

Laparoscopy versus Laparotomy in the Surgical Management of Ectopic Pregnancy: Integrative Literature Review

Mazen Bisharah¹, Hanee M. Alrashidi², Hedaya I. Almilad³, Awatif A. Almuharimi⁴, Wjood A. Alshehri⁵, Ranya M. aljuhani⁵, Atheer K. Almutairi⁵, Ibtisam S. J Hazazi⁶, Noof M. Adawi², Shada A. Almarashi⁷, Hanan A. Assaggaf⁸, Alya S. Alghamdi⁹, Ayah A. Alqattan¹⁰, Sarah S. Alsulami¹¹.

¹Consultant Obstetrics and Gynaecology and IVF, International Medical Center, KSA. ²Intern, Qassim University, Buraydah, KSA. ³Intern, University of Debrecen. ⁴Service resident, Dammam, KSA. ⁵Ibn sina national college, KSA. ⁶Intern, University of Tabuk, Tabuk, KSA. ⁷Intern, King Khalid University, Abha, KSA. ⁸General practitioner, Al-Noor Hospital, Makkah, KSA. ⁹Intern, BMC, Jeddah, KSA. ¹⁰General practitioner, King Faisal University, AlHofuf, KSA. ¹¹General practitioner, Arabian Gulf University, Jeddah, KSA.

ABSTRACT

Background: Ectopic pregnancy (EP) is a common gynecological emergency in resource-limited countries, where laparotomy is the conventional therapy despite the fact that laparoscopic surgery is considered the best option. There is a lack of prospective randomized evidence comparing laparoscopic surgery with laparotomy in the surgical care of women with REP.

Objectives: To summarize current evidences comparing laparoscopy versus laparotomy in the surgical management of ectopic pregnancy.

Methodology: PubMed, Web of Science, Science Direct, EBSCO, and Cochrane Library were utilized to identify the articles. In the current review, all pertinent articles related to both our topic and other articles were used. Other articles not related to the objective of the review were excluded. The research team looked through a standardized format in which the data had been extracted.

Results: According to PRSIMA guidelines, our study included 13 published studies that were registered to extract final data from a total of 110 studies found after searching the mentioned databases, which were then used for title screening. Some were excluded from screening of abstracts and others due to different inclusion criteria, after full-text review. These 13 studies were used to compare laparoscopy versus laparotomy in the surgical management of EP, establishing that laparoscopic treatment of EP may be the most beneficial method with the highest level of safety and efficacy.

Conclusion: Laparoscopic surgery is increasingly being used as the method of choice for treating EPs. When compared to laparotomy, laparoscopic treatment for EP raises concerns about safety, viability and results in fewer postoperative adhesions. Laparoscopy is also more practicable and proven to be more efficient in terms of blood loss, requirement for blood transfusion, need for analgesia, and time of postoperative hospital stay.

Keyword: ectopic pregnancy, laparoscopy, Laparotomy, Post-operative complications, Comparative study, Integrative Literature Review.

Introduction

Ectopic pregnancy (EP) is the medical term for when the fertilized egg implants outside of the uterine cavity. This includes the cervix, the cornual portion within the womb, the tummy, and the fallopian tubes, which together make up 97.7% of EP cases [1].

Different areas there are tubes utilized in tubal pregnancies, encompassing the interstices (2–3%), cornua (2%), fimbria (5%), the isthmus (12%), with the ampulla (80%) being the most often affected region of the tube [2]. Over the past 30 years, EPs have

Access this article online	
Quick Response Code:	Website: www.smh-j.com
	DOI: 10.54293/smhj.v3i1.68

Address for correspondence: Mazen Bisharah, Consultant Obstetrics and Gynaecology and IVF, International Medical Center, KSA.

E-mail: mbishar@imc.med.sa

Received: 2 November 2022 | **Accepted:** 23 November 2022

This is an open access article by SMHJ is licensed under Creative Commons Attribution 4.0 International License.

(<https://creativecommons.org/licenses/by/4.0>)

Please cite this article as: Bisharah M, Mateg Alrashidi H, Ibrahim Almilad H, Ali ALMUHARIMI A, Abdullah Alshehri W, Mohammed aljuhani R, Khalaf Almutairi A, Shary J Hazazi I, Mohammed Adawi N, Abdullah Almarashi S, Abdulqader Assaggaf H, Saad Alghamdi A, Abdulwahab Y Alqattan A, Shujaa Alsulami S. Laparoscopy versus Laparotomy in the Surgical Management of Ectopic Pregnancy: Integrative Literature Review. SMHJ [Internet]. 2022;3(1):41-49.

