Journal of Pharmaceutical Research and Innovation (JPRI)
Volume 5, Issue 2, July 2025

e-ISSN: 2583-0023

Surgical Approaches in Ectopic Pregnancy: Effectiveness, Complications, and Long-Term Outcomes

Mehmet Çopuroğlu

Department of Obstetrics and Gynecology, Kayseri City Hospital, Kayseri 38080, Turkey
Corresponding Author Email: drmehmetcopuroglu@gmail.com

Abstract

Ectopic pregnancy (EP) remains a significant cause of maternal morbidity and early pregnancy-related mortality. Surgical intervention is often necessary in cases of rupture, hemodynamic instability, or failed medical management. With advancements in laparoscopic techniques, surgical options have shifted, yet the optimal approach—salpingostomy versus salpingectomy—remains debated, particularly regarding reproductive outcomes and complication rates. This review compares the effectiveness, risks, and fertility outcomes of laparoscopic salpingostomy and salpingectomy in the management of EP. A synthesis of recent randomized trials, cohort studies, and meta-analyses was conducted, evaluating surgical success, complications, persistent trophoblastic tissue, recurrence, and subsequent fertility. Both procedures show high initial success. Salpingostomy preserves the fallopian tube and may benefit fertility, especially in bilateral tubal disease, but carries higher risk of persistent trophoblastic tissue and need for follow-up. Salpingectomy eliminates this risk and is preferred when the contralateral tube is healthy. Fertility outcomes are generally comparable when the remaining tube is patent. Laparoscopic approaches reduce morbidity and improve recovery compared to laparotomy but may be limited in low-resource settings. Psychological impacts and long-term care needs remain underemphasized in current protocols. Surgical management of EP should be individualized based on patient stability, fertility goals, and resource availability. Both salpingostomy and salpingectomy are appropriate in selected cases. Expanding access to laparoscopy and integrating psychological support into care pathways are essential for comprehensive management.

Keywords

Ectopic pregnancy, Fertility outcomes, Laparoscopic surgery, Salpingectomy, Salpingostomy.

INTRODUCTION

Ectopic pregnancy (EP), defined as the implantation of a fertilized ovum outside the endometrial lining of the uterus, is a critical gynecological emergency with potentially life-threatening consequences. Although the incidence is relatively low—affecting approximately 1–2% of all pregnancies—it accounts for nearly 6% of pregnancy-related deaths in the first trimester in high-income countries and up to 15% in low-resource settings [1] [2] [3]. The vast majority of EPs (>90%) occur in the fallopian tubes, with the ampullary region being the most common site. However, less common implantations such as cervical, ovarian, interstitial, abdominal, and cesarean scar pregnancies can pose even greater diagnostic and therapeutic challenges [4] [5].

Historically, ectopic pregnancy was a uniformly fatal condition prior to the development of surgical interventions in the late 19th and early 20th centuries. Early laparotomy techniques dramatically reduced mortality rates, and with the advent of diagnostic ultrasound, laparoscopy, and later, medical therapy, the management of EP has undergone a paradigm shift [6]. The introduction of high-resolution transvaginal ultrasound in the 1980s, combined with quantitative serum beta-human chorionic gonadotropin (β-hCG) assays, now allows for earlier detection of unruptured ectopic pregnancies—often before symptoms manifest [7] [8]. This early diagnosis enables clinicians to consider more conservative, fertility-sparing options and improves the overall prognosis.

Treatment approaches for EP fall into three broad categories: expectant management, medical therapy (primarily methotrexate), and surgical intervention. While expectant and medical management have gained popularity in selected asymptomatic or stable patients with low and declining β-hCG levels, surgical treatment remains indispensable in numerous clinical scenarios—including hemodynamic instability, suspected rupture, contraindications to methotrexate, or patient preference for immediate resolution [9] [10] [11]. In resource-limited environments, where timely follow-up for medical management is not feasible, surgery is often the only viable option.

