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Laparoscopic entry technique—a survey of practices of consultant gynaecologists

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Abstract To assess the mode of laparoscopic entry technique among consultant gynaecologists in the United Kingdom and Ireland and to find out whether recent recommendations have influenced practice, an anonymous postal questionnaire was sent to 1,190 gynaecologists. Responses were analysed using an Excel spreadsheet. There was a 64% response rate. Of the respondents, the majority (90%) performed laparoscopy by using a Veress needle technique. Regarding the patient's position when inserting the scope, 61% used lithotomy with Trendelenberg tilt, and 39% used the flat position. The entry point used was subumbilical by 54% and intraumbilical by 44%. Thirty-eight percent used pressure and 62% used volume to decide when to insert the primary trocar. Only 26% of responding gynaecologists were aware of the Middlesbrough consensus document, but most who had attended a course were compliant with the guidelines. In conclusion, the majority of gynaecologists practiced closed laparoscopy and used the volume technique to achieve pneumoperitoneum. Only a small number of gynaecologists were aware of the recent recommendations regarding safe laparoscopic entry technique, suggesting that methods for disseminating recommendations must be improved.

Keywords Laparoscopic entry technique · Closed laparoscopy · Recommendations

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Introduction

Once relatively confined to obstetrics and gynaecology, laparoscopic procedures have exploded in the last decade. In the United States, 310,756 laparoscopic cholecystectomies were performed in 1997. Diagnostic laparoscopy was estimated to have been done in 91,170 cases, and laparoscopic sterilisation was estimated to have been done in 317,961 women [1]. The attraction of laparoscopy to the gynaecologist and general surgeon, as opposed to “open” operations, is the reduced trauma of access. Clear evidence shows that, compared with laparotomy, laparoscopic surgery provides significant benefits for patients, providers, and surgeons. Potential benefits for patients include reduced total operative trauma, fewer major wound and adhesive complications, quicker patient convalescence, and faster return to work or usual activities. The benefits for health care providers include shorter hospital stay with consequent lower hospital and social costs. The benefits for the surgeon include an almost closed and no-touch operative approach with reduced risk of infection, better display of anatomy and pathology, more precise removal of diseased tissue, and more accurate tissue repair [2–5].

However, as with any surgical procedure, the laparoscopic approach is associated with complications that must be offset against the expected clinical benefits. The larger medical and surgical community is still evaluating the safety and effectiveness of these laparoscopic procedures compared with traditional “open” surgical procedures [3, 6–8], although we know that the entry of the laparoscope into the abdomen is the most common cause of serious complications [9–11].

The umbilical area is the thinnest portion of the abdominal wall and is therefore the preferred access site [12]. However, immediately below this point are the aortic bifurcation, the bowel, and the omentum. Access-related injuries to these organs as well as to the inferior vena cava, liver, portal vein, cystic artery, ureter,

bladder, iliac artery, and epigastric artery have all been reported [12, 13]. Major vascular injuries are rare [14], but once they are inflicted, between 9% and 13% of patients will die, often as a consequence of haemorrhage or gas embolism [15, 16]. Saber et al. carried out computed tomographic scan mapping of epigastric vessels and suggested that epigastric vessels are usually located in the area between 4 and 8 cm from the midline. They concluded that staying away from this area would determine the safety zone of entry of the anterior abdominal wall [17]. Access-related bowel or visceral injuries are more common. Reports indicate that between 50% and 66% of bowel and visceral injuries are undiagnosed at the time of primary surgery and can lead to major complications such as sepsis, peritonitis, and death [14].

Laparoscopic entry-related injuries can be classified into two main groups: type 1 injuries, which include damage by the Veress needle or trocar to normally located blood vessels and bowel, and type 2 injuries, which include damage by the Veress needle or trocar to bowel adherent to the abdominal wall. It is recognised that when bowel is firmly adherent to the anterior abdominal wall at the point of entry into the cavity, then bowel damage may occur, whether the mode of access is by laparotomy or laparoscopy (open or closed). Golan et al. carried out minilaparoscopy on women with history of previous multiple abdominal surgeries and concluded that minilaparoscopy performed with a 2-mm laparoscope inserted at the Palmer's point is safe and effective for identifying and preparing a proper cannula insertion point. This technique may be useful for avoiding bowel or other cannula-related trauma in women at high risk for such complications [18].

