosa has more rugae, which are covered with ciliated and secretory cells. These cells may be damaged with infection, previous ectopic or surgery predisposing patients to a greater risk of tubal pregnancy (Fig. 1).

The final portion of the tube is the infundibulum; it is funnel shaped and its most distal end is called the fimbriae. There are greater concentrations of ciliary cells here that facilitate transport of the ovum into the ampulla (Fig. 2).
The sonographic absence of an intrauterine gestational sac with a serum β-hCG level above the discriminatory zone is highly suggestive of an ectopic pregnancy.\(^{12,13}\)

The diagnosis is less evident when the β-hCG level is below the discriminatory level and when the adnexal ultrasonographic findings are inconclusive.\(^{14}\)

Promising tools to achieve an early diagnosis of ectopic pregnancy are ultrasonographic endometrial patterns and the endometrial thickness. Several endometrial patterns have been correlated with the presence of an ectopic pregnancy, which include the endometrial trilaminar pattern.\(^{15}\) Regardless of the location, the endometrium often responds to ovarian and placental production of pregnancy-related hormones. The most common types of endometrium associated with ectopic pregnancy are decidual reaction (42%), secretory endometrium (22%), and proliferative endometrium (12%).\(^{16}\) The trilaminar pattern is specific for the diagnosis of ectopic pregnancy, but it is associated with low sensitivity.\(^{17}\)

The endometrial thickness tends to be lesser in patients with an ectopic pregnancy.\(^{17}\) However, there was no endometrial thickness value that was adequately specific and sensitive for the diagnosis of ectopic pregnancy.\(^{17}\)

Over the last decades, transvaginal ultrasound (TVUS) has become the first step in the diagnosis of ectopic pregnancy and the most useful imaging test for determining the location of a pregnancy. TVUS should be performed as part of the initial evaluation and may need to be repeated, depending upon the hCG level or a suspicion of rupture. Sensitivity of TVUS as a single test in the diagnosis of ectopic pregnancy is 74% (95% CI: 65.1–81.6) with a specificity of 99.9% (95% CI: 99.8–100).\(^{18}\) Between 87% and 99% of tubal pregnancies can now be diagnosed reliably using TVUS.\(^{19}\)

Approximately 60% of ectopic pregnancies are seen as an inhomogeneous mass ("blob sign") adjacent to the ovary, 20% appear as a hyperechoic ring (bagel sign), and 13% have an obvious gestational sac with a fetal pole, with or without fetal cardiac activity.\(^{19}\)

The diagnosis of ectopic pregnancy (EP) relies on the interpretation of serial hCG levels in conjunction with TVUS and clinical history. Transvaginal sonography is sensitive and specific for distinguishing an intrauterine pregnancy (IUP) from an EP when the presenting hCG is above the discriminatory zone.\(^{13,20}\)

Measurement of hCG is performed initially to diagnose pregnancy and then followed to assess for ectopic pregnancy. For follow-up, hCG is measured serially (every 48–72 hours). A single hCG measurement alone cannot confirm the diagnosis of ectopic or normal pregnancy.

Clinical interpretation of TVUS in patients with hCG levels close to, or below, the discriminatory zone is challenging, and initial TVUS alone cannot detect 26% of ectopic pregnancies.\(^{18}\) Additional factors may impact the diagnostic utility of TVUS.\(^{21,22}\) Medical and/or surgical management is often appropriate once the diagnosis has been confirmed.

Although surgical intervention has long been the gold standard of ectopic treatment, medical management of unruptured ectopic pregnancy has emerged as a safe and effective alternative.

Regardless of the treatment strategy used, the primary goal is the avoidance of catastrophic outcomes including tubal rupture. Fertility preservation should also be a variable in the decision-making process for unruptured ectopic pregnancies.

Unfortunately, there is no consensus in the literature regarding the optimal treatment of tubal pregnancy for the maintenance of fertility.

The greatest risk factor for an ectopic pregnancy and loss of fertility is a history of previous ectopic pregnancy. The recurrent ectopic rate is 10–15% after the first ectopic pregnancy, and 30% after the second.\(^{21}\) This risk is related to both the underlying tubal disorder that led to the initial ectopic pregnancy and to the choice of treatment procedure.