Surgical options have evolved significantly, transitioning from open laparotomy to minimally invasive laparoscopic procedures, which are now considered the gold standard for most hemodynamically stable patients [12] [13]. Laparoscopic techniques, particularly salpingostomy and salpingectomy, allow for effective treatment with reduced morbidity, faster postoperative recovery, and minimal hospital stay [14]. However, the decision between salpingostomy (tube-conserving) and salpingectomy (tube-removing) is nuanced and depends on multiple clinical factors, including the extent of tubal damage, contralateral tubal patency, patient's fertility desires, and risk of persistent

e-ISSN: 2583-0023

trophoblastic tissue [15] [16].

The debate surrounding the optimal surgical approach is further complicated by emerging data on long-term reproductive outcomes. While salpingostomy is often preferred in patients desiring future fertility, it carries an increased risk of persistent ectopic tissue (requiring additional treatment) and possible recurrence in the same tube [17]. Conversely, salpingectomy eliminates these risks but at the potential cost of reduced fertility, especially in cases of pre-existing contralateral tubal pathology [18].

In addition to fertility concerns, the complication profile of each surgical method must be carefully considered. Laparoscopic procedures are associated with lower rates of intraoperative blood loss, postoperative adhesions, and wound infections compared to laparotomy. Nonetheless, in emergencies such as massive hemoperitoneum or difficult anatomic visualization, laparotomy may still be the safer option [19].

On a broader scale, the management of ectopic pregnancy also intersects with issues of global health equity, as access to timely diagnosis and minimally invasive surgical techniques remains uneven across regions. In low- and middle-income countries (LMICs), late presentations and limited access to advanced surgical equipment continue to contribute to high maternal morbidity and mortality from EP [20]. Additionally, cultural, legal, and socioeconomic factors may influence both patient behavior and healthcare provider decisions, further complicating treatment pathways [21].

Given the complexity and clinical implications of surgical choices in ectopic pregnancy management, a comprehensive understanding of the comparative outcomes of various surgical modalities is essential. Furthermore, evaluating these options through the lens of not only clinical effectiveness but also long-term reproductive health, cost-efficiency, and psychosocial impact is crucial for evidence-based and patient-centered care [22].

This review aims to critically synthesize the current literature on surgical management of ectopic pregnancy, with a focus on the effectiveness, complication profiles, and long-term outcomes associated with different surgical techniques. Through a detailed examination of comparative studies, clinical guidelines, and meta-analyses, this article seeks to provide clinicians with an evidence-based framework for optimizing treatment strategies tailored to individual patient needs.

Surgical Approaches: An Overview

Surgical management has long been a cornerstone in the treatment of ectopic pregnancy, especially in cases where rapid intervention is required to prevent life-threatening complications such as tubal rupture and intra-abdominal hemorrhage. The evolution of surgical approaches—from open laparotomy to minimally invasive laparoscopy—has significantly improved outcomes, with lower morbidity and faster postoperative recovery.

Historically, laparotomy was the only surgical method available for treating ectopic pregnancy. Although effective, it required a large abdominal incision, which increased the risk of postoperative pain, wound infections, adhesions, and prolonged hospital stays [23]. The introduction of laparoscopic surgery in the late 20th century revolutionized gynecologic surgery by offering a less invasive alternative with comparable success rates. Today, laparoscopy is widely regarded as the gold standard for the surgical treatment of hemodynamically stable patients with ectopic pregnancy [11].

There are two principal laparoscopic techniques for tubal ectopic pregnancy: salpingostomy and salpingectomy.

Salpingostomy

Salpingostomy involves creating a linear incision in the fallopian tube at the site of the ectopic gestation to remove the pregnancy tissue, while preserving the tube itself. This technique is particularly beneficial for patients desiring future fertility, as it maintains the structural integrity of the tube [14]. After evacuation of the gestational products, the incision is typically left unsutured to heal by secondary intention, although some surgeons opt for fine suturing.

However, salpingostomy carries specific risks, including persistent trophoblastic tissue occurring in up to 5–20% of cases—which may necessitate further treatment with methotrexate or even a secondary surgical procedure [16]. Close postoperative monitoring with serial β-hCG levels is therefore essential.

