Gastrointestinal injuries during gynaecological laparoscopy

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A retrospective case review study was carried out on gastrointestinal injuries which occur during gynaecological laparoscopy. Fifty-six patients with 62 gastrointestinal injuries were identified. One-third of the complications (32.2%) occurred during the installation phase for laparoscopy. Four of the six complications attributed to electrosurgery were secondary to the use of monopolar coagulation. Diagnosis of these gastrointestinal injuries was made during surgery in only 20 patients (35.7%). The mean time before diagnosis was 4.0 ± 5.4 (range 0–23) days. Treatment of these complications was performed by laparoscopic surgery in 16.1% of cases. Prevention relies on the surgeon’s experience, strict observance of the safety rules, perfect familiarity with the physical properties of the instruments used, systematic use of bowel preparation for patients presenting a risk of bowel complications, systematic supervision of the route taken by the trocars, meticulous inspection on completion of surgery of all areas where bowel adhesiolysis has been used and, in case of any doubt, tests for leakage involving the rectosigmoid. For patients with a risk of bowel complications, the creation of a pneumoperitoneum and performing a mini laparoscopy in the left hypochondrium can be the judicious option.

Key words: complications/gastrointestinal injuries/gynaecological laparoscopy

Introduction

Over the past few years, operative laparoscopy has proved that it is a surgical discipline in its own right. In parallel with study of the feasibility and analysis of the results, assessment of a new surgical technique requires that the risk of complications also be evaluated (Chapron and Querleu, 1994). The large numbers of patients included in the recent series make it possible to assess the risk of gastrointestinal injuries occurring during gynaecological laparoscopy as lying between 0.6 and 1.6 per thousand (Peterson et al., 1990; Lehmann-Willenbrock et al., 1992; Härkki-Sirén and Kurki, 1997; Jansen et al., 1997; Chapron et al., 1998). The aim of our work was not to assess the incidence of gastrointestinal injuries but to report on our experience of this type of complication in order to specify the circumstances under which they occur, the means for diagnosis, the risk factors and the means of prevention.

Materials and methods

The French Society of Gynecological Endoscopy (SFEG) comprises several commissions. One of these commissions in which several of the co-authors of this manuscript (C.C., F.P., D.Q.) take an active part is exclusively in charge of studying the complications of operative gynaecological laparoscopy. Under the direction of Professor F. Pierre, this commission has set up a register of complications for gynaecological laparoscopy. The members of the SFEG are invited, but not obliged, to send an anonymous report of their accidents. In this work we have analysed all cases of gastrointestinal injuries which have been sent to us. Our definition of gastrointestinal injury is evidence of damage to the following organs: stomach, small bowel, large intestine and rectosigmoid.

The charts of identified cases were reviewed and the following information recorded: patient’s age, original procedure, location of the injury, occurrence of the accident, method of diagnosis and treatment modalities. The gastrointestinal injuries were analysed according to the type of laparoscopy carried out (Querleu et al., 1993) (Table I).

No attempt was made to define the total number of laparoscopies performed in the participating institutions during the study period.

Results

Fifty-six patients presenting 62 gastrointestinal injuries in the SFEG complications register were analysed. The mean age of patients was 37.2 ± 10.3 (range 19–75) years, mean height 163.1 ± 5.8 (range 152–181) cm, and mean bodyweight 62.5 ± 9.8 (range 45–92) kg. The mean body mass index (BMI) was 23.5 ± 3.4 (range 17–33) kg/m². Thirty-seven patients (66.1%) presented a history of previous surgical procedures. In these cases the types of incision were as follows: simple appendicectomy (n = 8); Pfannenstiel (n = 16); midline subumbilical laparotomy (n = 9); laparoscopic surgery (n = 4). The indications for the laparoscopy included diagnostic laparoscopy (n = 5), tubal sterilization (n = 7), ectopic pregnancy (n = 2), benign ovarian cysts (n = 16), stages 3 and 4 endometriosis (n = 14), hysterectomy (n = 7), myomec-
involved the use of monopolar coagulation. Secondary to the use of electrosurgery, and four of these
during the operative laparoscopic procedure, six (18.8%) were
the pneumoperitoneum. Of the complications which occurred
they were secondary to insertion of the needle used to create
the technique and indications are now strictly defined
secondary to introduction of the umbilical trocar, while in six
laparoscopy; in nine of these patients, complications were
occurred are presented in Table III. One-third of the complica-
hernias through the umbilical trocar site.
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the small bowel (33.9%; 21 patients). Injuries to the omentum
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large intestine (48.4%; 30 patients), while one-third concerned
small bowel (33.9%; 21 patients). Injuries to the omentum
were large pneumoeiploons, and two of the omentum lesions were
hernias through the umbilical trocar site.
The locations of the 62 gastrointestinal injuries are presented in
Table II. Almost half of the complications involved the large intestine (48.4%; 30 patients), while one-third concerned
the small bowel (33.9%; 21 patients). Injuries to the omentum (16.1%; 10 patients) were associated with injury to the small
bowel in five cases. Three of the omentum injuries were large pneumoeiploons, and two of the omentum lesions were
hernias through the umbilical trocar site.
The circumstances under which these gastrointestinal injuries
occurred are presented in Table III. One-third of the complica-
tions (32.1%; 18 patients) occurred during the set-up phase of
laparoscopy; in nine of these patients, complications were secondary to introduction of the umbilical trocar, while in six
they were secondary to insertion of the needle used to create the pneumoperitoneum. Of the complications which occurred
during the operative laparoscopic procedure, six (18.8%) were secondary to the use of electrosurgery, and four of these
involved the use of monopolar coagulation.
The delay in the diagnosis of the gastrointestinal injuries is
reported in Table IV. The mean time which elapsed before
diagnosis of the complication was 4.0 ± 5.4 (range 0–23) days. Diagnosis of a gastrointestinal injury was made
intraoperatively in only 20 patients (35.7%). In 36 patients
(64.3%), the gastrointestinal injury went unnoticed during
during the second week in five cases (13.9%).
The treatment modalities of gastrointestinal injuries are
presented in Table V. Treatment of bowel injuries was most
often performed by laparotomy (47 patients; 83.9%). When
the treatment was by operative laparoscopy (nine patients;
16.1%), the diagnosis had been made during the original
operation in eight cases. The complications treated by laparo-
scopic surgery included major insufflation in the omentum
(n = 2), injury to the stomach secondary to introduction of the
needle used to create the pneumoperitoneum (n = 1),
injury to the sigmoid secondary to introduction of a trocar
(n = 2), injury to the sigmoid secondary to adhesiolysis carried
with the laparoscopic scissors (n = 2), injury to the rectum
(n = 1), and occlusion due to strangulation (n = 1).

