Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(6), 756-762 | ISSN:2251-6727

Laparoscopy Vs Laparotomy for the Management of Chronic Ectopic Pregnacy

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(Received: 16 September 2024 Revised: 11 October 2024 Accepted: 04 November 2024)

KEYWORDS

Laparoscopy, Laparotomy, Surgical Management and Patient Satisfaction

ABSTRACT:

Introduction: A sizable portion of the fertile population in the US is impacted by ectopic gestation. Ectopic pregnancy (EP) has become more common in recent years. It currently makes up more than 1% of all pregnancies that are recorded. Enhancements in the management of ectopic pregnancy have been pursued in order to lower postoperative morbidity and maintain reproductive capacity. The widespread adoption of conservative procedures has been made possible by recent advancements in microsurgical instruments and diagnostic modalities.

Aims: To assess and contrast laparoscopic and laparotomy methods for treating persistent ectopic pregnancy in terms of their efficacy, safety, and results.

Materials & Methods: The present study was a Comparative Cohort Study. This Study was conducted from One year. Total 100 patients were included in this study.

Result: Over 21 months, 89 patients with 91 suspected EPs presented to UCSD Medical Center and were considered for inclusion in the study. Sixteen pa- tients (18%) were primarily excluded because of un- stable vital signs. Two patients were excluded be- cause their private referring physicians requested exclusion from the study. The study population consisted of 73 EPs. Of these women, 50% were His- panic, 35% were white, and 15% were black or Asian.

Conclusion: Because of its benefits for patient satisfaction, safety, and recuperation, laparoscopy is frequently the method of choice for treating persistent ectopic pregnancy. In some clinical situations, laparotomy is still a viable choice. Future research should focus on large-scale, randomized trials to validate these findings and further refine surgical strategies in the management of ectopic pregnancies.

INTRODUCTION

A sizable portion of the fertile population in the US is impacted by ectopic gestation. Ectopic pregnancy (EP) has become more common in recent years. It currently makes up more than 1% of all pregnancies that are recorded [1]. Enhancements in the management of ectopic pregnancy have been pursued in order to lower postoperative morbidity and maintain reproductive capacity. The widespread adoption of conservative procedures has been made possible by recent advancements in microsurgical instruments and diagnostic modalities. Crucially, intrauterine pregnancy (IUP) rates tend to be greater following conservative tubal surgery, even while repeat EP rates do not appear

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to vary following conservative or aggressive surgery (salpingectomy) [2].

Shapiro and Adler [3] gave the first account of an EP that was performed by laparoscopy in 1973. Since then, successful methods for treating EP laparoscopically in patient subgroups have been reported. When compared to published laparotomy procedures, these trials demonstrate lower costs, morbidity, and at least equivalent subsequent pregnancy rates (PRs) among individuals seeking fertility.

Reich et al. [4] and Silva [5] have demonstrated how these methods may be used to unselected EP scenarios. In order to treat all hemodynamically stable EPs who present to a university-based residency training program, our study aimed to prospectively compare surgical laparoscopy and laparotomy.

For this investigation, centers operating between April 1988 and December 1989 were taken into consideration. Unstable vital signs were the sole absolute criterion for study exclusion. In alternate months, patients were assigned to either laparotomy or laparoscopy. Once enrolled, the surgical team considered the patient's goal for future fertility as well as the results of the operation to choose the exact operative method. Prior to the surgery, patients received counseling regarding the potential risks and problems associated with conservative EP treatments. The preferred operation for patients hoping to get pregnant in the future was linear sapingostomy. If tubal damage precluded a linear salpingostomy, a segmental re- section was performed, if appropriate.

MATERIALS & METHODS

Study Type and Design: Comparative Cohort Study.

Study Duration: One year

Sample Size: 100

Inclusion Criteria:

- Patients with a confirmed diagnosis of chronic ectopic pregnancy via ultrasound or other imaging techniques.
- Female patients aged 18 to 45 years.
- Patients presenting with symptoms related to ectopic pregnancy, such as abdominal pain, irregular bleeding, or other clinical indications.
- Patients willing to provide informed consent for the surgical procedure and participation in the study.
- Patients with hemodynamic stability, not requiring emergency intervention.