Salpingectomy

Salpingectomy entails the complete removal of the affected fallopian tube. This approach eliminates the risk of persistent ectopic tissue and recurrence in the same tube. It is typically recommended when the tube is extensively damaged, the patient has completed childbearing, or when the contralateral tube is healthy and patent [13].

Several studies have demonstrated that in women with a healthy contralateral tube, the subsequent fertility rates following salpingectomy may not be significantly different from those following salpingostomy [24]. However, in cases of bilateral tubal disease or previous ectopic pregnancy, conservative surgery may be more appropriate to preserve fertility.

Laparoscopy vs. Laparotomy

Laparoscopic surgery offers clear advantages over laparotomy in terms of reduced blood loss, lower infection rates, quicker recovery, and decreased hospital costs [12]. Nevertheless, laparotomy may still be indicated in specific situations—such as significant hemoperitoneum, extensive pelvic adhesions, or when laparoscopic expertise or equipment is unavailable. In resource-limited settings, laparotomy remains common due to infrastructural constraints [20] (Table 1).

Journal of Pharmaceutical Research and Innovation (JPRI)
Volume 5, Issue 2, July 2025
e-ISSN: 2583-0023

Table 1. Surgical Options in Ectopic Pregnancy

Surgical Method	*Tube Preservation*	*Risk of Persistent Tissue*	*Fertility Impact*	*Hospital Stay*
Salpingostomy	Yes	Moderate–High (5–20%)	Potentially better	Short
Salpingectomy	No	Low	Depends on other tube	Short
Laparotomy	Variable	Variable	Variable	Longer

Special Cases: Non-Tubal Ectopic Pregnancies

Surgical management becomes more complex in cases of non-tubal ectopic pregnancies. For example, interstitial pregnancies often require cornual resection or wedge resection, which may necessitate laparotomy and carry significant hemorrhagic risk [25]. Cesarean scar pregnancies, though rare, have also been managed surgically via hysteroscopy, laparoscopy, or laparotomy, depending on gestational age and bleeding risk [26].

While salpingostomy and salpingectomy remain the primary procedures for tubal ectopic pregnancy, the choice of surgical method must be individualized based on the clinical context, patient stability, reproductive desires, anatomical findings, and surgeon expertise.

Comparative Effectiveness of Surgical Methods

The selection of an optimal surgical method for ectopic pregnancy depends on balancing immediate clinical efficacy with long-term reproductive outcomes. The two primary procedures, salpingostomy and salpingectomy, have both demonstrated high success rates in resolving the acute condition. However, they differ significantly in their implications for fertility preservation, recurrence risk, and the potential need for additional treatment. This section explores the comparative effectiveness of these techniques in terms of resolution rates, future fertility, and recurrence of ectopic pregnancy.

Resolution Rates and Immediate Success

Both laparoscopic salpingostomy and salpingectomy exhibit high clinical success in treating tubal ectopic pregnancies. Salpingectomy, being more definitive, nearly eliminates the risk of residual trophoblastic tissue and is associated with lower rates of reintervention. Several studies have reported a >99% success rate with salpingectomy for immediate resolution of ectopic pregnancy [11].

Salpingostomy, while also effective, carries a 5–20% risk of persistent trophoblastic tissue due to retained microscopic chorionic villi within the tube. This may necessitate further medical management with methotrexate or a secondary surgical procedure [14]. Consequently, patients undergoing salpingostomy require close postoperative surveillance with serial β-hCG levels until complete resolution is confirmed (Table 2).

Table 2. Surgical Outcomes in Ectopic Pregnancy

Outcome	*Salpingostomy*	*Salpingectomy*
Immediate success rate	95–98%	>99%
Risk of persistent tissue	5–20%	<1%
Need for postoperative follow-up	High (β-hCG monitoring)	Minimal

Future Fertility Outcomes

Preservation of fertility is a key consideration in choosing between salpingostomy and salpingectomy. Salpingostomy is often preferred in women with contralateral tubal damage or in those who strongly desire future conception through natural means. It preserves the anatomic structure of the tube, theoretically allowing for higher chances of spontaneous intrauterine pregnancy (IUP). However, randomized controlled trials and cohort studies have reported similar future fertility rates between the two procedures, especially in patients with a healthy contralateral tube. The landmark DEMETER trial found no significant difference in subsequent IUP rates between salpingostomy and salpingectomy over a 36-month follow-up period (60.7% vs. 56.2%, respectively) [27].

