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Introduction of laparoscopic removal of ectopic pregnancy at a rural surgical centre

Gary Soenen, MD, FRCSC
General Surgeon, Hinton General Hospital,
Hinton, Alta.

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Correspondence and reprint requests to: Dr. Gary Soenen, Hinton General Hospital, 1280 Switzer Dr., Hinton AB T7V 1V2

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Abstract

Objective and method: To examine the effect of introducing laparoscopic removal of ectopic pregnancy on patient care and hospital costs in a rural surgical centre by means of a retrospective comparative study of laparoscopic versus open removal. The charts of 27 consecutive patients presenting with ectopic pregnancy between Jan. 1, 1992, and Jan. 31, 1996, were reviewed. Length of hospital stay, use of analgesia and total hospital costs were analysed.

Results: Laparoscopic removal of ectopic tissue was associated with a significantly shorter hospital stay relative to open surgery (0.7 and 2.5 days respectively; $p < 0.0001$, Student's t-test).

The need for analgesia was similarly lower in laparoscopic cases (10.0 and 61.9 morphine equivalents respectively; $p < 0.0001$). Hospital costs were far lower for laparoscopic cases ($570.26/case and $1227.05/case respectively).

Conclusion: Laparoscopic removal of tissue is the surgical "gold standard" for the treatment of ectopic pregnancy and should be introduced in centres where open removal is already being practised.

Résumé

Objectif et méthode : Examiner l'effet de la mise en œuvre de l'ablation par laparoscopie de grossesse ectopique sur les soins des patientes et les coûts hospitaliers dans un centre rural de chirurgie au moyen d'une étude comparative rétrospective de l'ablation par laparoscopie par rapport à l'ablation sanglante. On a examiné les dossiers de 27 patientes consécutives qui se sont présentées en état de grossesse ectopique entre le 1er janvier 1992 et le 31 janvier 1993. On a analysé la durée du séjour à l'hôpital, l'utilisation d'analgésiques et le total des coûts d'hospitalisation.

Résultats : On a établi un lien entre l'ablation par laparoscopie de tissus ectopiques et un séjour à l'hôpital beaucoup plus court qu'à la suite d'une chirurgie sanglante (0,7 et 2,5 jours respectivement; $p < 0,0001$, test de Student). Le besoin d'analgésie a été moins élevé proportionnellement dans les cas de laparoscopie (10,0 et 61,9 équivalents de morphine respectivement; $p < 0,0001$). Les coûts d'hospitalisation ont été beaucoup moins élevés dans le cas de la laparoscopie (570,26 $ et 1227,05 $ par cas respectivement).

Conclusion : L'ablation des tissus par laparoscopie est l'«étalon or» chirurgical du traitement des grossesses ectopiques et il faudrait l'implanter dans les centres qui pratiquent déjà l'ablation sanglante.

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Introduction

More than 1% of all pregnancies are ectopic.[1,2] Although medical treatment of ectopic pregnancy is evolving rapidly, surgery continues to be the primary treatment. Since the first description, by Shapiro and Adler in 1973,[3] of treatment of an ectopic pregnancy by laparoscopy, laparoscopic removal has gained popularity, particularly in Europe and the United States.[1,4-8] The advantages of the laparoscopic approach include a shorter hospital stay, less analgesia and a reduction in the total cost to the health care system.[1,2,4-13]

This article reports an analysis of the impact of the introduction of laparoscopic removal on length of stay, analgesia and cost at the Hinton General Hospital, a rural surgical centre serving a population of 10 000.

Methods

The hospital charts for 27 consecutive ectopic pregnancy removals at the Hinton General Hospital, carried out between Jan. 1, 1992, and Jan. 31, 1996, were reviewed. Cases of laparoscopic removal were compared with cases of open removal with respect to patient age, length of hospital stay, postoperative narcotic use, operating time and cost of postoperative stay. The calculation of the cost of the hospital stay was based on the per diem reimbursement by the Alberta Ministry of Health to rural hospitals ($453), as well as the cost of the extra equipment used in laparoscopic surgery. Use of analgesia was calculated by conversion to morphine equivalents (50 mg Demerol [pethidine hydrochloride] = 5 mg morphine = 1 Tylenol no. 3 [acetaminophen with codeine]).