Laparoscopy versus Laparotomy in the Surgical Management of Ectopic Pregnancy: Integrative Literature Review

Gone from 0.5% to 1-2% [3]. Age, smoking, tubal inflammation, using Assisted Reproductive Technology (ART), having tubal procedures, carrying sterilizing equipment, and other factors all contribute to an increase in prevalence [4]. EP is the most common cause of maternal death in the first trimester, and its prevalence is rising on a global scale. Abdominal discomfort and vaginal bleeding are common symptoms of EP, as along with other less obvious symptoms of a typical pregnancy including nausea, vomiting, and tenderness in the breasts. Abdominal pain is caused by hemoperitoneum and dilated tubes, which irritate the peritoneum. Clinical manifestation, beta-hCG levels in the serum, ultrasonography, and physical examination are used to make a pregnancy that is not intended. EP currently swiftly and correctly diagnosed. This is due to the fortunate development of transvaginal ultrasound and beta-hCG testing [5]. Late diagnosis of EP results in serious complications and emergency surgery in almost all instances in impoverished countries like ours, resulting in high death rates. Surgery is the preferred treatment for EP. There are many surgical methods in use, such as either a salpingostomy or a salpingectomy which are carried out using laparotomies or laparoscopies the [6]. Best way to treat an EP that has not burst is to perform a linear salpingostomy, which entails removing the products of conception from the ampullary part of the fallopian tube along the antimesenteric boundary. The following factors must be taken into account while choosing between laparoscopy and laparotomy; the patient's hemodynamic status, past surgical history, and the doctor performing the procedure's experience. Laparoscopy has been used for both therapeutic and diagnostic purposes for many years [7]. Operative laparoscopy for EPs is preferred to laparotomy for a number of reasons, including faster recovery periods, decreased blood loss during surgery, shorter hospital stays, also less analgesic needs [8, 9]. Laparoscopic surgery results in significantly fewer adhesions [10]. Significantly lower expenses are also connected to the laparoscopic method. We compared laparoscopy and laparotomy groups' characteristics and EP management [11]. This article aims to discuss the current data comparing two approaches laparoscopy and laparotomy in the surgical therapy of EP.

Methods

This Integrative Literature Review (ILR) involved exploratory research using a quantitative methodology. ILR is a tactic used in the health

sciences to identify new ways to healthcare, identify innovations, permit the implementation of services based on evidence, guarantee quality, and improve patient safety. There are six steps in all, which must be finished in the following order: The study's problem was identified, the inclusion and exclusion criteria were mentioned, the sample was explained, the included studies were assessed, the findings were explained, and the ILR synthesis was presented. Since the eligible literature is of high quality, a detailed literature exploration was done in databases: PubMed, Web of Science, Science Direct, EBSCO, and Cochrane Library. The paper would draw on subjects related to surgical therapy of EP. The published papers' titles and abstracts would be examined. The following keywords, which were converted into Mesh terms in PubMed, were used to find the eligible studies: ectopic pregnancy, laparoscopy, laparotomy, surgical management, and post-operative problems. The "OR" and "AND" Boolean operators were combined with the pertinent keywords. English, full-text publications, freely accessible articles, and human trials were all included in the search results.

Inclusion criteria: The subjects were selected for addition founded on their applicability to the research, which has at least one of the following criteria; Ectopic pregnancy, laparoscopic treatment, Laparotomy, Post-operative complications, management of Ectopic pregnancy.

Exclusion criteria: All extra papers, recurring research, and review articles that do not hold one of these inclusion criteria were ignored.

Data extraction: To find the identical papers in the search approach results, Rayyan (QCRI) was used. The authors determined the suitability of the titles and abstracts by revising filtering the shared search outcomes in agreement with a list of inclusion/exclusion criteria. The whole texts of the papers that satisfied the necessities for inclusion were examined by the reviewers. The authors conferred any disagreements in order to find a solution. Eligible studies were added using a data extraction method that was shaped. The authors gathered information about the evaluation of two approaches laparoscopy and laparotomy in the management of EP (authors, study year, methods and results).