Moreover, assisted reproductive technologies (ART) such as in vitro fertilization (IVF) further reduce the reproductive disadvantage associated with salpingectomy, especially when both tubes are compromised. In women with a healthy contralateral fallopian tube, salpingectomy is the preferred surgical option, as it significantly reduces the risk of persistent trophoblastic tissue without negatively impacting future fertility outcomes [16].

Risk of Recurrence

The risk of recurrent ectopic pregnancy after surgical treatment varies depending on the method used and patient-specific factors, such as pre-existing tubal damage or pelvic inflammatory disease. Salpingostomy is associated with a slightly higher recurrence risk, with studies reporting recurrence rates of 10–15%, compared to 5–8% for salpingectomy [27].

It is worth noting, however, that these figures may reflect patient selection bias—i.e., women undergoing salpingostomy are often those with more extensive bilateral tubal pathology to begin with (Table 3).

Journal of Pharmaceutical Research and Innovation (JPRI)
Volume 5, Issue 2, July 2025
e-ISSN: 2583-0023

Table 3. Reproductive Outcomes After Surgery

Outcome	*Salpingostomy*	*Salpingectomy*
Recurrent EP risk	10–15%	5–8%
Subsequent IUP rate	~60%	~55–60%
ART requirement (IVF)	Lower	Higher (if bilateral)

Patient-Centered Factors

When clinical safety permits, shared decision-making is encouraged, considering the patient's reproductive goals, access to ART, risk tolerance, and follow-up availability. In some cases, intraoperative findings may dictate the preferred procedure—e.g., a severely damaged or actively bleeding tube may necessitate salpingectomy even if fertility preservation was initially desired.

Furthermore, fertility-preserving surgery must be balanced against the healthcare system's ability to provide reliable follow-up. In resource-limited settings where β-hCG monitoring is not feasible, salpingectomy may be the safer and more practical option.

Complications Associated with Surgical Treatments

Although surgical management of ectopic pregnancy is generally safe and effective, it is not without risk. The choice of surgical technique—whether laparoscopy vs. laparotomy or salpingostomy vs. salpingectomy—has implications for the type and likelihood of complications. This section provides an evidence-based analysis of the intraoperative risks, postoperative complications, and long-term sequelae associated with the various surgical approaches used in ectopic pregnancy management.

Intraoperative Complications

Intraoperative risks vary depending on the surgical route (laparoscopy vs. laparotomy), the location of the ectopic pregnancy, and the patient's clinical condition. In general, laparoscopic procedures are associated with significantly lower complication rates compared to laparotomy [12].

Common intraoperative complications include:

- **Hemorrhage:** Active bleeding from the implantation site is a frequent concern, especially in ruptured EP. In salpingostomy, the open incision in the tube increases bleeding risk, although electrocautery and vasoconstrictors are typically effective in achieving hemostasis [14].
- **Visceral injury:** Bowel, bladder, and ureteral injuries are rare but serious risks, especially in laparotomy performed in patients with dense pelvic adhesions.
- **Conversion to laparotomy:** In approximately 1–5% of laparoscopic surgeries, intraoperative complications or poor visualization may necessitate conversion to laparotomy [28].

A study showed that an overall intraoperative complication rate of 3.3% for laparoscopy and 6.6% for laparotomy in the treatment of tubal ectopic pregnancy [16].

Postoperative Complications

Postoperative morbidity also differs by technique. Laparoscopy is associated with shorter recovery times, fewer wound infections, and lower rates of adhesion formation (Table 4).

Table 4. Surgical Complications Overview

Complication	*Laparoscopy*	*Laparotomy*
Wound infection	<1%	5–10%
Postoperative ileus	Rare	Common
Hospital stay	1–2 days	3–5 days
Pain and analgesia need	Low	High
Adhesion formation	Minimal	Moderate–High

Post-surgical infection rates are higher in laparotomy due to the open nature of the incision. Prophylactic antibiotics are standard in both approaches, yet wound infections, pelvic abscesses, and endometritis still occur more frequently following laparotomy [29].