The technique of laparoscopic removal of ectopic pregnancy involved the placement of a 10-mm Hasson disposable surgical Reflex STR trocar (Richard Allen Medical, Richland, Mich.) through the umbilicus, as well as placement of two 5-mm Surgiport trocars (Autosuture, Ville-Saint-Laurent, Que.) in the right and left lower quadrants. A dilute solution of epinephrine was infiltrated into the broad ligament to reduce blood loss. Linear salpingotomy was performed by L-hook electrocautery, which was followed by extraction of the ectopic tissue and placement into an Endo Catch bag (Autosuture). A 5-mm, 30° laparoscope (Dyonics Smith & Nephew, Lachine, Que.) was used in all cases. Because the laparoscope could be placed in any of the trocar sites, it was possible to retrieve the ectopic tissue through the umbilical incision.

Data between the 2 groups were compared with Student's t-test.

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Results

Twelve patients underwent laparoscopic removal, and 15 underwent open removal. In both groups, the average age was 26 years. The type of operative procedure was markedly different for laparoscopic and open procedures. Salpingotomy, with preservation of the uterine tube, was performed in 10 of the 12 patients who underwent laparoscopic removal but in only 2 of the 15 patients who underwent open removal. The average length of stay in hospital was significantly shorter for patients who underwent the laparoscopic procedure than for those who underwent open surgery (0.7 and 2.5 days respectively; $p < 0.0001$). Likewise, the use of analgesia was significantly lower among patients who underwent the laparoscopic procedure (10.0 and 61.9 morphine equivalents respectively; $p < 0.0001$).

Extra equipment costs for laparoscopic surgery amounted to $211.36 per case. Despite this additional cost, the total hospital cost for a case of laparoscopic removal was only $570.26, whereas the total cost for a case of open removal was $1227.05.

Operating times were shorter for laparoscopic surgery than for open removal (47 and 59 minutes respectively), but this difference was not statistically significant.

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Discussion

The number of cases in this study was small, and the conclusions should therefore be considered preliminary. However, our results do agree with those of many other studies demonstrating the benefits of laparoscopic surgery over laparotomy in the treatment of ectopic pregnancy.[1,2,4-11]

Few studies have addressed the direct financial benefits of laparoscopic surgery. For the 12 laparoscopic cases analysed in this study, the overall savings to the hospital amounted to $7881.48. Given that ectopic pregnancy is a common condition for which surgery is frequently required, the financial benefits across Canada could be enormous. For example, the financial benefit of laparoscopic surgery for ectopic pregnancy in the United States has been estimated at more than US$100 million per year.[2]

We observed a marked difference in the relative frequency of tubal salvage (salpingotomy) and tubal excision in the 2 groups of patients. This difference appears to represent the personal preferences of the surgeons, since either procedure can be performed easily in both laparoscopic and open removal. Certainly, a conservative surgical approach leaves the patient with the most options for future pregnancy, and it is clear that most women who have undergone linear salpingotomy go on to have a normal pregnancy.[10] Although another ectopic pregnancy occurs in many patients who have already had one ectopic pregnancy, many women wish to take that chance. Therefore, desire for future fertility should always be discussed with the patient before surgery.

Many rural surgical centres continue to offer only open removal or, where appropriate, referral to a larger centre where laparoscopy can be performed. The latter option is frequently not available, particularly in patients with ruptured or rupturing ectopic pregnancy. Given the obvious benefits to both the patient and the hospital, rural surgeons may wish to consider performing laparoscopic salpingotomy in this situation. It is the opinion of this author, a nongynecologist, that linear salpingotomy and extraction of ectopic pregnancy tissue is one of the easiest of laparoscopic operations to perform.

Although the clinical diagnosis of ruptured ectopic pregnancy is usually straightforward, confirmation with either ultrasound or diagnostic laparoscopy is necessary. If ultrasound imaging is not readily available, as in many rural communities, it would seem prudent to perform diagnostic laparoscopy first. If ectopic pregnancy is confirmed, the insertion of two 5-mm trocars is all that is required to change the procedure from a diagnostic to a therapeutic one. The amount of training needed to acquire the necessary skills depends almost entirely on the existing skill level of the surgeon and whether or not s/he already performs laparoscopic surgery. The cost of such training would vary accordingly.

The length of stay reported here is one of the lowest ever reported, likely because the presurgery stay at our hospital is minimal as a result of the usually immediate access to the rural operating room. This situation compares favourably with the usually much longer waiting period experienced in urban operating rooms, due to a backlog of cases. In this sense, the rural operating room is more efficient in handling surgical emergencies.

Although most ectopic pregnancies are amenable to treatment by laparoscopy, some cases, such as those involving cornual ectopic pregnancy with rupture and shock, may not be. For the stable patient, laparoscopic excision should be considered the procedure of choice.

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Conclusions

Laparoscopic removal of ectopic pregnancy is the surgical "gold standard" of treatment for this condition. It is associated with markedly reduced hospital stay, use of analgesia and total hospital costs.

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