Despite the rapid evolution and adoption of laparoscopic surgery by general surgeons in the past decade, most case reports and large series reporting these injuries are derived from older gynaecologic literature. Even with newer instrumentation and knowledge, these injuries still occur frequently. In part, this may relate to a learning curve associated with adopting laparoscopic surgery, but additional factors include a lack of understanding of the mechanisms involved in creating these injuries and a lack of appreciation for the proximity of important visceral structures to the anterior abdominal wall.

Various recommendations have been published regarding safe laparoscopic entry techniques [19–24]. Garry and colleagues have formulated guidelines for closed and open laparoscopy, secondary ports, and proper patient selection and counselling, which could form a basis for safe practice [19, 22]. The documented consensus has the support of the boards of the International Society of Gynaecological Endoscopy, the European Society of Gynaecological Endoscopy, the Australian Gynaecological Endoscopy Society, the British Society of Gynaecological Endoscopy, and the Minimal Access Surgery Training Group of the Royal

College of Obstetricians and Gynaecologists (RCOG). It is an authoritative document, although it is grade III evidence. The suggestions made include the following:

In closed laparoscopy, the primary incision should be made in the base of the umbilicus. If there is any suspicion of adhesions, an alternative entry choice is Palmer's point. Correct positioning of the needle should be checked by either Palmer's aspiration technique or observation of gas-flow pressure rates. The intraabdominal pressure should be 25 mmHg at the time of trocar insertion, as this gives a large gas bubble, and with the tension of the anterior abdominal wall, the distance between the anterior abdominal wall and the intraabdominal organs is greatly increased and maintained during trocar insertion, which may reduce type I injuries. This theory is well supported by a Canadian study in which laparoscopy was performed in 259 women. The researchers looked at the volume of CO₂ required to create a desired pressure and concluded that the mean CO₂ volumes at 10, 15, 20, and 25 mmHg were 3.7, 5.1, 5.9, and 6.5 l, respectively. However, an adequate pneumoperitoneum is determined by CO₂ insufflation to a pressure of 25 mmHg and not by a preconceived volume of CO₂ [22]. The primary trocar should be inserted through the thinnest part of the abdominal wall in the base of the umbilicus, and the laparoscope should be rotated 360° to visually check for any evidence of adhesions, bowel damage, or haemorrhage. At the end of the procedure, the primary trocar should be removed under direct vision to exclude any previously unnoticed bowel lesions.

For open laparoscopy, there may be reduction or avoidance of type 1 lesions, but the chance of type 2 bowel lesions is not eliminated. To minimise the risk of such damage, the deep fascia should be elevated with suitable clamps to separate the abdominal wall from its contents after the placement of a skin incision at the lower border of the umbilicus. The fascial edges should be tagged with an adequate suture. The entry should be confirmed by visualising bowel or omentum before inserting the blunt-tipped cannula into the abdomen. At the end of the procedure, the fascial defect should be closed to minimise the risk of herniation.

Secondary trocars should be introduced under direct laparoscopic guidance to precisely control the depth and direction of their insertion.

Patient counselling plays an important role in reducing the risk of litigation. However, patients should be made aware that not all complications can be avoided. When counselling patients, clinicians should inform them of the following risks:

1. The possibility of injury to bowel, bladder, and blood vessels. This risk is in the range of 1–4 per 1,000 cases.
2. The possibility that conversion to laparotomy may be required and that on very rare occasions a temporary colostomy may be required.

Patients and their doctors should expect a progressive and maintained improvement after laparoscopic surgery, and increasing pain or vomiting should alert them to the risk of a complication. The patient and family should leave the hospital with written information on how to recognise complications and what action to take in the event that they develop.

Aim

The aim of our survey was to assess the method of laparoscopic entry of consultant gynaecologists and to find out whether published recommendations have influenced routine practice.