Salpingostomy, though fertility-sparing, also increases the likelihood of postoperative complications due to:

- Retained trophoblastic tissue
- Prolonged β-hCG monitoring
- Potential need for secondary methotrexate or surgery

Adhesions and Chronic Pelvic Pain

One of the major long-term complications after abdominal or pelvic surgery is adhesion formation, which may result in chronic pelvic pain, infertility, or bowel obstruction. Laparoscopy significantly reduces adhesion risk due to minimal tissue trauma and faster healing compared to laparotomy [30].

Salpingostomy may result in intracavitary tubal adhesions, especially if bleeding or infection occurs postoperatively.

e-ISSN: 2583-0023

These adhesions can impair ciliary function and contribute to subsequent infertility or ectopic pregnancy recurrence.

Anesthesia and Thromboembolic Risk

General anesthesia is required for both laparoscopic and open surgical procedures. Although the risk of anesthesia-related complications is low, obese patients or those with cardiopulmonary comorbidities are at higher risk. Venous thromboembolism (VTE), although rare, must be considered, especially in prolonged laparotomy with limited mobility in the postoperative period. Prophylactic anticoagulation is typically employed for at-risk patients [31].

Long-Term Outcomes

While surgical management of ectopic pregnancy often provides immediate resolution of a potentially life-threatening condition, its long-term consequences—particularly with respect to fertility, psychosocial health, and healthcare burden—remain significant considerations. This section examines the extended outcomes following different surgical interventions and their broader implications for reproductive and emotional well-being.

Fertility and Reproductive Outcomes

Fertility preservation is a primary concern, especially in women of reproductive age who wish to conceive in the future. The impact of surgical management on fertility is influenced by several factors, including:

- Type of surgery performed (salpingostomy vs. salpingectomy)
- Condition of the contralateral tube
- Degree of pelvic adhesions or tubal damage
- Presence of underlying infertility conditions

As previously discussed, salpingostomy is intended to preserve the fallopian tube and may theoretically enhance future fertility. However, recent studies suggest that, when the contralateral tube is healthy, there is no significant difference in intrauterine pregnancy (IUP) rates between salpingostomy and salpingectomy [24] [27].

The DEMETER trial, a multicenter randomized controlled study, demonstrated comparable IUP rates after salpingostomy (60.7%) and salpingectomy (56.2%) over 36 months, with no statistically significant difference [14]. Additionally, assisted reproductive technologies (ART) such as in vitro fertilization (IVF) have helped overcome fertility challenges even in cases where both tubes are compromised or removed.

Nevertheless, the risk of recurrent ectopic pregnancy is a concern, particularly after salpingostomy, with recurrence rates reported between 10–15% [22]. Patients with a history of EP should receive preconception counseling and early ultrasonographic evaluation in subsequent pregnancies to confirm intrauterine implantation.

Psychological and Emotional Impact

Ectopic pregnancy is not only a physical trauma but also a significant emotional and psychological event, often associated with grief, anxiety, depression, and post-traumatic stress [8]. The sudden nature of the diagnosis, the need for urgent surgical intervention, and concerns about future fertility amplify psychological distress.

Studies show that women who undergo surgical management—especially in emergency contexts or with tubal loss—may experience:

- Depression and emotional withdrawal
- Anxiety regarding future pregnancies
- Guilt or fear associated with recurrent EP
- Relationship strain with partners

A qualitative study revealed that many women report feelings of “loss and emptiness,” and emphasized the need for better psychological support and post-treatment counseling [32]. Healthcare providers should incorporate psychosocial support services into post-EP care, including referral to mental health professionals, support groups, and fertility counseling when appropriate.