Data synthesis: Product table with the data gathered from the eligible studies were formed to give a qualitative outline of the involved study result data. Choices about how to make most of the data from the

Laparoscopy versus Laparotomy in the Surgical Management of Ectopic Pregnancy: Integrative Literature Review

eligible articles were made after comprehensive systematic review's data extraction procedure.

Results

(Figure 1) demonstrates how studies were chosen and identified. A total of 110 studies were found after searching the above-mentioned databases then used for title screening. Twenty of them were excluded after 75 of them were included for the abstract screening. The full texts of the remaining 45 publications were examined. Due to different inclusion criteria after the full-text revision, 33 papers were excluded, and 12 were included for data extraction (Table 1). Included studies were published from 2005 till 2022 and patients were recruited from India, turkey, China, South Africa, Nepal, Canada, Ireland, Jordan and also other countries [13-24]. The results which reported in these collected studies stated that if all surgical units have limited access surgery experience, more ectopic pregnancies can be managed laparoscopically. It is claim that laparoscopic therapy of EP is the most advantageous procedure with the highest level of safety and effectiveness. Even in cases of severe hemoperitoneum, laparoscopic therapy of EP remains a safe, helpful alternative in the hands of a skilled laparoscopic surgeon. It undoubtedly has the advantages of a quicker recovery after surgery, a shorter hospital stays, and a lower need for post-operative analgesia. In details, it was found that the laparoscopic groups had operating time and postoperative hospital stay shorter than laparotomy patients and that's more satisfied for patients [13, 18, 21, 23]. The post-operative complications and probability of surgical wound infection are less occurred in the laparoscopy than the open laparotomy [14, 17, 21]. The hispanic women, women who paid for their own medical care and women with private insurance, like to undergo open laparotomy operations [12]. Significantly decreased serum levels of NE, E, ACTH, Cor, INS, PRA, AngII, and ALD were found in the laparoscopy group compared to the laparotomy group but the need of blood transfusions is significantly more in the laparotomy than the laparoscopy [15,16,24]. In comparison to the Laparoscopy group, the laparotomy group contained noticeably more women with BMI >30 kg/m² [20]. The laparotomy operation also used in ruptured EP patients with unstable conditions [22].

Laparoscopy was used in 86.3% of all methods in 2004, up from 40.9% in 1995 [19]. Thus, the final results of these studies prove that the laparoscopy approach is more usable, safe, and has advantages in almost cases more than laparotomy approach.

Discussion

Maternal morbidity and mortality in the first trimester in the first trimester, there is morbidity and death. The life of a woman is at danger if treatment and diagnosis are delayed [25, 26]. Acute ruptured EP can result in significant hemorrhage and decrease of blood volume, affecting the liver, kidneys, and other crucial organs' blood flow and raising the possibility of harm to visceral function. When practicing medicine, quick emergency surgery can halt bleeding. From worsening and guarantee the patient's life [27]. As a woman gets older, her likelihood of an ectopic pregnancy rises, with a key risk factor being age beyond 35 [28] tubal function alterations brought on by ageing that slow down ovum movement, resulting in tubal implantation, as well as This relationship may be due to an increase in chromosomal abnormalities in trophoblastic tissue [29,30]. With rising trends of risk improvements in the diagnostic modalities, the prevalence of EP has significantly increased over the past few decades [31]. The first successful surgical procedure was documented in 1759 [32, 33]. The laparotomy was the main surgical procedure used for more than 200 years. Bruhart et al. published the first study on laparoscopic surgery for an ectopic pregnancy in 1980 [26,35,36]. While open laparotomies were once the standard surgical procedure for treating EPs, laparoscopy is now becoming increasingly common for EP diagnosis and management [29,30]. Laparoscopy is well accepted to play a significant part in the surgical EP treatment and that it has expanded the scope of available diagnostic and therapeutic options [37]. The advent of laparoscopic treatment for EP marked the second major advancement in care. Shapiro described the first laparoscopic salpingectomy in 1973, and Bruhat published the first report of laparoscopic salpingostomy in 1978. Numerous studies have now unequivocally shown the benefits of the laparoscopic method over laparotomy [38].

