

Complications of laparoscopic surgery

Amanda Cuss

Jason Abbott

Abstract

Laparoscopic surgery is the standard of care for many gynaecological conditions with documented benefits and excellent outcomes for patients and healthcare providers. However, in addition to the general complications associated with surgery and anaesthesia, laparoscopy poses unique complications relating to abdominal entry and surgical instrumentation. Governing bodies, representing both the surgical specialities and gynaecology, have attempted to gain consensus on the safest technique for abdominal entry to no avail. Studies comparing techniques to date are underpowered and the likelihood of high-grade evidence ever becoming available is low due to the prohibitive patient numbers and costs. This review will examine complications of laparoscopy and current recommendations from surgical training organizations for abdominal entry in laparoscopic surgery.

Keywords abdominal entry; closed entry; complications; gynaecology; Hasson entry; laparoscopy; open entry; surgical complication; Veress needle

Introduction

Laparoscopic surgery has documented benefits to patients with decreased hospitalization recovery, reduced risk of adhesion formation and improved cosmesis. For healthcare providers, shorter hospital stays are appealing, with improved public health and economics outcomes. Laparoscopic surgical complications have long been considered the “Achilles heel” of this surgical modality, since complications unrecognized at the time of the injury often result in greater morbidity or even mortality.

Complications associated with gynaecologic laparoscopy are uncommon, with an overall complication rate of 3–8/1000. This rate is largely unchanged through the past two decades with a large multicentre prospective study from 2005 reporting an overall complication rate of 5.7/1000.

Surgical complications associated with laparoscopic techniques include those typical for all surgical modalities, including anaesthetic issues, thromboembolic problems, haemorrhage and infection, but also include complications associated with abdominal

Amanda Cuss MBBS (Hons) BMedSci (Hons) Prince of Wales Hospital, Sydney, Australia and Royal Hospital for Women, Sydney, Australia. Conflicts of interest: none declared.

Jason Abbott B Med (Hons) MRANZCOG FRANZCOG PhD is Associate Professor at the Royal Hospital for Women, Sydney, Australia and University of New South Wales, Sydney, Australia. Conflicts of interest: none declared.

entry and complications due to a restricted field of view. Complications arising from entry techniques include visceral injury, major and anterior wall vessel injury, urological injury (bladder and ureter), herniation through trocar sites, extraperitoneal insufflation and failure to gain entry to peritoneum. Procedural complications include haemorrhage, vessel injury, bowel injury and urinary tract injury.

A brief review of entry techniques follows before discussing the complications of abdominal entry at laparoscopy.

Entry techniques

Veress needle

The Veress needle technique is considered a classic closed approach involving insertion of a 2 mm sharp-tipped outer needle that retracts with the hollow core blunt tipped gas-delivering needle sliding forward as it enters the peritoneal cavity. Gas insufflation ensues to varied pressure, time or volume parameters before insertion of the sharp-tipped primary trocar. The Veress method is the most commonly taught mode of entry laparoscopically in Australia and the UK for gynaecological surgery.

Direct entry

An alternative closed entry option is direct insertion of the primary trocar, which is followed by laparoscopic visualization to confirm peritoneal entry and then gas insufflation. This closed technique has the advantages of rapid entry and near exclusion of entry failure but have a potentially greater risk of bowel, and particularly, great vessel damage.

Open entry

The open or Hasson (named for American gynaecologist Harith Hasson) entry commences with dissection of the tissues to the peritoneum, opening of the peritoneum visually and insertion of a blunt trocar into the cavity, thereby avoiding the use of sharp instruments entering the abdomen blindly. Theoretically this technique should avoid damage to the retroperitoneal vessels and bowel, although both are reported.

Vision-guided direct entry

This group of techniques involves insertion of trocars with optical guidance, either directly or with camera assistance through the layers of the abdominal wall and into the peritoneal cavity by downward pressure or using a trocar with a thread and employing a screwing motion. They theoretically reduce decrease the risk of bowel and vessel injury, particularly in obese patients or those who have had prior abdominal surgery but are similar in risk of bowel damage to the open technique.

Radially expanding entry

In this technique, a sleeve is fitted over a Veress needle and increasingly large, subsequent sleeves are fitted progressively to expand the entry site (similar to progressive cervical dilation prior to curettage) with reported minimal trauma.

Complications related to laparoscopic entry

There are a number of surgical complications associated with entry to the peritoneal cavity at the time of laparoscopic surgery. These include:

- Damage to the vessels of the anterior abdominal wall
- Damage to the bowel – both when the organ is its normal anatomical position (denoted as a type I injury), and when the bowel is adherent to the abdominal wall (a type II injury)
- Damage to the retroperitoneal structures such as the major vessels
- Extraperitoneal insufflation
- Herniation through port sites
- Failure to achieve access to the peritoneal cavity.

Injury associated with laparoscopic entry has been the focus of review, technical innovation and attempt at consensus since a significant amount of all complications occur at the time of entry to the abdominal wall, with the overall entry-related injury rate estimated by meta-analysis to be 1.1/1000.