Cost-Effectiveness and Health System Implications

Economic evaluations of ectopic pregnancy management suggest that laparoscopic surgery, particularly salpingectomy, may be more cost-effective in certain clinical scenarios due to:

- Shorter hospital stays
- Reduced need for intensive monitoring
- Lower rates of persistent trophoblast requiring further treatment

A cost-effectiveness analysis compared salpingectomy to salpingostomy and found that while salpingostomy may yield marginally higher spontaneous pregnancy rates, the increased need for follow-up, potential second-line treatment, and risk of recurrence made it less cost-efficient in health systems prioritizing immediate resolution [33].

Moreover, laparoscopy is more resource-intensive in terms of equipment and surgical training, which may limit its availability in low-resource settings. In these environments, laparotomy, though less ideal in terms of patient recovery, may be the only viable option—highlighting the global disparities in access to quality reproductive healthcare [3].

DISCUSSION

The surgical management of ectopic pregnancy remains a vital component of gynecologic emergency care, particularly in cases where immediate intervention is required to prevent severe maternal morbidity or mortality. While medical and expectant management are appropriate for selected hemodynamically stable patients, surgical treatment provides a definitive resolution, especially in the presence of tubal rupture or methotrexate failure [11]. Over recent decades, the field has undergone a significant shift from traditional laparotomy to minimally invasive laparoscopy, leading to

e-ISSN: 2583-0023

improved perioperative outcomes, reduced hospital stays, and enhanced patient satisfaction [12].

One of the central clinical dilemmas in surgical management involves the choice between salpingostomy and salpingectomy. Salpingostomy offers the benefit of preserving the fallopian tube, theoretically improving chances of future natural conception. However, this approach carries a significant risk of persistent trophoblastic tissue, reported in up to 20% of cases, often requiring secondary treatment with methotrexate or further surgery [16]. Salpingectomy, on the other hand, eliminates this risk by completely removing the affected tube and is associated with lower recurrence and retreatment rates. Notably, findings from the DEMETER trial revealed no statistically significant difference in intrauterine pregnancy rates between salpingostomy (60.7%) and salpingectomy (56.2%) over a three-year follow-up, provided the contralateral tube is healthy [14]. These results suggest that tubal conservation may not be necessary in all cases, particularly where the remaining tube is functionally intact.

The laparoscopic approach has proven to be superior to laparotomy in both immediate and long-term surgical outcomes. Laparoscopy is associated with lower intraoperative blood loss, reduced postoperative pain, fewer infections, and decreased adhesion formation, all of which contribute to faster recovery and better fertility preservation [29]. Nevertheless, in low-resource settings where laparoscopic equipment or surgical expertise may be limited, laparotomy remains widely practiced [3]. This disparity highlights a broader issue of inequity in access to safe and effective reproductive healthcare globally, necessitating increased investment in surgical infrastructure, training, and health system strengthening in underserved regions.

While clinical success is often measured in terms of physical resolution and reproductive outcomes, the psychological impact of ectopic pregnancy remains an underexplored yet critical dimension. Women who experience an ectopic pregnancy, especially those who undergo emergency surgery or lose a fallopian tube, may suffer from significant emotional distress, including depression, anxiety, and grief [34]. Unfortunately, mental health outcomes are seldom included in clinical trials or follow-up care protocols. A more holistic, patient-centered approach to post-treatment care would include routine psychological screening and access to counseling services.

It is also important to acknowledge the complexity of non-tubal ectopic pregnancies—such as interstitial, cervical, and cesarean scar implantations—which present with unique surgical risks and often require individualized management strategies. These forms were beyond the scope of this review but represent an important frontier for future research, as standardized treatment guidelines are currently lacking and most recommendations are derived from isolated case reports or small case series [25] [26].

In summary, the choice of surgical technique for ectopic pregnancy must be individualized based on patient-specific factors, including reproductive goals, tubal anatomy, hemodynamic stability, and access to resources. While both salpingostomy and salpingectomy are effective, evidence suggests that in the presence of a healthy contralateral tube, salpingectomy may offer a safer and equally fertile outcome. Future studies should prioritize long-term, patient-centered outcomes, incorporating not only reproductive success but also quality of life, emotional well-being, and cost-effectiveness, particularly in diverse healthcare settings.