Laparoscopy versus Laparotomy in the Surgical Management of Ectopic Pregnancy: Integrative Literature Review

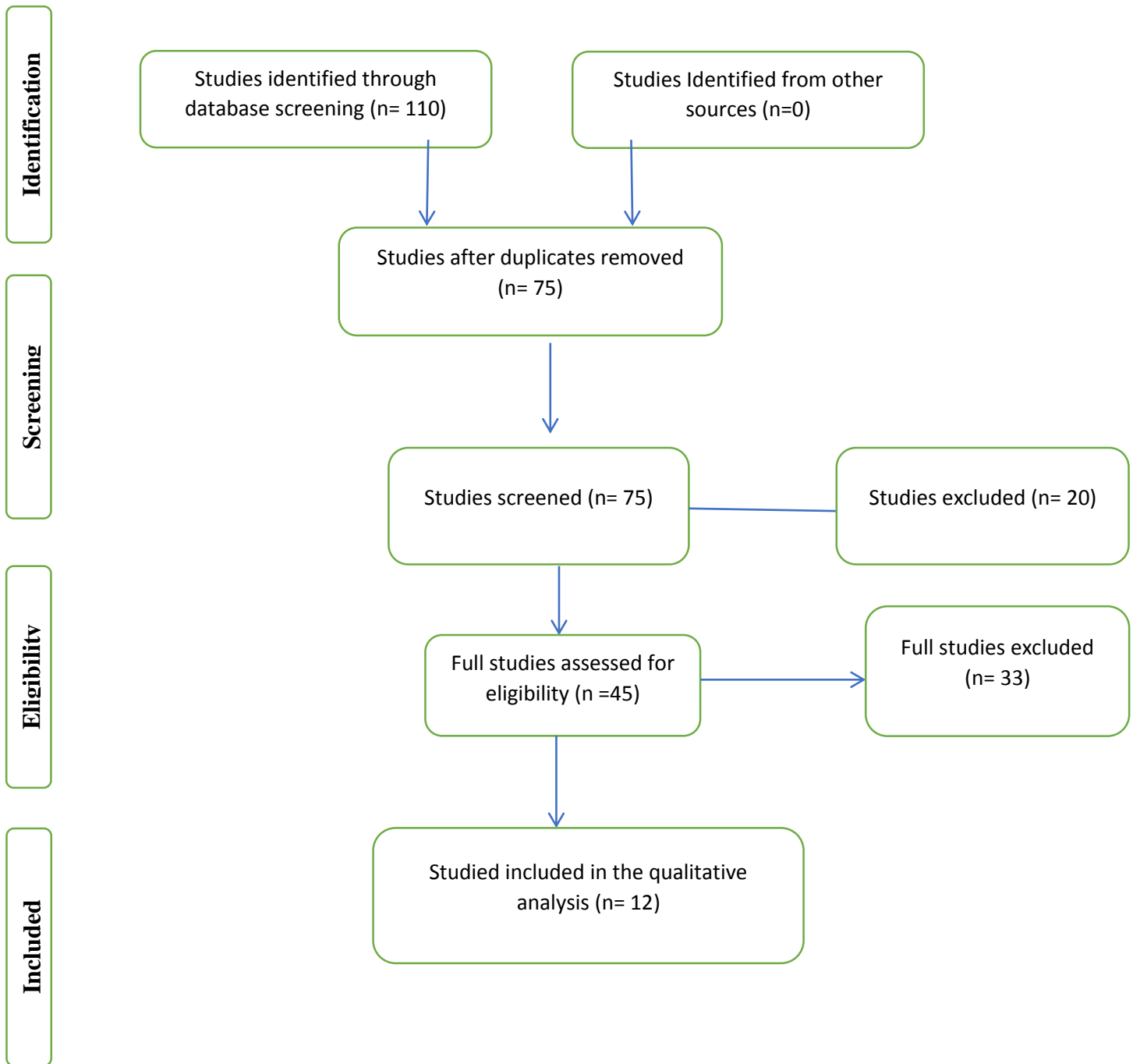


Figure 1: Included studies had different study designs.

Laparoscopy versus Laparotomy in the Surgical Management of Ectopic Pregnancy: Integrative
Literature Review

Table 1: Author, country, year of publication, methodology and outcome.

