

Laparoscopy in Patients with Prior Surgery: Results of the Blind Approach

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ABSTRACT

Background and Objectives: To compare the complication rate due to blind access laparoscopy between patients with or without a prior history of laparotomy.

Methods: We examined a prospective record of data on laparoscopic surgeries performed from 1992 to 1998. Only cases in which the Veress needle and the first trocar were inserted through the umbilicus were included in this study. Results issued from patients without previous abdominal surgery (Group I) were compared with those arising from women with prior laparotomy (Group II). A statistical analysis was performed using the Chi-square test or Fisher exact test when appropriate.

Results: One thousand thirty-three laparoscopies were carried out during the study period, 881 of which began with a blind access through the umbilicus. Two hundred two women (19.3%) had an history of abdominal or pelvic surgery. Eight hundred forty-two patients were included in Group I and 39 in Group II. Failure to penetrate into the peritoneal cavity occurred significantly more frequently in Group II (4/39) than in Group I (1/842, $P < 0.0001$). The insertion of the Veress needle gave rise to 2 complications in Group I and 0 in Group II ($P = 1.0$). Transumbilical trocar insertion gave rise to 1 complication in each group (1/841 vs. 1/35, $P = 0.11$). When all events were considered, incidents or accidents were significantly more frequent in Group II (5/39) than in Group I (4/842) ($P < 0.0001$).

Conclusions: We recorded a higher rate of incidents/complications due to the Veress needle and

trocar insertion in patients with a previous history of laparotomy. An adapted approach should be recommended for these patients.

Key Words: Adhesion, Gynecological laparoscopy, Complications, Open laparoscopy, Microlaparoscopy.

INTRODUCTION

Thirty to fifty percent of laparoscopic complications take place during the surgical access.¹ Prior abdominal surgery, which raises the risk of abdominal wall adhesions, has been identified as one of the major risk factors.² A previous history of laparotomy is no longer a contraindication to laparoscopy, but a strong debate about the safest approach in these cases still remains.³

The aim of this study was to evaluate the morbidity of gynecological laparoscopy due to blind umbilical access (Veress needle and first trocar) in patients with or without a prior history of laparotomy.

MATERIAL AND METHODS

Data relevant to laparoscopic procedures performed in our department have been prospectively recorded since 1992.¹ Patient's surgical history, main indications and diagnosis, type of surgical procedure, intraoperative and postoperative complications have been systematically collected on a PC using software developed by FOXPRO (Microsoft).

For the present work, we retrospectively studied the complication rate of Veress needle and first trocar blind insertion in patients with or without a previous history of laparotomy. The study period ranged from January 1, 1992 to December 31, 1998. We included all the patients operated on under general anesthesia, with blind insertion of the Veress needle and of a 10- to 12-mm reusable trocar through the umbilicus as well. Patients operated on with other approaches (open laparoscopy, insufflation in the left upper quadrant, microlaparoscopy under local anesthesia, and others) were excluded from this study.

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In patients without a prior history of laparotomy (Group I), the Veress needle was inserted transumbilically. A 15-mm Hg pneumoperitoneum was created after the following safety steps: 1) aspiration with a syringe through the Veress needle, which should not yield gas or blood; 2) injection of 20 cc of air, which cannot be sucked back subsequently; 3) the initial intraperitoneal pressure should be negative; 4) insufflation up to a pressure of 15-mm Hg when the initial insufflation is harmonious. A 10- to 12-mm transumbilical trocar was then inserted through the umbilicus.

In patients with a prior history of laparotomy (Group II), the Veress needle was inserted and the peritoneal cavity insufflated with the same technique. The 10- to 12-mm trocar was placed through the umbilicus after it had been confirmed to be free of adhesions. This was carried out by introducing a 21-gauge intramuscular (IM) needle adapted to a syringe half filled with water through the abdominal wall. If the peritoneum was free of bowel or omental adhesion, bubbles would show up in the syringe. Three to four sites near the umbilicus were checked before the insertion of the transumbilical trocar. When adhesions were suspected in the region of the umbilicus, trocars were inserted elsewhere in a free area. Moreover, we systematically changed to a different access after 2 failures.

Complications were defined as vascular or visceral lesions induced by the insertion of the Veress needle or the umbilical trocar. Any patient who had a history of abdominal or pelvic surgery carried out through midline, Pfannenstiel, or transrectal laparotomy entered Group II.

Operators' skill was homogenous, because all of them had ended their learning curve for laparoscopic access.

The statistical analysis were performed using SPSS software (SPSS Inc, Chicago, USA). Nominal variables were compared using the Fisher exact test. A *P* value of 0.05 was considered as significant.