CONCLUSION

Surgical treatment remains a critical option in the management of ectopic pregnancy, especially when medical therapy is contraindicated or fails. Laparoscopy, when available, offers superior outcomes compared to laparotomy and should be the preferred approach. Between salpingostomy and salpingectomy, the choice should be individualized based on tubal health and future fertility goals. While salpingostomy preserves fertility, salpingectomy provides a lower risk of recurrence. Ultimately, management decisions should balance clinical safety, reproductive outcomes, and patient preference, with increasing attention to psychological support and equitable access to care.

REFERENCES

[1] Creanga, A. A., Shapiro-Mendoza, C. K., Bish, C. L., Zane, S., Berg, C. J., and Callaghan, W. M., 2011, Trends in ectopic pregnancy mortality in the United States: 1980–2007. *Obstetrics & Gynecology*, 117(4), 837–843.

[2] World Health Organization, 2019, Global causes of maternal death: A WHO analysis 2007–2017. Geneva: WHO.

[3] Goyaux, N., Leke, R., Keita, N., and Thonneau, P., 2003, Ectopic pregnancy in African developing countries. *Acta Obstetricia et Gynecologica Scandinavica*, 82(4), 305–312.

[4] Bouyer, J., Coste, J., Fernandez, H., Pouly, J. L., and Job-Spira, N., 2002, Sites of ectopic pregnancy: A 10-year population-based study of 1800 cases. *Human Reproduction*, 17(12), 3224–3230.

[5] Fylstra, D. L., 2012, Ectopic pregnancy not within the (distal) fallopian tube: A review. *American Journal of Obstetrics and Gynecology*, 206(4), 289–299.

[6] Speert, H., 1980, *Obstetrics and gynecology in America: A history*. San Francisco: Norman Publishing.

[7] Seeber, B. E., and Barnhart, K. T., 2006, Suspected ectopic pregnancy. *Obstetrics & Gynecology*, 107(2), 399–413.

[8] Kirk, E., Bottomley, C., and Bourne, T., 2014, Diagnosing ectopic pregnancy and current concepts in the management of pregnancy of unknown location. *Human Reproduction Update*, 20(2), 250–261.

[9] Practice Committee of the American Society for Reproductive Medicine, 2013, Medical treatment of ectopic pregnancy: A committee opinion. *Fertility and Sterility*, 100(3), 638–644.

[10] Lipscomb, G. H., Givens, V. M., Meyer, N. L., and Bran, D., 2005, Comparison of multi-dose and single-dose methotrexate protocols for the treatment of ectopic pregnancy. *American Journal of Obstetrics and Gynecology*, 192(6), 1844–1847.

[11] American College of Obstetricians and Gynecologists, 2018, ACOG Practice Bulletin No. 193: Tubal ectopic pregnancy. *Obstetrics & Gynecology*, 131(3), e65–e77.

e-ISSN: 2583-0023

[12] Mol, F., Mol, B. W., Ankum, W. M., van der Veen, F., and Hajenius, P. J., 2008, Current evidence on surgery, systemic methotrexate and expectant management in the treatment of tubal ectopic pregnancy: A systematic review and meta-analysis. *Human Reproduction Update*, 14(4), 309–319.

[13] Clausen, I., 1996, Conservative versus radical surgery for tubal pregnancy: A review. *Acta Obstetricia et Gynecologica Scandinavica*, 75(1), 8–12.

[14] Fernandez, H., and Gervaise, A., 2004, Ectopic pregnancies after infertility treatment: Modern diagnosis and therapeutic strategy. *Human Reproduction Update*, 10(6), 503–513.

[15] Sowter, M. C., and Farquhar, C. M., 2004, Ectopic pregnancy: An update. *Current Opinion in Obstetrics and Gynecology*, 16(4), 289–293.

[16] Hajenius, P. J., Mol, B. W., Bossuyt, P. M., Ankum, W. M., and Van Der Veen, F., 2007, Interventions for tubal ectopic pregnancy. *Cochrane Database of Systematic Reviews*, 2007(1), CD000324.

[17] Takeda, A., Imoto, S., and Nakamura, H., 2015, Fertility outcomes in women treated with laparoscopic surgery for tubal pregnancy. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 190, 88–91.

