Laparoscopic-Assisted Surgical Procedures

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KEYWORDS

• Laparoscopy • Minimally invasive • Biopsy • Cystotomy • Gastropexy
• Intestinal surgery • Urinary surgery • Reproductive surgery

KEY POINTS

- Laparoscopic-assisted procedures are an excellent alternative to open celiotomy for diagnostic sampling and certain therapeutic interventions in dogs and cats.
- Laparoscopic-assisted procedures allow a balance between the improved patient recoveries often associated with smaller incisions and the need for appropriate visualization of visceral organs/identification of lesions.
- The organ systems of small animal veterinary patients that are most commonly approached using laparoscopic-assisted procedures include the urinary bladder, the gastrointestinal tract, and the reproductive tracts.
- Procedure-specific morbidities and patient selection should be considered when choosing between assisted laparoscopic and open approaches.
- Like many minimally invasive procedures, there is an individual learning curve for each type of procedure.

INTRODUCTION

Minimally invasive surgery is adopted in veterinary medicine with increasing frequency, and with a wider selection of described procedures. Overall, the benefits of making surgical interventions less invasive include reduced patient morbidity, shortened durations of hospitalization, reduced wound contamination and breakdown, and shorter patient recovery periods.[1] Although many laparoscopic procedures are performed fully intracorporeally, laparoscopic-assisted (LA) procedures offer several benefits. An LA procedure maintains the positive minimally invasive attributes of laparoscopic surgery but may reduce the complexity of certain procedures by allowing challenging maneuvers to be performed outside the peritoneal cavity. Exteriorization of hollow visceral organs also reduces the potential for spillage of luminal contents

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and contamination of the peritoneal cavity and allows for collection of high-quality biopsy samples from multiple sites. Laparoscopic equipment is increasingly available to the veterinary practitioner, and the benefits of LA surgery combined with technical similarity of the end procedure to many open surgical procedures that are already familiar to many veterinarians are causing LA procedures to become more routine and useful in a variety of practice settings.

Instrumentation and principles of minimally invasive abdominal surgery are well covered elsewhere,[2–4] and this article assumes a basic understanding of laparoscopic principles and instrumentation. The minimal instrumentation required for LA procedures includes a laparoscope, a video-imaging system, a gas insufflator, and laparoscopic instruments including grasping forceps (laparoscopic Babcock forceps, laparoscopic Kelly forceps), and a blunt palpation probe. Useful, but not strictly essential, equipment for LA procedures includes a table that allows the patient to be tilted in lateral and craniocaudal directions, expanded laparoscopic instrumentation, and hemostatic devices such as laparoscopic clip appliers, electrocautery, or vessel-sealing devices (eg, LigaSure [Valleylab Inc, Boulder, CO], the Enseal [SurgRX Inc, Redwood City, CA], and the Harmonic Scalpel [Ethicon Endosurgery Inc, Cincinnati, OH]). A study comparing the use of extracorporeal sutures, laparoscopic clips, and a bipolar vessel-sealing device for ovarian pedicle ligation found that the bipolar vessel-sealing device was associated with significantly shorter surgical times and a lower incidence of hemorrhage from the ovarian pedicle[5]; therefore, if the operating surgeon intends to offer LA ovariohysterectomy on a regular basis, investment in a vessel-sealing device is recommended.

INDICATIONS/CONTRAINDICATIONS

The general indication for LA procedures revolves around circumstances in which minimally invasive visual inspection of the abdominal cavity and surgical intervention/biopsy of hollow viscera, or larger, mobile abdominal viscera are desired. An LA procedure allows for exteriorization of the organ in question outside the abdominal cavity for dissection or suturing, which may reduce the need for specialized equipment and limit potential peritoneal contamination from an incised hollow viscus (intestines, urinary bladder).

General contraindications for LA procedures can include:

- Hemoabdomen
- Septic peritonitis
- Peritoneal adhesions
- Diaphragmatic hernia

GENERAL PATIENT CONSIDERATIONS AND POSITIONING FOR LAPAROSCOPIC-ASSISTED TECHNIQUES

As for any minimally invasive procedure, the operating surgeon should be prepared to convert to an open surgical procedure if either an intraoperative complication occurs that requires open access to correct or the minimally invasive approach does not allow the procedure to be completed as planned. For the procedures described here, the patient is usually placed in dorsal recumbency as for an open celiotomy. A tilt-table may be beneficial to allow for Trendelenburg, reverse Trendelenburg, or laterally rotated positioning if useful; alternatively, sandbags may be used to prop the patient at the desired angle, depending on the goals of the procedure. The ventral abdomen should be clipped widely as for an open surgical procedure, and the patient should be