**Discussion**

Gastrointestinal complications occur quite frequently during
gynaecological laparoscopic surgery and, depending on the
Gastrointestinal injuries during laparoscopy

Table VI. Prevalence of gastrointestinal injuries

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series, represent between 20% and 46% of all complications (Peterson et al., 1990; Chapron et al., 1998). The incidence of these complications is between 0.62 and 1.60 per thousand laparoscopies (Jansen et al., 1997; Chapron et al., 1998). The wide variations in the statistical results according to the series is due to the following parameters: first, the type of laparoscopy is not identical in all publications (Table VI), as the risk of complications is statistically correlated with the complexity of the laparoscopic surgical procedure (Bateman et al., 1996; Jansen et al., 1997; Chapron et al., 1998); second, the surgeons' experience is not identical in the whole series, since the risk of complications falls significantly as the surgeons' skill increases (Soderstrom and Butler, 1973; Jansen et al., 1997; Pierre et al., 1998).

Diagnosis of gastrointestinal complications is made during the operation in only one-third of cases, with injuries during laparoscopic surgery often going unnoticed (Härkki-Sirén and Kurki, 1997; Chapron et al., 1998). The time which elapses before complications are diagnosed is longer in the case of a bowel injury secondary to the use of electrosurgery (Jansen et al., 1997). In our series, monopolar coagulation was responsible for four out of six gastrointestinal electrosurgery injuries, these results confirming that the risks involved with electrosurgery appear to be more important with monopolar coagulation (Nduka et al., 1994; Baggish and Tucker, 1995; Grosskinsky and Hulka, 1995). Electrosurgery must be used with extreme caution when close to the bowel and requires the surgeon to be perfectly familiar with the physical principles of its action according to the different methods of use.

One-third of the gastrointestinal injuries in this series (in 18 patients; 32.1%) occurred during the installation phase for laparoscopy. This observation, which confirms those by other authors (Härkki-Sirén and Kurki, 1997; Jansen et al., 1997; Chapron et al., 1998), underlines the fact that the installation phase is an integral part of the laparoscopic surgery procedure and that this part of the operation must not be considered as trivial under any circumstances. This finding raises the question of whether there are any practical solutions which could reduce the risk of complications occurring during this initial phase of the operation. In this respect, we feel there are two important elements: first, should the pneumoperitoneum be created before introducing the first trocar? and second, could open laparoscopy be a useful means of obtaining this goal?

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To our knowledge, there is no study in the literature which advocates against creating a pneumoperitoneum. Only three prospective randomized studies have specifically evaluated the direct trocar insertion technique (Borgatta et al., 1990; Nezhat et al., 1991; Byron et al., 1993), and analysis of these shows, in a total of 664 patients, that the only bowel complication observed during insertion of the initial trocar (perforation of the colon) occurred among patients without prior pneumoperitoneum (Borgatta et al., 1990). These results would seem to be confirmed by those of a recent study which reported that in the cases with prior abdominal surgery and abdominal wall adhesions, initial insufflation was safer than direct trocar insertion and that the use of disposable trocars did not improve the safety of the procedure (Lanvin et al., 1996). The fact that these disposable trocars are not an infallible means of preventing complications has also been underlined with respect to major vascular injuries (Chapron et al., 1997b).