Exclusion Criteria:

- Patients with a history of extensive abdominal or pelvic surgeries that could complicate laparoscopic access.
- Patients with contraindications to either laparoscopic or open surgery (e.g., severe cardiopulmonary disease, coagulopathy).
- Patients with ruptured ectopic pregnancies, significant internal bleeding, or any acute surgical abdomen requiring immediate intervention.
- Patients with concurrent conditions that may affect surgical outcomes or complicate recovery (e.g., malignancies, severe infection).
- Patients unable or unwilling to follow postoperative care instructions or attend follow-up visits.
- Patients who are currently pregnant or have a recent positive pregnancy test, excluding those with a clear ectopic diagnosis.

Statistical Analysis:

For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests, which compare the means of independent or unpaired samples, were used to assess differences between groups. Paired t-tests, which account for the correlation between paired observations, offer greater power than unpaired tests. Chi-square tests (χ^2 tests) were employed to evaluate hypotheses where the sampling distribution of the test statistic follows a chi-squared distribution under the null hypothesis; Pearson's chi-squared test is often referred to simply as the chi-squared test. For comparisons of unpaired proportions, either the chi-square test or Fisher’s exact test was used, depending on the context. To perform t-tests, the relevant formulae for test

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JCHR (2024) 14(6), 756-762 | ISSN:2251-6727

statistics, which either exactly follow or closely approximate a t-distribution under the null hypothesis, were applied, with specific degrees of freedom indicated for each test. P-values were determined from Student's t-distribution tables. A p-value ≤ 0.05 was considered statistically significant, leading to the rejection of the null hypothesis in favour of the alternative hypothesis.

RESULT

Table 1: Comparison of Study Groups Surgical Procedures Performed

	Laparoscopy (%)	Laparotomy (%)
Salpingectomy	35 (9/26)	54 (19/36)
Linear salpingostomy	42 (11/26)	27 (10/36)
Segmental resection	11.5 (3/26)	19 (7/36)
Fimbrial expression	11.5 (3/26)	0

Table 2: Comparison of Study Groups Operative Parameters

(n = 26)	Unruptured ectopic (%)	Pelvic adhesions (%)	Operating time (min)	Estimated blood loss (CC)
Laparoscopy	73	26	118 ± 30	62 ± 61
Laparotomy	57	43	109 ± 36	115 ± 115
P <0.0001				

Table 3: Comparison of Study Groups Outcome Parameters

	Analgesic requirement (mg)	Length of stay (hr)	Cost	Time to normal activity
Laparoscopy (n = 26)	26±43	26±19	5,528 ± 1,586	17±9
Laparotomy (n = 37)	58±37	634±17	6,793 ± 155	62±49
Morphine equivalents in milligrams Values are means ± SD	P<0.005			

Table 4: Comparison of Study Groups Fertility

	Patients available for follow-up	No. of patients attempting pregnancy/total contacted	IUP	EP
Laparoscopy (n = 26)	77	8/20	7/8	0/8
Laparotomy (n = 37)	57	10/21	5/10	2/10

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Thirty-six cases were allocated to operative man- agement by laparoscopy and 37 to laparotomy. There were 10 secondary exclusions in the laparoscopy group. Six patients were excluded because of un- availability of equipment (3) or attending physician trained in operative laparoscopy (3). Four patients were excluded because of: (1) pregnancy location (interstitial); (2) dense adhesions; (3) uncontrollable bleeding from the mesosalpinx and (4) excessive size (8 cm in width). The latter was early in the study, and since then, ectopics of this size have been man- aged with laparoscopic surgery.

The number of conservative procedures (linear salpingostomy, segmental resection, and fimbrial expression) in each group was not significantly dif- ferent. The distribution of procedures performed is shown in Table 1. Linear salpingostomy was at- tempted on all ampullary and isthmic EP in which tubal conservation was desired and appropriate. Segmental resection was performed for those isthmic or ampullary EP with irreparable tubal destruction or persistent bleeding from a salpingostomy bed.

The number of unruptured EPs and the number of patients with pelvic adhesions were not statisti- cally different. The mean intraoperative estimated blood loss was significantly lower in the laparoscopy group (Table 2). There was no statistical difference (52% laparoscopy versus 47% for laparotomy) be- tween the two groups in the number of patients with a pre-existing hemoperitoneum.