Sexually transmitted infections or tubal surgery are responsible for the majority of the tubal damage seen in ectopic pregnancies. Postabortal or puerperal infection, appendicitis, and endometriosis are additional etiologies for tubal pathology. One episode of salpingitis results in subsequent ectopic pregnancy in up to 9% of women. Smoking is also a risk factor but may be a surrogate marker as it coincides with other high-risk behaviors.\(^{1}\) As an example, a study of surgical and medical therapy of ectopic pregnancy reported the rates of recurrent ectopic pregnancy after single dose methotrexate, salpingectomy, and linear salpingostomy were 8, 9.8, and 15.4 percent, respectively, among patients who attempted to conceive.\(^{24}\)

Despite remarkable advances made in both diagnosis and treatment, ectopic pregnancies continue to account for up to 9% of all maternal deaths in developed countries.\(^{25}\) The ability to make diagnoses early and accurately has led to the significant expansion of treatment options and the development of innovative surgical and nonsurgical treatment approaches. Today, ectopic pregnancies continue to make up approximately 2% of all recognized pregnancies.\(^{26}\) Less than 5% of ectopic pregnancies are found outside the tube in locations including the ovary or other intraabdominal structures, the cervix, or defects in the myometrium (e.g., cesarean scar pregnancy). The diagnostic and treatment approaches to these unusual ectopic pregnancies vary greatly depending on their location.

The diagnosis of an ectopic pregnancy is made on the basis of history including physical examination, the assessment of risk factors, vaginal ultrasonography, and serum hCG levels.

The concept of a "discriminatory zone" which is the hCG level above which we expect to see an intrauterine gestational sac has been an important addition to the early diagnosis of an ectopic pregnancy.\(^{27–30}\) In most institutions, the discriminatory zone is a serum hCG level of 1,500 or 2,000 IU/L with TVUS. The reported sensitivity and specificity of hCG of >1,500 IU/L are 15.2 and 93.4%, and for an hCG level of >2,000 IU/L, they are 10.9 and 95.2%, respectively.\(^{31}\)

The level is higher for transabdominal ultrasound (approximately 6,500 IU/L), but TVUS is the standard modality used to evaluate ectopic pregnancy.

However, the correct level to use for the discriminatory zone is controversial. A number of factors (e.g., prostaglandins, integrin, growth factors, cytokines, lectin, matrix-degrading cumulus, and modulator proteins) may cause premature implantation in the tube.\(^{32}\) Pelvic infection may alter tubal function, in addition to causing tubal obstruction and pelvic adhesive disease. Some data suggest that a history of chlamydia infection results in the production of a protein (PROKR2) that makes a pregnancy more likely to implant in the tubes.\(^{33}\)

Of interest is the fact that unusual forms of ectopic pregnancies, such as interstitial and heterotopic pregnancies, are encountered more often. This is partly because of the more frequent use of assisted reproductive techniques.\(^{3,34,35}\) Very rarely it is found retroperitoneally or after a hysterectomy.\(^{36–40}\)

Bassil et al.\(^{41}\) reported advanced heterotopic pregnancy after IVF and embryo transfer, with survival of both the baby and the mother.
**Ectopic Pregnancy: Management of Treatment Options Based on Location**

The management of ectopic pregnancy can be expectant, medical, or surgical. The choice depends on the clinical circumstances, site of ectopic pregnancy, and serum hCG levels.

The laparoscopic approach is emerging as the gold standard for the management of ectopic pregnancy by salpingostomy (incising the tube to remove the tubal gestation but leaving the remainder of the tube intact) or salpingectomy (removal of the fallopian tube), depending upon the clinical scenario.