RESULTS

One thousand thirty-three laparoscopic procedures were performed during the study period. Two hundred two patients had a history of laparotomy or laparoscopy (19.5%), of whom 109 had a midline or a transversal peritoneal scar (10.5% of patients). Eight hundred eighty-one patients had a blind transumbilical access; 842 of these were included in Group I and 39 in Group II. The other

Table 1.

Complications due to the insertion of the Veress needle.

	Group I	Group II	<i>P</i>
Failure of insertion	1/842	4/39	< 0.0001
Complication	2/841	0/35	1.0

Table 2.

Complications due to the insertion of the laparoscopic trocar and canula.

	Group I	Group II	<i>P</i>
Complication	1/841	1/35	0.11

patients had an open approach or a left upper quadrant access.

The overall incident-complication rate of this blind laparoscopic access was 1%. The insertion of the Veress needle gave rise to 5 incidents and 2 complications (**Table 1**). In 5 cases, the surgeon failed to get into the peritoneal cavity, and an open technique was required (1/842 in Group I vs 4/39 in Group II; *P* < 0.0001). Two complications were recorded in Group I (2/841) vs 0/35 in Group II (*P* = 1). One complication was injury to the left common iliac artery, and the other was injury to the transverse colon, both with the tip of the Veress needle.

Transumbilical trocar insertion gave rise to 2 complications: 1/841 in Group I (injury of the uterus) and 1/35 in Group II (bowel injury in a patient with a previous midline laparotomy, despite a comforting "bubble test") (*P* = 0.11) (**Table 2**). In the other cases, the bubble test guided the surgeon to an area free of adhesions.

Finally, when only true complications were considered, risk did not significantly increase between patients in Group I (3/841) and in Group II (1/35) (*P* = 0.15); but when all events were considered, incidents or complications were significantly less frequent in Group I (4/842) in comparison with Group II (5/39) (*P* < 0.001).

DISCUSSION

Laparoscopic access remains a hazardous phase of the procedure, owing to the blind insertion of the Veress

needle to create the pneumoperitoneum and subsequently of the laparoscope through the umbilicus. A great number of laparoscopic complications occur during this step.¹ The most serious of them consist of vascular and bowel injuries.⁴

Adhesions after abdominal or pelvic surgery have a major impact on subsequent patient's health.⁵ A prior history of laparotomy has been recognized as one of the most important risk factors in patients operated on by laparoscopy.² In an experimental study, Lanvin⁶ recorded significantly more frequent bowel complications (80%) in animals with midline laparotomy than in those without previous surgery (32.5%) ($P = 0.0001$). In humans, Brill⁷ observed that abdominal wall adhesions were significantly more frequent in previously operated on patients. Midline laparotomy above the umbilicus was responsible of the highest rate of adhesions (67% vs 27%). Complications can occur two times more frequently in patients with a prior history of laparotomy.⁸

The blind transumbilical approach is the most common route for gynecological laparoscopy. We wanted to evaluate the complication rate of blind access in patients with or without a prior history of laparotomy.

In this series, the overall complication rate of the blind transumbilical access was 1%, which is comparable to the results reported in recent literature.^{9,10}

In this series, failures to get into the peritoneal cavity were significantly more frequent in patients who had already had a laparotomy. This can be explained by bowel or omental adhesions to the anterior abdominal wall that may hinder the Veress needle finding its way to the peritoneal cavity. No bowel or intestinal mesentery injuries occurred in these cases, probably because changing the access after 2 failures has always been practiced. This rule probably increases the rate of failures, but decreases the complication rate. Bowel lesions due to the Veress needle insertion are rare when safety steps and rules are strictly observed.¹¹

Typical complications induced by the Veress needle generally involve large vessels. Vena cava, aorta, or iliac vessel injuries have been frequently reported in the literature.⁴ In our experience, we have seen only 1 case that was successfully treated by laparotomy, but we should keep in mind that deaths have been reported.⁴ Thin women are at higher risk followed by previously operated on patients.

Insertion of the transumbilical trocars was responsible for only 1 serious complication (1 bowel injury). It happened despite a negative bubble safety test in a patient of Group II with a prior midline laparotomy. This false-negative led us to be cautious with that test and to look for other kinds of prevention.