Short-term complications in the laparoscopy group included a blood transfusion in one patient and treatment of Neisseria gonorrhea endometritis in a second patient. In the laparotomy group, two patients required transfusion. Postoperative febrile morbidity in the laparotomy patients included three patients with pneumonia, presumed peritonitis, and a urinary tract infection, respectively. Additionally, one laparotomy patient had a wound infection.

In the laparotomy group, there were no failed conservative procedures, defined as persistently ris- ing or plateauing β-hCG titers. Early in our expe- rience, two patients initially treated with a conser- vative laparoscopic procedure (salpingostomy and fimbrial expression) underwent a second laparo- scopic procedure (salpingectomy). A third patient with persistence was treated with methotrexate and β-hCG levels declined rapidly.

Length of stay and total cost of hospitalization were significantly decreased in the laparoscopy group (Table 3). The cost of treatment for persistent EP in the three patients who failed conservative laparoscopic surgery was included in the total cost for the laparoscopy group. Laparoscopy resulted in an average savings of approximately $1,200 for each patient. The term analgesic requirement attempts to quantify postoperative discomfort or pain. The laparoscopy group used significantly less narcotic postoperatively. A longer recovery period was re- quired for the laparotomy group (Table 3).

Of the 37 laparotomy patients, 21 were available for follow-up. Twenty of the laparoscopy patients were available for follow-up. Follow-up limitations reflect the large segment of indigent patients in our population who have no long-term permanent home address or telephone number. We attempted to cir- cumvent this problem by obtaining a contact person at the time of admission, which was somewhat help- ful. In the laparoscopy group, 40% of patient’s con-tacted had attempted pregnancy. In the laparotomy group, 50% of patients available for follow-up desired pregnancy. The differences in IUPs achieved and EP were not statistically significant (Table 4).

DISCUSSION

Any new modality's function must be determined by thorough research demonstrating its obvious advantages. When compared to laparotomy, several series have demonstrated that laparoscopy seems to be both safe and effective for treating EP. Additionally, it

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JCHR (2024) 14(6), 756-762 | ISSN:2251-6727

has been demonstrated that laparoscopy speeds up healing and is more cost-effective.

Pouly et al. [2] reported a subsequent IUP rate of 64% and an ectopic rate of 22% after performing laparoscopic salpingostomy on 321 tubal gestations. Due to residual trophoblastic tissue, fifteen individuals (4.8%) required a repeat laparoscopy or laparotomy. The relative safety and effectiveness of conservative laparoscopic therapy for EP were amply proven by this extensive series. Following laparoscopic salpingostomy, DeCherney and Diamond reported a 10% ectopic gestation rate and a 52% IUP rate Dubuisson et al. [6] shown 100 consecutive successful laparoscopic complete salpingectomy cases for ampullary EP. Despite a hemoperitoneum of more than 1 L in 12% of patients and tubal rupture in 32% of patients, there were no intraoperative problems. A large pelvic hematocele and severe adhesions were the reasons for the exclusion of two patients, respectively.

Although surgical laparoscopy is becoming more and more popular in the treatment of EP, there aren't enough well-controlled, prospective studies that contrast it with the more conventional laparotomy. Brumsted et al. [7] revealed a case-control research that contrasted laparotomy with operational laparocopy. Pregnancy age, technique, maximal β-hCG level, pelvic adhesions, ectopic size, hemoperitoneum, implantation location, and rupture presence or absence were all taken into consideration while matching 25 pairs. They discovered that the laparoscopy group had a considerably lower duration of hospital stay, operating room stay, and convalescent time. Additionally, much less postoperative analgesia was needed by the laparoscopy group. More recently, Ver- mesh et al. [8] finished treating unruptured EP with linear salpingotomy in a prospective randomized study that compared laparoscopy and laparotomy. The anticipated blood loss and hospital stay duration were significantly reduced in the lap-aroscopy group. Postoperative hysterosalpingography showed no discernible change in tubal patency between the two groups. There was also no difference in IUP rates.

