Complications and Conversion from Endoscopic to Open Surgery

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KEYWORDS

• Endoscopy • Surgery • Complications • Conversion • Minimally invasive

KEY POINTS

- Endoscopic surgery is still a rapidly expanding modality of diagnosis and treatment of small animal patients.
- Hemorrhage, difficulty with visualization, and adjacent tissue trauma seem to be common in the veterinary literature.
- The development of skills, equipment, and minimally invasive means of correcting complications may be of great importance in decreasing the incidence of conversion from endoscopic to open surgery.

COMPLICATIONS

Complications of any endoscopic surgery include complications associated with the purpose of the procedure(s) done. Thus, the clinician MUST be familiar with and capable of performing the procedure via laparotomy, thoracotomy, or sternotomy. Endoscopy is not a substitute for open surgery; attempting an endoscopic procedure that one has not performed via traditional open surgery may not be wise. Conversion to an open approach is the standard rescue for inability to advance or address problems with endoscopy. A full skill set and knowledge of the open approach and procedure must be immediately available in the operative suite, as should be the equipment necessary for open surgery. Conversely, conversion to an open approach is not a failure. Clinicians also should be completely capable of and have the facilities required for aftercare following the procedure, regardless if it is done endoscopically or by a traditional, open approach. The use of endoscopy does not eliminate the need for monitoring and aftercare associated with the procedure, even if the approach is minimally invasive. Expanding one's endoscopic skills to advanced procedures such as pericardectomy, lung lobectomy, mass removal, and so forth should not be attempted

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if 24-hour care is not available to monitor a thoracostomy tube after surgery, which is not unique to endoscopic surgery, nor is its need eliminated by doing the procedure endoscopically.

Anesthetic complications of laparoscopy and thoracoscopy have been discussed elsewhere in this issue. Vigilant monitoring and communication between the surgeon and anesthetist are vital to successful endoscopic endeavors. Establishing a cohesive working team should help to limit and overcome common issues specific to laparoscopy and thoracoscopy related to anesthesia. Hypercarbia and hypoxia may be related to establishment of pneumoperitoneum, pneumothorax, or one-lung ventilation (OLV).[1,2] High intra-abdominal pressure (IAP) of 12 to 15 mm Hg should be required only for trochar-cannula insertion; once all ports are in place, reduce the IAP to 6 to 8 mm Hg to decrease the untoward effects of pneumoperitoneum. Occasionally, insufflation of the thorax is done to increase working space in small patients, particularly in cats.[3] Limit the duration and amount of insufflation to as short a duration as possible and do not exceed 2 mm Hg to decrease the risk of complication associated with insufflation. Establish OLV in the operative suite to avoid inadvertent loss of OLV, to allow thoracoscopic visual confirmation of OLV, and to minimize the duration of OLV and its side effects.[4]

Complications can be associated with port placement and may be limited by visualization of the placement with optical ports or endoscopic placement (Endo Tip port [Karl Storz Endoscopy, Goleta, CA, USA]). Many techniques have been advocated to limit damage to internal structures during port placement. Laparoscopic ports can be placed on establishing pneumoperitoneum with a Veress needle; however, many early reports of laparoscopic techniques were associated with the use of a Veress needle. Hemorrhage, splenic laceration, or hollow organ rupture may occur.[5] A recent report described intercostal Veress needle placement for insufflation, which did not result in organ trauma and may be a nice alternative to traditional Veress needle use.[6] Briefly, with the dog in dorsal recumbency, the Veress needle was placed in the middle or ventral third of the last palpable intercostal space. One or 2 attempts resulted in successful needle placement in 88% of the dogs. Minor complications (subcutaneous emphysema, omental or falciform injury) occurred in 41%. Hepatic or splenic trauma or pneumothorax occurred in 14%. The Hasson technique has been advocated to diminish the risk associated with port placement, and an alteration has been described in which the incision in the linea alba is made only large enough for a large red rubber catheter to be inserted for insufflation, after which a trochar cannula can be inserted. Newer “optical” ports and self-dilating ports also have been advocated for minimization of complications associated with port placement. Threaded ports have become more popular because they allow multiple instrument changes without port dislodgement. One such port (ENDOTIP) can be placed through a small abdominal approach with traction sutures on the body wall similar to the Hasson technique. A very small stab incision through the body wall allows the port to be threaded into the abdomen with a 0° endoscope in its lumen. Visual confirmation of abdominal entry sans trauma can be done, and the port will not be excessively deep in the abdomen due to visualization.

Hemorrhage is possible with any surgical procedure, and endoscopy adds the risk of trauma during instrument passage and motion; the latter may be more dramatic than expected early in the learning curve.[7,8] Instruments should always be passed under visual guidance with a wide field of view until the target is reached, then a smaller, more magnified field can be used. Hemorrhage from intercostal vessels is possible, and may occur on port removal due to loss of compression of the vasculature between the port and rib. Placing ports in an open fashion with blunt obturators may help to