Open laparoscopy has been proposed as a safe alternative to the traditional blind approach. It allows entry into the peritoneal cavity under direct vision and may prevent injury of the adherent viscera.¹² On the other hand, this access is time consuming and exposes patients to gas leaks from the wound. Some authors did not find any significant advantage in this approach. Brill⁶ admitted that 30% of the complications related to trocar insertion occurred in spite of an open approach in women with a prior laparotomy.⁶ Only a small number of randomized trials have been published. The results of most of these studies lack the power to demonstrate any benefit.¹³⁻¹⁵ For some authors, recognition of adhesions is difficult through a small skin incision, limiting the interest of the open approach in obese patients or women with a prior midline laparotomy. Finally, open laparoscopy seems more logical in a routine situation, because it could be the best approach for preventing vascular complications. However, in our experience, no complication occurred with open laparoscopy (data not shown).

More recently, insertion of a microlaparoscope through a 3-mm Veress needle in the left upper quadrant has been proposed.¹⁶ The first "blind" laparoscopic instrument is set in an area generally free of adhesions. It allows a precise exploration of the anterior abdominal wall to check for adhesions; and subsequent trocars can be inserted under direct visual control. We have tested this approach in more than 100 patients without any complication so far (data not shown). This approach is simple to learn and to perform and does not require any instruments other than a small diameter fibroscope, which is increasingly used in gynecology for a large range of indications.

Other techniques like abdominal wall adhesion screening by means of sonography or trocars associated with a viewing system have been proposed. But, today no large trial has been published on the usefulness of these devices.

CONCLUSION

In this series, incidents and complications resulting from

the installation of laparoscopy were more frequent in patients with prior laparotomy. This should inspire a search for the best alternative approaches in such patients, because today, no other access has demonstrated its superiority. Safety rules still have to be taught to junior surgeons.

References:

1. Mac Cordick C, Lécuru F, Rizk E, Robin F, Boucaya V, Taurelle R. Morbidity of laparoscopy for gynaecological surgery. Results of a prospective monocenter study. *Surg Endosc*. 1999;13:57-61.
2. Chi IC, Fellblum PJ, Balogh SA. Previous abdominal surgery as a risk factor in interval laparoscopic sterilization. *Am J Obstet Gynecol*. 1983;145:841-846.
3. Rosen D, Lam A, Chapman M, Carlton M, Cario G. Methods of creating pneumoperitoneum: a review of techniques and complications. *Obstet Gynecol Surv*. 1998;53:167-174.
4. Chapron C, Pierre F, Lacroix S, Querleu D, Lansac J, Dubuisson JB. Major vascular injuries during gynecologic laparoscopy. *J Am Coll Surg*. 1997;185:461-465.
5. Ellis H, Moran BJ, Thompson JN, et al. Adhesions-related hospital readmissions after abdominal and pelvic surgery: a retrospective cohort study. *Lancet*. 1999;353:1476-1480.
6. Lanvin D, Elhage A, Querleu D. Does the use of pneumoperitoneum and disposable trocars prevent bowel injury at laparoscopy? A randomized experimental study in the rabbit. *Gynaecol Endosc*. 1996;5:343-348.
7. Brill A, Nehzat F, Nehzat C, Nehzat C. The incidence of adhesions after prior laparotomy: a laparoscopic appraisal. *Obstet Gynecol*. 1995;85:269-272.
8. Kolmorgen K. Laparoscopy complications in previously operated patients. *Zentralb Gynaekol*. 1998;120:191-194.
9. Richardson RE, Sutton CJ. Veress needle complications: a prospective audit. 7th Congress of the European Society for Gynaecological Endoscopy. Lausanne, 6 – 9 Dec 1998.
10. Bateman BG, Kolp LA, Hoeger K. Complications of laparoscopy - operative and diagnostic. *Fertil Steril*. 1996;66:30-35.
11. Kjer J. Laparoscopy after previous abdominal surgery. *Acta Obstet Gynecol Scand*. 1987;66:159-161.
12. Hasson HM. Open laparoscopy: report of 150 cases. *J Reprod Med*. 1974;12:234-238.
13. Byron J, Markenson G, Miyazawa K. A randomized comparison of Veress needle and direct trocar insertion for laparoscopy. *Surg Gynecol Obstet*. 1993;177:259-262.
14. Peitgen K, Nimitz K, Hellinger A, Walz MK. Open approach or Veress needle in laparoscopic interventions? Results of a prospective randomized controlled study. *Chirurg*. 1997;68:910-913.
15. Cogliandolo A, Manganaro T, Saitta F, Micali B. Blind versus open approach to laparoscopic cholecystectomy: a randomized study. *Surg Laparosc Endosc*. 1998;8:353-355.
16. Audebert A. Microlaparoscopy at the beginning of laparoscopy. *Microendoscopy in Gynecology and Obstetrics*. Bordeaux, March 1997.