Author and publishing year	Region	Sample size	Outcome
Singh et al. (2020) [13]	India	75 ectopic pregnancy patients (39 laparoscopy and 36 laparotomy)	The laparoscopy group's mean operating time (range 30–52 min) was significantly lower than the laparotomy group's (range 40–60 min). Regarding the use of blood products in treatment and postoperative problems, there was no difference between the groups. The laparotomy group's hospital stay was substantially longer than the group who underwent laparoscopy. Laparotomy patients required post-operative analgesia for a longer period of time than laparoscopy patients.
Bahat et al. (2018) [14].	Turkey	471 EP patients (54% had laparotomies, while 46% had laparoscopic surgery).	Age, gravidity, parity, curettage, gestational age at admission, mean - HCG levels at admission, and preoperative and postoperative hemoglobin levels did not show any statistically significant differences between the two groups. Compared to the laparotomy group, the laparoscopy group's postoperative hospital stay was shorter, and the laparotomy group's procedure time was also much shorter. About 8.1% laparotomy patients experienced surgical wound infection between the sixth and tenth postoperative days.
Zhou et al. (2017) [15].	China	68 patients in total (39 laparotomies and 29 laparoscopy).	The age, length of amenorrhea, and amount of abdominal bleeding were not substantially different between the two patient groups. Significantly decreased serum levels of NE, E, ACTH, Cor, INS, PRA, AngII, and ALD were found in the laparoscopy group compared to the laparotomy group. Laparoscopic surgery is less traumatic overall than laparotomy and provides less stress to the adrenal glands.
Cornelius et al. (2017) [16].	South Africa	140 patients.	The laparoscopy group's operating duration was significantly longer (67.3 v. 30.5 min). In the laparoscopy group, the length of hospital stays, pain scores, and requirement for analgesia were all significantly lower. Compared to the laparoscopy group, significantly more women undergoing laparotomies needed blood transfusions. Operative laparoscopy is achievable in an environment with limited resources and is linked to a considerable reduction in morbidity and a quicker return to work.
Shrestha and Saha (2012) [17].	Kathmand, Nepal	32 ectopic pregnancy cases (37.5% had laparoscopic surgery, and 62.5% laparotomy).	Complications occurred in 20% of patients treated by laparotomy and 8.3% of patients treated by laparoscopy.
Cohen et al. (2013) [18].	Israel	60 cases (48 had laparoscopy, and 12 needed an emergency laparotomy).	The laparoscopy group's median operating time was 50 minutes as opposed to 60 minutes. The laparotomy group experienced a considerably higher median intra-abdominal blood loss (1500mL vs 1000mL). Regarding blood product therapy, perioperative problems, and hospital stay, there was no difference between the groups.
Takacs et al. (2006) [19].	Canada	1,046 patients with ectopic pregnancies (578 laparoscopies and 468 laparotomies).	A total of 468 laparotomies and 578 laparoscopies were successfully carried out. The percentage of approaches made via laparoscopy rose from 40.9% in 1995 to 86.3% in 2004.

Laparoscopy versus Laparotomy in the Surgical Management of Ectopic Pregnancy: Integrative
Literature Review

Takacs et al. (2005) [20].	University of Miami Jackson Memorial Hospital USA	229 patients; 201 laparoscopies, and 28 laparotomies.	28 of the 229 laparoscopies (or 12.2%) required a laparotomy. For less experienced surgeons compared to more experienced surgeons, the conversion rate was much higher.
Wong and Hickey (2005) [21].	Ireland	26 patients (13 laparotomy and 13 laparoscopy).	Laparotomy was performed faster than the laparoscopy group during anesthesia, whereas the laparoscopic group's operating time was 7.3 minutes longer. Lower intraoperative blood loss (50 ml vs 413.1 ml), less post-operative analgesic need, shorter hospital stays (2.4 days vs 4.5 days), quicker return to work (2 weeks vs 4 weeks), and less wound infection were all related with the laparoscopic method.
Mohamed et al. (2002) [22].	South Cleveland Hospital USA	210 EP cases (84.3% laparoscopy and 15.7% required laparotomies).	Following laparoscopic therapy, the estimated blood loss, the requirement for blood transfusion, and the length of hospital stay were all significantly lower than those in the laparotomy group.
Jahan et al. (2014) [23].	Bangladesh	89 women with ectopic pregnancies (70 patients had laparoscopy and 19 had laparotomy).	The overall success percentage of laparoscopic surgery is 98.9%. In the laparoscopy group, only 3 patients (3.81%) needed blood transfusions, compared to 16 (74.94%) in the laparotomy group. The length of the procedure was 53.2 16.8 minutes for the laparoscopy group and 84.5 30.3 minutes for the laparotomy group. When compared to the laparotomy group, the length of hospitalization was much shorter in the laparoscopy group. In contrast to the laparotomy group, where all of the patients required analgesia following surgery, 57 (72.4%) patients in the laparoscopy group did not.
Muhammad et al. (2018) [24].	Multan, Pakistan	167 patients (64 laparoscopy and 103 laparotomy)	167 patients in all, 19.2% of whom had ruptured EP, and 80.8% of whom did not. Laparoscopy and laparotomy were found to have a significant correlation with the need for blood transfusion and analgesia. In contrast to laparotomy, a significant portion of patients did not require anesthesia (64.1%) or blood transfusions (95.3%) during laparoscopy. There was a significant difference (p=0.000) between the two groups in terms of total operating time, length of hospital stay, and anticipated blood loss.