We applied endoscopic techniques to all types of tubal ectopic gestations except those complicated by hemodynamic instability. Only 4 patients of 36 were secondarily excluded from the laparoscopy arm because the surgeons thought laparoscopic surgery could not be safely accomplished. Reasons for ex- clusion from the study included: (1) location (inter- stitial); (2) dense adhesions; (3) bleeding from a sal- pingostomy site that could not be controlled; and (4) size (8 cm). It should be noted that there are reports of cornual as well as ovarian pregnancies that have been removed at laparoscopy. Because the operative skills of the surgeons improved as the study progressed, the latter two could probably have been accomplished at laparoscopy. Ectopic preg- nancies of large size (>8 cm) were treated success- fully at laparoscopy later in the study. This points out the importance of experience in determining which ectopic gestations are appropriately treated at laparoscopy. As the staff became more experi- enced and accomplished surgically, more difficult cases were attempted and successfully completed by both staff and residents. It also underscores the im- portance of teaching operative laparoscopy to resi- dents who are able to master the technique and ben- efit greatly from the experience. We believe that laparoscopic treatment of EP is an appropriate next step after a resident has mastered diagnostic lapa- roscopy and simple sterilization procedures.

There was no discernible difference in the two groups' operating hours. This was unexpected since the evening operating room crew was not familiar with the sophisticated equipment needed for operational laparoscopy. It seems probable that a substantial reduction in operating time would have been achieved with more skilled nurses and surgeons.

The estimated intraoperative blood loss was much lower in the operative laparoscopy group, despite the fact that the number of unruptured EPs and the estimated pre-existing hemoperitoneum were same in the two groups. Blood loss during laparoscopy was comparable to what has been seen in other series. The two groups did not significantly vary in the type of operational operations carried out; however, the laparoscopy group underwent more fimbrial expressions (3 vs 0) and the laparotomy group underwent more salpingectomies (35% versus 54%)..

Our study identified several other advantages of the laparoscopic approach. As noted by others, there was a significant reduction in length of hospital stay with a corresponding decrease in hospital cost. Be- cause the

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JCHR (2024) 14(6), 756-762 | ISSN:2251-6727

procedural time was similar in the two groups, fees (operating room, anesthesiologists, and surgeons) were also similar. Most of the savings was seen in a decreased hospital room and drug charge. With an average savings of $1,200 per patient and a nationwide rate of 88,000 cases per year, lap- aroscopic treatment could result in $100 × 10º in savings per year. The significant decrease in anal- gesic requirement in the laparoscopy group corre- lates well with length of stay as well as with signif- icant reduction in time to normal activity seen in that group. The economic benefit to the health care system as well as to individual patients seems ob- vious.

A significant complication of conservative surgery for EP has been postoperative persistence of func- tional trophoblast. In this study, the persistence rate was not statistically different between the two groups. However, in the laparotomy group, there were no failed conservative procedures. In the lap- aroscopy group, 3 of 17 (18%) patients undergoing conservative procedures had persistently rising or plateauing β-hCG titers. This incidence is high but in the range (3% to 22%) reported by several groups. One of the patients with persistence un- derwent fimbrial expression. Bruhat et al. [9] has reported a high rate of failure with laparoscopic tubal aspirations (18%). At laparotomy, Timonen and Nieminen [10] have also observed a high rate of per- sistence with this procedure.

Reproductive outcome was similar in both groups. The ectopic gestation rate as well as intrauterine conception rates for both laparoscopy and laparot- omy are consistent with previous reports. It is im- portant to note that because of the small sample size and number of patients available for follow-up, this study has a low power to detect a difference if one exists. Moreover, PRs should be interpreted with caution because our study population included many patients with risk factors that have been shown to reduce fertility (e.g., previous ectopic gestation,previous PID, previous pelvic surgery and adhe- sions) [11].

In conclusion, this is the first prospective study to compare laparoscopy with laparotomy in the management of appropriately selected (hemody- namically stable) EP. We have shown that a lapa- roscopic approach provides lower costs and morbid- ity. It also appears to provide comparable subsequent fertility. It is hoped that this study will encourage physicians and residency training programs to invest in the training and equipment necessary to provide the endoscopic approach to patients with EP.

CONCLUSION

Because of its benefits for patient satisfaction, safety, and recuperation, laparoscopy is frequently the method of choice for treating persistent ectopic pregnancy. In some clinical situations, laparotomy is still a viable choice. Large-scale, randomized studies should be the main focus of future research in order to confirm these results and improve surgical techniques for treating ectopic pregnancies.

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