In 1973, Shapiro and Adler described treatment of ectopic pregnancy and reported laparoscopic salpingectomy using electrocoagulation. Salpingotomy by laparoscopy was first reported using multiple punctures in 1980. Linear salpingotomy with a cutting current was described by DeCherney et al. Laparoscopy is the surgical procedure of choice to both confirm and facilitate removal of an ectopic pregnancy. However, not all ectopic pregnancies are suitable for laparoscopic treatment, these include contraindication for laparoscopy, insufficient laparoscopic experience of the surgeon, or severe pelvic adhesion. Laparotomy may be indicated if the patient is hemodynamically unstable or the size of the ectopic indicates an open surgery. Patients should always be counseled on the risk of conversion to laparotomy when laparoscopy is performed (Fig. 3).

**Conservative Laparoscopic Treatment vs Radical Treatment for Ectopic Pregnancy**

The laparoscopic conservative treatment of ectopic pregnancy was reported by Manhes et al. Pouly investigated the fertility of cases that preserved tubes after surgical treatment for ectopic pregnancy. The ratios of intrauterine pregnancy and ectopic pregnancy after salpingostomy were 67% and 12%, respectively. Laparoscopic procedures were associated with shorter operation times, less intraoperative blood loss, shorter hospital stays, and lower analgesic requirements.

The use of conservative surgical techniques exposes women to the risk of persistent trophoblast which may lead to recurrence of clinical symptoms, potential need for further treatment, and postoperative serum hCG monitoring. Laparoscopic salpingostomy should be considered as the primary treatment when managing tubal pregnancy in the presence of contralateral tubal disease and the desire for future fertility. The possibility of further ectopic pregnancies in the conserved tube should be discussed if salpingostomy is being considered by the surgeon or requested by the patient.

The European Surgery in Ectopic Pregnancy (ESEP) study group suggests that salpingectomy should generally be preferred to salpingostomy in women with tubal pregnancy and a healthy contralateral tube as salpingotomy does not significantly improve fertility prospects compared with salpingectomy.

Results from another recent randomised controlled trial (DEMER) found that salpingostomy and salpingectomy resulted in similar rates of spontaneous conception of an intrauterine pregnancy at two years (70% vs 64%).

In a large prospective cohort study in France, the cumulative intrauterine pregnancy rate within 24 months was higher after salpingostomy than after salpingectomy (76% vs 67%). This difference became significant, after multivariate analysis, in women older than 35 years and in those with a history of infertility or tubal disease, in line with other data.

The persistent trophoblast was more common in the salpingostomy group than in the salpingectomy group, with the reported frequency similar to the 6% reported elsewhere.

In reviews of controlled and uncontrolled studies, rates of persistent trophoblast have been 8.1–8.3% after laparoscopic salpingectomy and 3.9–4.1% after open salpingectomy. Factors that have been suggested as increasing the risk of developing persistent trophoblast include higher preoperative serum hCG levels (>3,000 IU/L), a rapid preoperative rise in serum hCG, and the presence of active tubal bleeding.

Two randomized trials found that the rates of recurrent ectopic pregnancy after salpingostomy or salpingectomy are similar.

Results of a cohort study reported in 2012 suggest that the 2-year cumulative rate of recurrence of ectopic was 19% whatever the treatment received. There was 18.5% recurrence after salpingostomy or salpingectomy and 25.5% after medical treatment. After adjustment to confounders, the rate of recurrence was significantly higher among women who had a history of voluntary termination of pregnancy. Conversely, fewer recurrences occurred among women having a history of infertility or previous live birth.

Ectopic implantation usually occurs because clinical or subclinical salpingitis causes anatomic and functional changes in the fallopian tubes. These changes are typically bilateral and permanent; thus, it is not surprising that ectopic pregnancy is often followed by recurrent ectopic pregnancy and infertility.

**Technical Aspects of Laparoscopic Conservative Treatment**

In the late 1970s, Bruhat et al. described principles and techniques for laparoscopic salpingostomy, and some improvements to the initial technique were made in the 1980s. Since then, the technique has not been substantially modified.

There is some evidence that favors the conservative approach in terms of fertility prognosis.