Laparoscopy versus Laparotomy in the Surgical Management of Ectopic Pregnancy: Integrative Literature Review

The choice of these approaches depends on a number of variables, including the patient's condition, the surgeon's skill level, and the equipment availability. The benefits of laparoscopy over laparotomy are well known and documented in the literature. As laparoscopic method has various benefits, such as reduced adhesion development, and doing a laparoscopy is not contraindicated in the presence of hemoperitoneum [37]. It also includes a quicker recuperation period after surgery, lower costs, and a shorter operating time [31]. Less adhesion was seen in follow-up investigations as compared to laparotomy [32]. It has been noted that laparotomy does not completely retrieve trophoblastic tissue [33]. On the other side, laparotomy is recommended due to improved tissue visibility and enhanced confidence in controlling hemostasis [34].

Conclusion

In most circumstances, laparoscopy is now advised. Patients with EPs or those who are hemodynamically unstable typically require laparotomies. It is also preferred for patients whose laparoscopic approach is challenging and for surgeons with little experience doing laparoscopies. According to the previous 13 studies, laparoscopic EP therapy causes fewer postoperative adhesions than laparotomy. In the surgical care of all kinds of EP, laparoscopy is more feasible and safer than laparotomy. In comparison to a laparotomy, a laparoscopy was found to be more effective in terms of blood loss, the need for blood transfusion, the requirement for analgesia, and the length of the postoperative hospital stay. The best treatment for EP may be laparoscopic, since it offers the highest level of safety and effectiveness. The diagnosis of patients with clinically dubious conditions is another crucial function of laparoscopy. So, if at all possible, laparoscopy should be chosen.

Conflict of Interest

None

Funding

None

References

1. Shobeiri F, Tehrani N, Nazari M. Trend of ectopic pregnancy and its main determinants in Hamadan province, Iran (2000-2010). *BMC Res Notes*. 2014;7:733. doi:10.1186/1756-0500-7-733
2. Kanga DVT, Nana PN, Fouelifack FY, Fouedjio JH. Contribution des avortements et des grossesses extra-utérines dans la mortalité maternelle dans trois hôpitaux universitaires de Yaoundé [Role of abortion and ectopic pregnancies in maternal mortality rate at