Methods

An anonymous postal questionnaire was sent to all consultant gynaecologists in the United Kingdom and Ireland. The names and addresses of these consultants were obtained from RCOG, London. A total of 1,190 consultants were identified, and the questionnaire was sent in November 2002.

Results

The response rate was 64% ($n = 764$) by April 2003. In view of the anonymous nature of the study, no follow-up of the nonresponders was undertaken. Among the 764 responding gynaecologists, one-third (264) were practicing in university or teaching hospitals. Six hundred and ninety (90%) performed laparoscopy using a Veress needle, 56 (8%) used a direct entry technique, nine (1%) used Hasson's method, and nine (1%) performed a combination of open and closed laparoscopy (Table 1).

Entry techniques used by responding gynaecologists

Entry technique	Total = 764
Veress needle (closed)	90% (690)
Direct entry	8% (56)
Hasson's	1% (9)
Combination	1% (9)

The patient position used during both open and closed laparoscopy was lithotomy with Trendelenberg tilt, used by 466 (61%); flat, used by 222 (29%); or a combination of positions, used by 76 (10%).

The most common entry point, used by 414 (54%) of the responding gynaecologists, was subumbilical, followed by intraumbilical (322; 42%) and suprapubic (14; 2%), and 14 (2%) used a combination of sites (Table 2).

Entry points used by responding gynaecologists

Entry point	Total = 764
Subumbilical	54% (414)
Intraumbilical	44% (322)
Suprapubic	2% (14)
Combination	2% (14)

A check test, such as Palmer's aspiration technique, observation of gas flow rates and/or intraabdominal pressure rates, or abdominal tension for needle positioning, were not used by the majority (431; 56%), whereas for the 333 (44%) who did use one of the above tests, Palmer's aspiration test was the test of choice (90%).

When respondents were asked whether they used volume or pressure for establishing pneumoperitoneum before trocar insertion, volume was used by the majority (477; 62%); only 287 (38%) used the intraabdominal pressure technique.

For those using a volume of gas to establish pneumoperitoneum before inserting the trocar, they quoted a wide range of volumes, from less than 2.0 to more than 3.5 l (Table 3).

Volumes of gas used to create pneumoperitoneum

Volume (liters)	Total = 477
3.0	54% (258)
2.5	21% (100)
3.5	14% (67)
2.0	9% (42)
< 2.0 or > 3.5	2% (10)

For those using gas pressure to establish pneumoperitoneum prior to trocar insertion, the ranges quoted were anywhere between 15 and 25 mmHg (Table 4).

Gas pressures used to create pneumoperitoneum

Pressure (mmHg)	Total = 287
20	54% (122)
15	21% (93)
25	14% (46)
18	9% (11)
12	3% (10)
< 12	2% (5)

When asked whether they would continue or change their techniques depending on a patient's previous history, 406 (53%) gynaecologists said they would use the same technique irrespective of an individual's indication, whereas 358 (47%) said they would change if the patient were obese or had a history of previous abdominal surgery.

When asked whether they had changed their technique in the last 5 years, 263 (34%) said they had done so.

When asked whether they had attended any minimal access surgery course recognised by RCOG or the British Society of Gynaecological Endoscopy (BSGE), only 257 (34%) said they had attended one of the courses, whereas the majority (507; 66%) had not been to any course. Of the gynaecologists who had attended a course, the majority (177; 69%) were compliant with the guidelines, which indicates that it may be important for clinicians to attend a minimal access surgery course in order to achieve change (Table 5).

Compliance to guidelines by gynaecologists who had attended a minimal access surgery course recognised by the Royal College of Obstetricians and Gynaecologists or the British Society of Gynaecological Endoscopy

Compliant with guidelines	Total = 257
Yes	69% (177)
No	31% (80)

When asked whether they were aware of any recent recommendations for safe laparoscopic entry technique, only 202 (26%) said they had read some recommendations, whereas most (562; 74%) were unaware of any such published documents.