In the absence of clinically relevant predictive factors of failure for a conservative surgical technique by laparoscopy, a standardized surgical technique and the use of appropriate instrumentation are important.
are recommended to achieve lower failure rates and reduce the probability of persistent ectopic pregnancy.69 Faulty equipment and use of inappropriate instrumentation have been cited as reasons for conversion70 or change in surgical techniques.71

The linear salpingotomy must be as nontraumatic as possible. The most common technique is monopolar electrosection, because it is the easiest and cheapest method.74

As previously described,43,63,64 linear salpingotomy must be performed along the antimesenteric border to preserve tubal vascularization. The salpingotomy must be carried out at the internal part of the hematosalpinx. The trophoblast is located there, and the distal part contains generally only clots. The incision should be done over the ectopic pregnancy, reaching the proximal (medial) portion of the hematosalpinx.69

This is very important because one study72 noted the trophoblastic tissue to be implanted medial to the salpingotomy site in tubes that had been excised after the diagnosis of persistent ectopic pregnancy. These findings suggest that surgeons may not remove adequately the tissue medial to the site of the “bulge” within the tube.69

Salpingostomy must be large enough (10–15 mm) to allow the introduction of a 10 mm cannula and extraction of trophoblast without difficulty through it. With a narrower device, the risk of partial removal of the trophoblast increases. The high rate of failure in some series is largely explained by the use of inefficient suction devices.

The products of conception are released from the tube using a combination of hydrodissection with irrigating solution under high pressure and gentle blunt dissection with a suction irrigator. The specimen can then be placed into a laparoscopic pouch and removed from the abdominal cavity; it is also useful for removal of large fragments of placental tissue. Using fluid to remove the gestation is preferable to removing it bluntly. Extracting the products of conception in pieces with forceps may lead to retained trophoblastic tissue, particularly in the area of the tube proximal to the ectopic gestation. The tubal expression (“tubal milking”) without associated salpingotomy procedure is associated with a higher rate of persistent ectopic pregnancy and should be avoided.43,64,73

The use of a fine monopolar needle, as a result of its minimal surface, allows clean and the most precise cutting of the three tubal layers, avoiding further tissue damage.69

The use of monopolar scissors or other devices with greater surfaces leads to a less precise cutting limit and unnecessary thermal damage to the surrounding tissue.69

The crucial point is to avoid large coagulation of the tubal wall, which can lead to a tuboperitoneal fistula.74 Therefore, it must be achieved with a fine electrode and a cutting current. The electrode must not be pressed on the tube but rather should just touch it slightly to increase the power density. The speed of movement along the incision must be sufficiently fast to maximize the cutting effect and limit the collateral coagulation. Bipolar coagulation is forbidden for this step.74

The tube is carefully irrigated, inspected for complete removal of the trophoblast, and explored to ensure hemostasis.

Complete hemostasis of the tube is unnecessary or even deleterious. If no vasoconstrictive drugs are used, the bleeding generally comes from the trophoblast implantation area (Fig. 4). Bipolar electrocoagulation, used to achieve hemostasis, leads to large destruction of the tube and is not efficient. Generally, the bleeding stops by itself after 5–10 minutes (Fig. 5).74 In the case of severe bleeding, removal of the tube must be considered but only after mechanical compression of the mesosalpinx for at least 5 minutes (Fig. 6).74 A preventive injection of vasoconstrictive drugs (Pitressin) is an efficient alternative when permitted (Fig. 7).65 The salpingotomy incision is left open to heal by secondary intention75 to decrease the risk of obstruction and allow better healing of mucosal folds (Fig. 8).67 It was proved that suturing the tube increases the risk of obstruction and decreases postoperative fertility.76 In addition, laparoscopic suturing is time-consuming and it does not have additional benefits.76 Fertility performance after surgery appears to be related to reproductive performance before the ectopic pregnancy (Fig. 9).

**Laparoscopic Radical Treatment (Salpingectomy) for Tubal Ectopic Pregnancy**

Salpingectomy is the standard procedure if the condition of the tube is compromised (ruptured or otherwise disrupted), bleeding is uncontrolled, or the gestation appears too large to remove with salpingostomy. Salpingectomy is required in women who have contraindications to methotrexate therapy.
For women who have completed childbearing, bilateral salpingectomy may be performed as permanent sterilization. The availability and high intrauterine pregnancy rate of IVF have also decreased the need to preserve diseased fallopian tubes, including tubes with an ectopic pregnancy. However, many women do not have access to IVF for financial, geographic, or ethical reasons. An additional potential benefit of salpingectomy rather than another sterilization method is a decrease in the risk of tubal neoplasia with spread to the ovary.