Vascular injuries are the most serious complications because of their immediacy and the potential mortality, with an incidence of up to 0.5% of laparoscopies in total and that of mortality cited to be up to 17%. Most vascular injuries occur during entry to the peritoneum with insertion of the trocar or the Veress needle, however they are also reported to occur with both direct and open entry techniques. The aorta and right common iliac vessels are at high risk due to their proximity to the umbilicus on initial entry. Injuries to inferior epigastric vessels and their tributaries are more common with secondary port placement and injuries to these vessels have also resulted in death.

Gastrointestinal injuries can occur to any viscus, including the oesophagus and stomach, but most commonly occur to the small bowel and colon. Visceral injuries occur with any entry technique and with both primary and secondary trocars. It is often considered the injury from a primary trocar may be unavoidable – such as a type II bowel injury, however opinion is such that injury from a secondary port should be avoidable.

Multiple studies report that insertion of primary trocar or Veress needle results in approximately 50% of all laparoscopic intestinal injuries. A review in 2004 found an overall incidence of any bowel injury in laparoscopy of 329,935 patients to be 0.13%, and that of penetrating injury 0.22%. A recent 5-year retrospective series revealed an incidence of 0.11% whilst a 6-year prospective study in 2011 revealed an incidence of 0.13% – all patients in this latter study had undergone previous abdominal surgery, placing them at greater risk of complication. These separate data are consistent in their findings. The reported bowel injury rate with open technique is 0.048–0.1% – not dissimilar to that of closed entry. Type I bowel injuries, those of damage in normal position occur rarely with open or closed entry techniques when correct anatomical procedure is followed. However, when bowel is abnormally positioned in the peritoneum, (type II injuries) usually as a result of adhesions, it is difficult to avoid injury with any entry technique as a result of the unexpected position of the bowel when entering the cavity with the initial entry tool. At this time, recognition of the injury and appropriate repair is the key to avoiding significant morbidity and even mortality.

Extraperitoneal insufflation may not be initially detected but may cause difficult or failed entry and rarely subcutaneous emphysema, pneumothorax, pneumopericardium and, most seriously, carbon dioxide embolism. The frequency of this type of complication is low at 0.001–0.59% of all laparoscopic cases

however carbon dioxide embolism is a significant complication with a mortality rate of up to 28.5%. Theoretically the use of open entry techniques should reduce the risk of these complications however the numbers required to prove a reduction in injury are impossible to consider and a more prudent approach is therefore required.

The incidence of herniation of bowel through a port site (Richter's hernia) is uncommon and related to port size. It is reported to occur in 0.06–3.1% of laparoscopies – a much lower rate than that associated with laparotomy incision. Laparoscopic port-site hernias are more common laterally than centrally, and the risk is directly related to port size, with risk increasing with a larger port size. Herniation has been found to occur rarely in 5 mm ports and 7 mm ports but more commonly in ports above 10 mm, with a 3.1% increased risk in ports of 12 mm in size. An incisional Richter hernia can lead to mortality if unrecognized at time of procedure or post-operatively.

There are a number of reviews of laparoscopic entry and a Cochrane systematic review published in 2010 including 17 randomized controlled trials (RCT) of 3040 patients undergoing gynaecological laparoscopy. The conclusion from all reviews and meta-analyses remains that there is no evidence of any advantage of a particular technique in the prevention of the major complications of mortality, bowel or urinary injury, vascular injury, gas embolism or other organ injury. It is evident that all such reviews are likely to reach the same conclusion given the power required to mount a study to determine the safest entry technique requires hundreds of thousands of patients. Proponents of individual techniques have postulated advantages to entry techniques and whilst RCTs have failed to reveal a difference in complication rates between open and Veress needle entry, it should be highlighted that an open technique, which may still cause injury, may increase the chance for immediate detection and appropriate repair. This may be a particularly important outcome since undetected injury following the use of the Veress needle is documented to be associated with poorer clinical outcomes.

Studies comparing direct entry with Veress needle entry have not determined a difference in organ injury rate, however, there is a reduction of extraperitoneal insufflation and failed entry. Reduced risk of extraperitoneal insufflation was also reported in comparisons between radially expanding trocars and standard direct trocar entry. Other aspects of entry that are reported to impact safety for laparoscopic entry include the site of insertion of the Veress needle (transumbilical, infraumbilical, 'Palmer's' point and suprapubic); lifting the abdominal wall before needle insertion; patient positioning and various tests to ensure correct placement of the Veress needle prior to insufflation. With all of these variants, the same constraints regarding proof of safety arise as with the primary entry method.

In 1999 a group of laparoscopic experts from around the world met at the Middlesbrough Consensus Meeting in the United Kingdom, however there was no consensus reached, regarding which technique was the safest, and the outcome was that the technique most familiar to the surgeon was appropriate for entry. It did conclude that if a Veress needle entry is performed, an infra-umbilical incision, a sharp Veress needle with the patient in a horizontal position (no Trendelenburg tilt) and observation of gas pressure, not volume or time, were important

Download English Version:

<https://daneshyari.com/en/article/3966828>

Download Persian Version:

<https://daneshyari.com/article/3966828>

[Daneshyari.com](https://daneshyari.com)