Discussion

During the past two decades, rapid advances in laparoscopic surgery have made it an invaluable part of gynaecological and general surgical practice. A corresponding change in practice has occurred to encompass increasingly complex procedures, but there remains no clear consensus as to the optimal method of entry into the peritoneal cavity. More than half of all complications occur at the time of entry [23]; therefore, it is essential that entry technique be optimised. Many proponents of open and closed entry are found in the literature; some authors suggest, without sufficient collaborating evidence, that a particular method is superior and that they will continue to use their favoured technique [14, 24–29]. However, metaanalysis of all published data shows less bowel injury with the closed technique but benefits of the open technique in relation to vascular injury [3]. Jansen et al. [30] audited the practices of Dutch consultant gynaecologists to determine the incidence of complications of laparoscopy and their correlation with entry technique. In their study, which included more than 50,000 procedures, the number of entry-related visceral complications in the open technique was significantly higher than with the closed-entry technique. The researchers concluded that there was no evidence to abandon the closed-entry technique in laparoscopy. However, the selection of particular patients for an open or alternative-entry procedure was still recommended.

Our survey indicated that most gynaecologists practiced closed laparoscopy using a Veress needle. However, their patients were in the lithotomy position with a Trendelenberg tilt at the time of Veress entry, which theoretically would increase the risk of sustaining vascular injury by exposing the aortic bifurcation beneath the umbilicus, as the omentum and bowel fall away into the upper abdomen when in this position.

The majority inserted the Veress needle subumbilically, which is likely to increase the risk of preperitoneal gas insertion, especially in obese patients. Most used the volume of gas inserted for establishing pneumoperitoneum, but this does not allow a consistent space to be developed between the anterior abdominal wall and the intraabdominal organs because each patient's skin and fascia will vary in elasticity.

Only a third of the responding gynaecologists had attended an RCOG/BSGE-recognised minimal access surgery course, but even more concerning is that only a quarter were aware of any documents with recent recommendations on safe laparoscopic entry technique. Jones et al.[31] audited the implementation of a consensus guideline for safe laparoscopic entry technique and concluded that apart from laparoscopies performed on the professorial unit, a large number of procedures did not comply with the recommendations of the Middlesbrough consensus, leaving the question, "What is the best way to implement recommendations?"

Fortunately, complications are rare whatever the technique used, but this also means that gynaecologists doing a few laparoscopies each week may not encounter a complication for many years of practice, and hence they may be very reluctant to consider changing their practices. This situation is compounded by the paucity of randomised data to indicate which technique is the safest, but many of the expert groups' recommendations are based on study data, experience, and common sense. Hence, it may be difficult, if a complication occurs, to defend an individual who failed to recognise the existence of recommendations endorsed by expert groups. However, this paper does demonstrate that a wide range of techniques is still being used in gynaecological laparoscopic surgical practice in the UK and Ireland.

Conclusion

The laparoscopic approach is associated with complications that must be offset against the expected clinical benefits. This is the first survey to assess the method of laparoscopic entry of consultant gynaecologists and to find out whether published recommendations influence their routine practice. The aim of our survey was to audit the laparoscopic entry techniques of various consultant gynaecologists and, while by no means suggesting changing their techniques, hopefully to induce the thought, "Is the way I enter the abdomen with the laparoscope the safest it can be?"

This survey shows that the majority of gynaecologists practice closed laparoscopy and use volume technique to achieve pneumoperitoneum, which is contrary to the recommendations. Only a small number of gynaecologists are aware of recent recommendations regarding safe laparoscopic entry technique. Most gynaecologists who have attended an RCOG/BSGE recognised course are compliant with guidelines, suggesting that attending a minimal access surgery course is important. To reduce the complications associated with entry technique, it is important to educate people and make them aware of the recent recommendations, but this may be difficult when complications rates are low, and for an individual clinician, his or her experience of a complication may be very rare. Unfortunately, the estimated number of laparoscopies that would need to be done in a randomised trial to demonstrate differences between the techniques has been estimated to be 80,000 patients per arm; therefore, such a trial is unlikely to be performed. But this does not imply that because the complication risk is low, no thought should be given to methods to reduce the risk further.

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