Salpingectomy appears to be associated with a reduced risk of ovarian cancer, and some data suggest that the tube is the site of origin for some high-grade serous carcinomas that were presumed to be ovarian. However, further study is needed, and unilateral salpingectomy has not been investigated.

Electrosurgery was applied for salpingectomy by bipolar or even monopolar coagulation. No data support a difference in the use of any of these technologies, even though bipolar cautery is generally considered to be less dangerous. The mesosalpinx and the blood vessels coursing through can be desiccated with bipolar electrosurgery. It is rarely necessary to desiccate either the tubo-ovarian or utero-ovarian vessels, thus sparing the accessory blood supply to the ovary.

There is no difference in the direction of the salpingectomy: it can be carried out from the isthmus to the infundibulopelvic ligament or vice versa. Extraction of the tubes from the abdominal cavity must be done in an endobag or through a culdotomy, rather than pulling the tube through a trocar incision.

**Fig. 6:** The salpingostomy is performed at the proximal part of the hematosalpinx (Donnez J, et al. Atlas of Operative Laparoscopy and Hysteroscopy. Informa; 2007)

**Fig. 7:** The robust, large suction device permits removal of the trophoblast through gentle and progressive traction (Donnez J, et al. Atlas of Operative Laparoscopy and Hysteroscopy. Informa; 2007)

**Fig. 8:** A repeat suction is performed (Donnez J, et al. Atlas of Operative Laparoscopy and Hysteroscopy. Informa; 2007)

**Fig. 9:** This minimal bleeding does not require further hemostasis and coagulation. The abdominal cavity must simply be washed (Donnez J, et al. Atlas of Operative Laparoscopy and Hysteroscopy. Informa; 2007)

**Conclusion**

Ectopic pregnancy remains the leading cause of death in the first trimester of pregnancy. Today, TVUS examination facilitates early detection of most ectopic pregnancies. Whether a laparoscopic salpingostomy should be done or a salpingectomy is still a matter of debate. The choice of salpingostomy or salpingectomy relies upon many factors and includes shared decision-making between the surgeon and patient.

The effect of different management strategies on subsequent fertility after tubal ectopic pregnancy is still controversial.
Laparoscopic Conservative Treatment and Laparoscopic Salpingotomy

Awareness of the possibility of an ectopic pregnancy is most critical for early detection. Prompt diagnosis and proper treatment may also play a role in the preservation of fertility after an ectopic pregnancy. The increased knowledge of risk factors among clinicians and proper patient education have enabled an early and accurate diagnosis of ectopic pregnancy.

Although surgical intervention has long been the gold standard of ectopic treatment, medical management of unruptured ectopic pregnancy has emerged as a safe and effective alternative. Laparoscopic surgery remains the “gold standard” in majority of women.

There is some evidence to suggest that future fertility outcomes are slightly improved after tubal conservation surgery in comparison with salpingectomy. Long-term follow-up shows that the IUP rate in laparoscopy, medical management, and expectant management are all comparable, and the most important factor in surgical cases is the health of the contralateral tube. As the incidence of ectopic pregnancy continues to rise in a population that will likely desire future fertility, early diagnosis is key in facilitating safe utilization of more conservative management in the hope of preserving tubal function and reproductive potential.

In the absence of clinically relevant predictive factors of failure for a conservative surgical technique by laparoscopy, a standardized surgical technique and the use of appropriate instrumentation are recommended to achieve lower failure rates and reduce the probability of persistent ectopic pregnancy. The strict respect of the operative procedure is the best guarantee to prevent persistent trophoblast after salpingotomy. Unfortunately, there is no consensus in the literature regarding the optimal treatment of tubal pregnancy for the maintenance of fertility.

References

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