With the aim of reducing complications during the set-up phase, certain authors recommend using open laparoscopy (Hasson, 1971; Horattas and Rosser, 1993; Hurd et al., 1994). Although this technique does present the undeniable advantage of contributing to a reduction in major vascular injuries (Bonjer et al., 1997), the benefits with respect to bowel complications are far more questionable. In no case does open laparoscopy enable the risk of bowel complications to be eliminated (Hasson, 1980; Penfield, 1985; Fitzgibbons et al., 1991; Levy et al., 1994; Bateman et al., 1996; Bonjer et al., 1997), and in certain cases these complications may even pass unnoticed (Perone, 1983). These observations are confirmed by the results of the recent study by Bonjer et al. (1997) which showed that the incidence of visceral injury at closed and open laparoscopy were not significantly different.

Some 16% (nine patients) of the gastrointestinal injuries in this series were treated by operative laparoscopy. It is the development of laparoscopic suture equipment and the increasing experience of the surgeons which enable bowel complications to be treated by laparoscopy in certain situations (Reich, 1992; Renault et al., 1996; Chapron et al., 1998). The gynaecological surgeon must not hesitate in this context to contact a gastrointestinal surgeon to consult with him on the repair modalities. The conditions which we feel are necessary in order to consider laparoscopic surgery treatment for a gastrointestinal injury include the following: a skilled surgeon with perfect mastery of laparoscopic sutures with suitable equipment available to carry out these procedures; bowel complication diagnosed immediately during surgery, apart from postoperative occlusions (one case in our series); satisfactory exposure; there must be a single, clean injury; the possibility of making a suture with no tension; preoperative bowel preparation; and no major leakage of intestinal contents into the abdominal cavity. In every other situation it is necessary to treat via laparotomy.

The prevention of gastrointestinal complications during
laparoscopy depends on the following ten principles being respected. (i) Systematic bowel preparation should be carried out in the case of patients with a risk of bowel injury (past history of surgery, endometriosis, the probable necessity of carrying out bowel lysis, etc.). Quite apart from the fact that this bowel preparation contributes to help with exposure, and thus the quality and safety of the laparoscopic surgery procedure, it does ensure that in certain situations a bowel injury can be repaired by laparoscopic surgery during the same anaesthetic. (ii) Before creating the pneumoperitoneum, check that there is no gastric distension. In case of doubt and/or if intubation was difficult, the stomach should be evacuated with a nasogastric tube in order to prevent injuries to its anterior surface. (iii) The surgeon must be perfectly familiar with the operating principles of the various instruments used (insufflators, mono and bipolar coagulation) and always have available instrumentation in impeccable condition and regularly maintained. (iv) Respect the safety rules scrupulously at every stage during set-up of the laparoscopy: creation of the pneumoperitoneum; insufflation; insertion of the optics trocar; additional trocars must in every case be introduced under visual control in an area free from adhesions, after checking the route of the parietal vessels by transillumination (Chapron and Querleu, 1994). (v) Systematically inspect the whole of the abdominopelvic cavity after introducing the optics trocar. If there are any adhesions close to the optics trocar site, check that there is no bowel-traversing injury, by introducing the laparoscope through a suprapubic route (Chapron et al., 1992). (vi) In patients with a past history of surgery (especially midline laparotomy), do not hesitate to create the pneumoperitoneum in the left hypochondrium (Palmer, 1974). In this context, if the surgeon decides to carry out an open laparoscopy, the incision must in no case be made at the same place as the previous scar. An interesting alternative to open laparoscopy after creating the pneumoperitoneum in the left hypochondrium consists of making a mini or micro laparoscopy (fibre optic endoscopes with diameters of 1.2 or 2 mm) in the same location. The 10 mm optics trocar is thus introduced in an area free from adhesions, remembering that insertion of the laparoscope trocar by the transumbilical route is by no means mandatory. (vii) On completion of surgery, meticulously inspect all areas where bowel lysis was required. When there is the slightest doubt, carry out tests for leakage (transanal injection of 200 ml methylene blue using a Foley catheter) in order not to overlook a rectosigmoid injury which would become apparent secondarily in a context of peritonitis (Chapron and Querleu, 1994). The surgeon must realize that although a negative result of 200 ml methylene blue using a Foley catheter) in order not to overlook a rectosigmoid injury which would become apparent secondarily in a context of peritonitis (Chapron and Querleu, 1994). The surgeon must realize that although a negative result of these tests means there is no immediate bowel injury, it does not exclude a delayed gastrointestinal complication appearing following necrosis secondary to the use of electrosurgery. (viii) Systematic closure of all ≥10 mm trocar sites to avoid the risk of incisional hernia. (ix) The importance of providing patients, at discharge, with information regarding symptoms which could be signs of impending complications (Pierre et al., 1996). (x) Specific training of surgeons in operative laparoscopy is absolutely necessary, as the risk of complications falls as the surgeon gains in skill (Soderstrom and Butler, 1973; Jansen et al., 1997; Chapron et al., 1998; Pierre et al., 1998). Consideration must be given to the implementation of accreditation systems which would enable this training to be assessed (Chapron et al., 1997a).

If these principles are respected, the incidence of gastrointestinal injuries can be reduced, bearing in mind that there is no infallible means of their being prevented entirely.

References


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