Current Concepts in Minimally Invasive Surgery of the Abdomen

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KEYWORDS

• Laparoscopy • Dog • Cat • Minimally invasive • Biopsy • Ovariectomy
• Cisterna chyli ablation • Adrenalectomy

KEY POINTS

- Laparoscopic and laparoscopic-assisted procedures are well established in veterinary surgery, with novel minimally invasive approaches and procedures described regularly in the peer-reviewed literature.
- Advances in preoperative work-up (eg, abdominal CT and/or MRI) have facilitated more appropriate patient selection for minimally invasive surgical procedures, allowing more focused dissections and less surgical trauma.
- As the field advances, advantages related to magnification, visualization, and accessibility are expected to establish laparoscopic and laparoscopic-assisted procedures as superior to traditional open surgery for certain procedures.
- Developing advances, such as single-incision laparoscopic surgery (SILS) and/or natural orifice transluminal endosurgery, are actively pursued in veterinary patients.

INTRODUCTION: NATURE OF THE PROBLEM

Minimally invasive surgery of the abdomen is an area of veterinary medicine that continues to progress, paralleling advances in instrumentation, technology, and increasing familiarity of the procedures by newly trained surgeons. Laparoscopic and laparoscopic-assisted procedures are becoming increasingly available to veterinary patients, both in the referral and nonreferral settings, with the American College of Veterinary Surgeons incorporating training in minimally invasive surgery as a required aspect of a residency program. Consequently, many excellent review articles and

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books exist within the veterinary literature, providing detailed equipment descriptions and procedural information related to laparoscopy.[1–5] The purpose of the present article is to supplement these sources by providing readers with an update on more recent developments in the field veterinary laparoscopy and laparoscopic-assisted procedures. Basic equipment setup and procedures are referenced briefly to allow a greater focus on more contemporary procedures and advances in the field.

INDICATIONS/CONTRAINDICATIONS

Indications for laparoscopy include biopsies of almost all organs that can be achieved by laparotomy (**Box 1**). Laparoscopy is also a minimally invasive way to perform several surgical procedures, with more procedures performed as experience and expertise increases (**Box 2**). Ancillary surgical procedures, such as placement of feeding tubes to optimize recovery or to help stabilize patients before procedures, also can be performed (**Box 3**), along with a complete abdominal explore for oncologic staging purposes. Organs and pathology are better seen laparoscopically due to magnification and light source.[5] Targeted biopsies of specific lesions can be performed, obtaining larger samples than could otherwise be achieved percutaneously. Sample procurement via laparoscopy decreases patient morbidity, pain, infection rate, and time compared with a standard laparotomy.[6–9] Other advantages include the ability to document pathology of organs, which is advantageous for developing treatment plans and medical record keeping; monitoring chronic conditions; and education with clients and veterinary colleagues involved in the care of patients.[5]

There are few contraindications to laparoscopy due to the minimally invasive nature of this technique, especially if a traditional laparotomy is warranted. Unstable patients have contraindications for laparoscopy similar to those of laparotomy. Patients with diaphragmatic defects (eg, hernias) should not undergo laparoscopy because insufflated CO_2 expands into the pleural space causing respiratory compromise. Large tumors or mass removals may be best performed with the traditional open approach or surgeries where an obvious conventional surgical approach is warranted. Lack of surgeon experience is a contraindication with laparoscopic procedures, with a steep initial learning curve for this technique. Some surgeons choose to use a predetermined time limit before conversion to traditional methods. Laparoscopy needs specialized surgical equipment, the lack of which is a contraindication.

Box 1
Abdominal organs readily biopsied via laparoscopy

- Liver
- Spleen
- Pancreas
- Lymph nodes
- Kidney
- Adrenal gland
- Peritoneum
- Cholecystocentesis (transhepatic)
- Prostate