- three university hospitals in Yaoundé]. *Pan Afr Med J*. 2017;27:248. doi:10.11604/pamj.2017.27.248.12942
3. Qin M, Zhu LP, Zhang L, Du L, Xu HQ. *Zhonghua Fu Chan Ke Za Zhi*. Chinese Journal of Preventive Medicine. 2011;46(4):244-249.
4. Li C, Zhao WH, Zhu Q, Cos S-J, Ping H, Xi X, et al. Risk factors for ectopic pregnancy: a multi-center case-control study. *BMC Pregnancy Childbirth*. 2015;15:187. doi:10.1186/s12884-015-0613-1
5. Hamza A, Meyberg-Solomayer G, Juhasz-Böss I, R. Joukhadar, Z. Takacs, E. Solomayer, et al. Diagnostic Methods of Ectopic Pregnancy and Early Pregnancy Loss: a Review of the Literature. *Geburtshilfe Frauenheilkd*. 2016;76(4):377-382. doi:10.1055/s-0041-110204
6. Taheri M, Bharathan R, Subramaniam A, Kelly T. A United Kingdom national survey of trends in ectopic pregnancy management. *J Obstet Gynaecol*. 2014;34(6):508-511. doi:10.3109/01443615.2014.910181
7. Johnson JJ, Garwe T, Raines AR, Thurman Jb, Carter S, Bender Js, et al. The use of laparoscopy in the diagnosis and treatment of blunt and penetrating abdominal injuries: 10-year experience at a level 1 trauma center. *Am J Surg*. 2013;205(3):317-321. doi:10.1016/j.amjsurg.2012.10.021
8. Ciprian Ilea, Ovidiu-Dumitru Ilie, Olivia-Andreea Marcu, Irina Stoian, Bogdan Doroftei. "The Very First Romanian Unruptured 13-Weeks Gestation Tubal Ectopic Pregnancy." *Medicina (Kaunas, Lithuania)*. 2022;58(9):1160. doi:10.3390/medicina58091160
9. Marchand, G., Taher Masoud, A., Sainz, K., Azadi, et al. "A systematic review and meta-analysis of laparotomy compared with laparoscopic management of interstitial pregnancy" *Facts, views & vision. ObGyn*. 2021;12(4):299-308.
10. Li PC, Lin WY, Ding DC. Risk factors and clinical characteristics associated with a ruptured ectopic pregnancy: A 19-year retrospective observational study. *Medicine (Baltimore)*. 2022;101(24):e29514. doi:10.1097/MD.00000000000029514
11. Al Naimi A, Moore P, Brüggmann D, Krysa L, Louwen F, Bahlmann F. Ectopic pregnancy: a single-center experience over ten years. *Reprod Biol Endocrinol*. 2021;19(1):79. doi:10.1186/s12958-021-00761-w
12. Matthews KC, Tangel VE, Abramovitz SE, Riley LE, White RS. Disparities in Obstetric Readmissions: A Multistate Analysis, 2007-2014. *Am J Perinatol*. 2022;39(2):125-133. doi:10.1055/s-0041-1739310
13. Singh S, Sandhu N, Singh S, Kumar P, Aziz A. Comparison between laparoscopy and laparotomy in the management of ectopic pregnancy: a retrospective study. *Int J Reprod Contracept Obstet Gynecol*. 2020;9:705-709.

Laparoscopy versus Laparotomy in the Surgical Management of Ectopic Pregnancy: Integrative Literature Review

