Step by step approach to the abdominal cavity in small animals – part 1

**CELIOTOMY** is commonly performed in veterinary practice; therefore, a systematic approach to the abdominal cavity is essential for every surgical-minded vet.

The term laparotomy refers to a flank incision while celiotomy is a more correct definition of a generic surgical approach to the abdomen: in reality both are used synonymously.

**Indications**

Celiotomy may be performed for a variety of reasons, both therapeutic and diagnostic.

- Acute onset abdominal pain and findings suggestive of life-threatening abdominal pathology (GDV, intestinal obstructions and volvulus, etc.).
- Abdominal trauma/foreign bodies.
- Septic/aseptic peritonitis.
- Abdominal trauma/foreign bodies.
- Biopsies of abdominal organs (chronic pathologies of abdominal organs, staging of neoplasia, etc.).
- Approach to the retroperitoneal space.
- Approach to the retroperitoneal space.
- Reconstruction of abdominal wall defects and hernias.
- Specialised surgery of the gastrointestinal tract, liver and pancreas, urinary system, reproductive system, haemolymphatic system.

**Contraindications**

All patients undergoing a celiotomy must be haemodynamically stable enough to go through anaesthesia. Therefore, compromised patients must be medically stable and considered for surgery. An exploratory laparotomy represents a useful diagnostic tool, it must be performed only when extra-abdominal conditions have been ruled out. Inadequate surgical training and equipment also represent contraindications to surgery.

**Pre-operative patient management**

Pre-operative management depends on the underlying pathology. General indications are: performing an accurate general examination with special attention to the cardiovascular system; adequate diagnostic imaging work-up according to the initial presentation; placing of an intravenous catheter; blood works including a minimum of PCV, CBC, platelet count, total proteins, BUN and blood glucose; more biochemistry and clotting profiles according to the animal disease or if a coagulopathy is suspected; blood typing if an intra-operative haemorrhage is foreseen.

**Surgical anatomy of the abdominal wall**

The abdominal ventral wall is composed of an external and an internal leaf. The external leaf is formed by the aponeurosis of the external and internal abdominal oblique muscles and by the aponeurosis of the transversus abdominis muscle near the pubis. The internal leaf is composed by a portion of the aponeurosis of internal abdominal oblique muscle, by the aponeurosis of the transversus abdominis muscle and by the transversal fascia. The internal leaf disappears in the caudal third of the abdomen.

**Surgical instrumentation**

A basic laparotomy tray should include: scalpels handle for 10 and 11 blades, needle holder (Mayo or Mathieu), Brown-Adson, DeBakey and thumb forceps, Allis tissue forceps, Babcock forceps, Halsted forceps, Babcock forceps, Halsted-Carniet forceps (straight and curved), Metzenbaum and Mayo scissors (straight and curved), Doyen intestinal clamps, Balfour or Gosset self-retaining retractors, Senn-Miller or Hartmann’s retractors, all necessary surgical instruments, including the inguinal area, the medial side of the legs and the caudal thorax must be clipped. The area clipped represents a useful diagnostic tool, allows the identification of the area of interest and to enhance the understanding of the surgical process. The patient is placed in dorsal recumbence. The entire abdomen, including the inguinal area, the medial side of the legs and the caudal thorax must be clipped. The area clipped must be large enough to accommodate unforeseen complications and for expansion of the field if necessary. The prepuce can be retracted to one side with a towel clamp but if left

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**Anaesthetic/analgesic considerations**

An anaesthetic plan must be organised according to the signalment, history, underlying disease process and ASA status classification. Appropriate analgesia is paramount. Pre-emptive anaesthetic should be used in all cases. Analgesia may include opioids, ketamine, alpha-two agonists and local anaesthetics. Post-operative analgesia may include also NSAIDs.

Anesthetic monitoring such as ECG, pulse oximetry, non-invasive or invasive blood pressure monitoring, capnography and body temperature monitoring are vital for debilitated patients. Mechanical ventilation may be required.

**Figure 1.** The surgical field must be thoroughly draped. It is also possible to apply an antimicrobial adhesive drape to decrease strike through and leakage. Surgical tools such as LigaSure vessels sealer (left) allow reduction of blood loss and procedure time. Poole suction tip (right) is necessary for removal of large volumes of fluid from abdomen.

**Figure 2.** Example of a complete laparotomy tray. It must include multiple forceps, scissors and retractors to be able to deal with any kind of complication and to enhance visibility. Swabs, sterile saline, laparotomy spong and electro-coagulation must also be readily available.
With fingers or closed blunt forceps, make a sharp incision into the linea alba with the cutting edge facing up and away from abdominal organs with the linea alba visible, tent it during closure. Identify, ligate and transect the preputial muscle (the two ends trimmed. In dogs subcutaneous fat may obscure linea alba, therefore more dissection may be necessary (push-cut technique). Ligate or cauterise small subcutaneous vessels.

In the male dog, identify and transect the pudendal vessels. It is not possible to manipulate and maintain moistened gastrointestinal leakage must take priority. All organs must be gently dissected and handled. The spleen can be examined from the left side of the animal, inspect and palpate the left kidney, adrenal gland, ureter and ovary.

Part two will include indications and instructions as to how to obtain biopsies in the abdomen and closure of the abdomen.

References and further reading


Need for more information on using antibiotics

BAYER Animal Health reports that research conducted on its behalf among nearly 500 veterinary professionals showed that a majority of them (60%) believe they require more information on antibiotic use and best practice advice to be able to make informed prescribing choices.

Almost half (48%) of those surveyed felt that not enough is being done to educate veterinary professionals on the responsible use of antibiotics and how to avoid exacerbating the issue of antimicrobial resistance.

"In response to this research, Bayer is developing a suite of educational resources to arm vets with practical tools that help them look beyond the ‘tip of the iceberg’ of bacterial infections, educating about not just the clinical cure but bacteriological cure too,” says Vicky McAlister, the firm’s group product manager.

An animation has been created that explains the considerations vets should take into account when choosing which antibiotic to prescribe. This can be viewed at www.veraflox.co.uk/en/new-generation-fluoroquinolone/index.php.

The animation is part of a wider awareness programme entitled “What Lies Beneath” in which Bayer aims to better understand the challenges the profession faces when prescribing antibiotics so that additional tools can be developed.

The programme will include a series of webinars to be released later in the year which, says the firm, will present a different perspective on common issues such as compliance, how to make appropriate antimicrobial choices and the approach to and interpretation of relevant diagnostic tests.