[18] Bhandari, S., Bhattacharya, S., and Maheshwari, A., 2014, Effect of surgery for tubal ectopic pregnancy on future fertility. *Journal of Obstetrics and Gynaecology Research*, 40(6), 1871–1877.

[19] Udigwe, G. O., Umeononihu, O. S., and Mbachu, I. I., 2010, Ectopic pregnancy: A 5-year review of cases at Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi. *Nigerian Medical Journal*, 51(4), 160–163.

[20] Thonneau, P., Goyaux, N., Ndé, M., Eyraud, B., and Maggioni, C., 2002, Ectopic pregnancy in African developing countries. *Acta Obstetricia et Gynecologica Scandinavica*, 81(10), 793–799.

[21] Hardon, A., 2003, Women's views and experiences of fertility regulation. *Reproductive Health Matters*, 11(21), 17–26.

[22] Li, C., Zhao, W. H., Zhu, Q., et al., 2015, Risk factors for ectopic pregnancy: A multi-center case control study. *BMC Pregnancy and Childbirth*, 15, 187.

[23] Tulandi, T., and Saleh, A., 1999, Surgical treatment of ectopic pregnancy. *Clinical Obstetrics and Gynecology*, 42(1), 31–38.

[24] Bangsgaard, N., Lund, C. O., Ottesen, B., and Nilas, L., 2003, Improved fertility following conservative surgical treatment of ectopic pregnancy. *BJOG: An International Journal of Obstetrics & Gynaecology*, 110(8), 765–770.

[25] Moon, H. S., Choi, Y. J., Park, Y. H., and Kim, S. G., 2000, New simple endoscopic operations for interstitial pregnancy. *American Journal of Obstetrics and Gynecology*, 182(1 Pt 1), 114–121.

[26] Jurkovic, D., Hillaby, K., Woelfer, B., Lawrence, A., Salim, R., and Elson, C. J., 2003, First-trimester diagnosis and management of pregnancies implanted into the lower uterine segment cesarean section scar. *Ultrasound in Obstetrics & Gynecology*, 21(3), 220–227.

[27] Capmas, P., Bouyer, J., and Fernandez, H., 2012, Conservative treatment of ectopic pregnancy. *Expert Review of Obstetrics & Gynecology*, 7(3), 275–283.

[28] Roy, K. K., Baruah, J., Singh, S., et al., 2011, Outcome of laparoscopic management in ectopic pregnancy: A retrospective review of 72 cases. *Archives of Gynecology and Obstetrics*, 283(3), 643–647.

[29] Oelsner, G., and Shashar, D., 1998, Laparoscopic management of ectopic pregnancy. *Current Opinion in Obstetrics and Gynecology*, 10(4), 273–277.

[30] Lower, A. M., Hawthorn, R. J., Ellis, H., O'Brien, F., Buchan, S., and Crowe, A. M., 2000, The impact of adhesions on hospital readmissions over ten years after 8849 open gynaecological operations: An assessment from the Surgical and Clinical Adhesions Research Study. *BJOG: An International Journal of Obstetrics & Gynaecology*, 107(7), 855–862.

[31] Royal College of Obstetricians and Gynaecologists, 2015, Reducing the risk of venous thromboembolism during pregnancy and the puerperium (Green-top Guideline No. 37a).

[32] Van den Berg, M. M., van Langen, I. M., Wildschut, H. I. J., et al., 2013, Psychological aspects of termination of pregnancy for fetal anomalies: A cross-sectional study. *Prenatal Diagnosis*, 33(5), 450–456.

[33] Van Mello, N. M., Mol, F., Adang, E. M., et al., 2010, Salpingostomy versus salpingectomy in tubal ectopic pregnancy: Cost-effectiveness analysis alongside a randomized trial. *BJOG: An International Journal of Obstetrics & Gynaecology*, 117(6), 728–738.

[34] Farren, J., Jalmbrant, M., Ameye, L., et al., 2016, post-traumatic stress, anxiety and depression following miscarriage or ectopic pregnancy: A prospective cohort study. *BMJ Open*, 6, e011864.