14. Bahat, P.Y., Turan, G., Çetin, B.A., & Polat, I. Comparison of Laparoscopy and Laparotomy in Surgical Treatment of Ectopic Pregnancies: A 6-Year Experience at a Tertiary. *JCOG*. 2018;28(2):60-64.
15. Zhou M. Comparison between laparoscopic surgery and laparotomy for the treatment of acute ruptured ectopic pregnancy. *J Acute Dis*. 2017;6:97-100.
16. Snyman L, Makulana T, Makin JD. A randomised trial comparing laparoscopy with laparotomy in the management of women with ruptured ectopic pregnancy. *S Afr Med J*. 2017;107(3):258-263. doi:10.7196/SAMJ.2017.v107i3.11447
17. Shrestha J, Saha R. Comparison of laparoscopy and laparotomy in the surgical management of ectopic pregnancy. *J Coll Physicians Surg Pak*. 2012;22(12):760-764.
18. Cohen A, Almog B, Satel A, Lessing JB, Tsafirir Z, Levin I. Laparoscopy versus laparotomy in the management of ectopic pregnancy with massive hemoperitoneum. *Int J Gynaecol Obstet*. 2013;123(2):139-141. doi:10.1016/j.ijgo.2013.05.014
19. Takacs P, Chakhtoura N. Laparotomy to laparoscopy: changing trends in the surgical management of ectopic pregnancy in a tertiary care teaching hospital. *J Minim Invasive Gynecol*. 2006;13(3):175-177. doi:10.1016/j.jmig.2006.01.007
20. Takacs P, Latchaw G, Gaitan L, Chakhtoura N, De Santis T. Risk factors for conversion to laparotomy during laparoscopic management of an ectopic pregnancy. *Arch Gynecol Obstet*. 2005;273(1):32-34. doi:10.1007/s00404-005-0008-z
21. Wong VV, Hickey K. Introducing laparoscopic management of ectopic pregnancy to a busy gynaecology unit--is it worthwhile? *Ir Med J*. 2005;98(1):25-26.
22. Mohamed H, Maiti S, Phillips G. Laparoscopic management of ectopic pregnancy: a 5-year experience. *J Obstet Gynaecol*. 2002;22(4):411-414. doi:10.1080/01443610220141399
23. Jahan, S., Das, T. R., Habib, S. H., Jahan, A., Joarder, M., Nahar, N., & Banarjee, M. A Comparative Study between Laparoscopic Management of Ectopic Pregnancy and Laparotomy: Experience in Tertiary Care Hospital in Bangladesh: A Prospective Trial. *Bangladesh Journal of Endosurgery*. 2014;2(1):1-4.
24. Murtaza, M., Hameed, H., & Khan, R. M. Z. Laparoscopy versus Laparotomy in the Management of Ectopic Pregnancy. *Journal of Islamabad Medical & Dental College*. 2018;7(1):18-22.
25. Yang L, Gao J, Zeng L, Weng Z, Luo S. Systematic review and meta-analysis of single-port versus conventional laparoscopic hysterectomy. *Int J Gynaecol Obstet*. 2016;133(1):9-16. doi:10.1016/j.ijgo.2015.08.013
26. Leziak, M., Żak, K., Frankowska, K., et al. Future Perspectives of Ectopic Pregnancy Treatment-Review of Possible Pharmacological Methods. *Int J Environ Res Public Health*. 2022;19(21):14230. doi:10.3390/ijerph192114230
27. Sivalingam VN, Duncan WC, Kirk E, Shephard LA, Horne AW. Diagnosis and management of ectopic pregnancy. *J Fam Plann Reprod Health Care*. 2011;37(4):231-240. doi:10.1136/jfprhc-2011-0073
28. Kim YW, Park BJ, Kim TE, Ro DY. Single-port laparoscopic salpingectomy for surgical treatment of tubal pregnancy: comparison with multi-port laparoscopic salpingectomy. *Int J Med Sci*. 2013;10(8):1073-1078. doi:10.7150/ijms.5994
29. Odejimi FO, Rizzuto MI, Macrae RE, Thakur V. Changing trends in the laparoscopic management of ectopic pregnancy in a London district general hospital: 7-years' experience. *J Obstet Gynaecol*. 2008;28(6):614-617. doi:10.1080/01443610802355544
30. Hsu MI, Tang CH, Hsu PY, Huang Y-T, Long C-Y, Huang K-H, et al. Primary and repeated surgeries for ectopic pregnancies and distribution by patient age, surgeon age, and hospital levels: an 11-year nationwide population-based descriptive study in Taiwan. *J Minim Invasive Gynecol*. 2012;19(5):598-605. doi:10.1016/j.jmig.2012.05.008
31. Agdi M, Tulandi T. Surgical treatment of ectopic pregnancy. *Best Pract Res Clin Obstet Gynaecol*. 2009;23(4):519-527. doi:10.1016/j.bpobgyn.2008.12.009
32. Hsu MI, Tang CH, Hsu PY, et al. Primary and repeated surgeries for ectopic pregnancies and distribution by patient age, surgeon age, and hospital levels: an 11-year nationwide population-based descriptive study in Taiwan. *J Minim Invasive Gynecol*. 2012;19(5):598-605. doi:10.1016/j.jmig.2012.05.008
33. Khani B, Ahmadi M, Rouholamin S. Comparison the Results of Hysterosalpingography in Patients with Ectopic Pregnancy Treated by Laparoscopic Salpingostomy, Laparotomy, and Treated with Methotrexate. *Adv Biomed Res*. 2022;11:27. doi:10.4103/abr.abr_258_20
34. Wang X, Huang L, Yu Y, Xu S, Lai Y, Zeng W. Risk factors and clinical characteristics of recurrent ectopic pregnancy: A case-control study. *J Obstet Gynaecol Res*. 2020;46(7):1098-1103. doi:10.1111/jog.14253
35. Cymbaluk-Płoska A, Chudecka-Głaz A, Kuźniak S, Menkiszak J. Ectopic pregnancy treatment by combination therapy. *Open Med (Wars)*. 2016;11(1):530-536. doi:10.1515/med-2016-0091

Laparoscopy versus Laparotomy in the Surgical Management of Ectopic Pregnancy: Integrative
Literature Review

36. Ngwenya S. Challenges in the surgical management of ectopic pregnancy in a low-resource setting: Mpilo Central Hospital, Bulawayo, Zimbabwe. *Trop Doct.* 2017;47(4):316-320. doi:10.1177/0049475517700810
37. Agdi M, Tulandi T. Surgical treatment of ectopic pregnancy. *Best Pract Res Clin Obstet Gynaecol.* 2009;23(4):519-527. doi:10.1016/j.bpobgyn.2008.12.009
38. Hudeček R, Felsingrová Z, Felsing M, Jandakova E. Laparoscopic Treatment of Cesarean Scar Ectopic Pregnancy. *J Gynecol Surg.* 2014;30(5):309-311. doi:10.1089/gyn.2014.0005