EXPLORATORY LAPAROTOMY

RELEVANT ANATOMY AND INDICATIONS

In the ruminant, the most cranial forestomach, the reticulum, lies just caudal to the diaphragm and to the left of the midline, beneath the 6^{th} through 8^{th} ribs. The space left of the median, from approximately the 7^{th} or 8^{th} rib to the pelvis, is occupied by the rumen. On the right side of the ruminant lie the omasum and the elongated true stomach, the abomasum. The omasum lies near the ventral aspect of the 7^{th} to the 11^{th} ribs, and the abomasum extends from the xiphoid region to the 9^{th} or 10^{th} rib, occupying primarily the right side except for the fundus, which deviates to the ventral aspect of the rumen atrium.Autonomic innervation of these structures is accomplished by a balance of both sympathetic and parasympathetic nervous inputs, supplied by the splanchnic nerves and the dorsal and ventral vagal trunks, respectively. Right flank laparotomy is indicated in the following instances: exploratory laparotomy when a problem amenable to treatment from the right side is suspected; omentopexy or pyloroomentopexy; surgical correction of small intestinal, cecal, and colonic conditions or right displaced abomasum, right torsional abomasum etc; and cesarean section when, because of rumenal distention or fetal positioning, removal of the calf by a left flank approach would be difficult or when hydrops amnios or allantois is present. Right flank laparotomy is also chosen when the problem is unknown and a full exploratory is needed.

Pre-Surgical Procedures

- For a Right Flank Approach lateral recumbency left lateral recumbency is ideal
- General Anaesthesia is also indicated and is discussed in the pre-op procedures portion of this C-map presentation
- Local anaesthesia is also indicated and achieved via bupivicaine/ketamine caudal epidural combination. After administration the anima was rolled onto its right side for approx 10minutes to achieve a higher degree of block on the right side of the animal
- An extensive area on the right flank spanning dorsally from T13 running to the 1st coccygeal space and downwards to the ventral abdomen was clipped of all hair 24hours prior to surgery. On the day of surgery the same site was cleaned with a "dirty scrub" of chlorohexidine.
- Right and left jugular area's were clipped to allow for venous access for both anesthetic use via C.R.I as well as incase of an emergency
- Right and left cephalic vein as well as left cephenas vein were clipped to allow catheter placement for similar reasons as above.
- Pulse oximeter was attached to the lips of the patient to allow ease of monitoring vital signs during surgery
- Final preparation of the surgical field was achieved via an alternating scrub of iodine then alcohol three times

Surgical Procedure - Right Flank Approach

Incision

- Start the skin incision just ventral to the lateral edge of the transverse process L2, and proceed ventrally parallel to the 13^{th} rib for about 12 cm

- Incise the subcutaneous fascia to a length equal to that of the skin incision, to expose the external oblique abdominal muscle.

- Start at the dorsal commissure of the skin incision and incise the external oblique abdominal muscle ventrally for the distance of the skin incision.

- From the dorsal commissure of the skin incision, incise ventrally the internal oblique abdominal muscle for the distance of the external oblique abdominal muscle incision.

- Then incise the exposed transverse abdominal muscle and the closely associated peritoneum to a length comparable to that of the internal oblique abdominal muscle incision

Examination

If the viscera are in normal position, the duodenum will be encountered running horizontally across the dorsal part of the incision with the mesoduodenum dorsal and the greater omentum ventral. The pylorus and abomasum can be palpated ventrally. The greater omentum may be redacted cranially to allow examination of the jejunum, ileum, cecum, and spiral colon. The kidneys and pelvic region can also be palpated at this stage. The rumen can be palpated as well as part of the reticulum and diaphragm feeling for adhesions between the two. The diaphragm can also be used to feel the beating of the heart by gentle palpation of the diaphragm. The omasum, caudal border of the liver, gallbladder, and diaphragm can be palpated cranially on the right side.

In the sugery performed October 30, 2018 , upon incision of the skin and through subcutaneous fascia a cutaneous blood vessel was knicked . The vessel was quickly clamped with a hemostat and then ligated with a 3-0 Vicryl . The surgery proceeded as normal afterwards . After complete opening of the body wall and its respective layers the gross appearance of the GIT was examined then the surgeon palpated all the relevant structures of the GIT in situ . The greater omentum , small

intestines , spiral colon and the caecum were all exteriorized for more detailed examination. Each portion of the G.I.T that was exteriorized was meticulously inspected for normal as well as abnormal findings . While exteriorized the contents were lavaged regularly with LRS solution to keep the intestines moist and prevent dehydration . After examination of the contents cranial of the incision site examination of contents caudal to the incision site were made . The right ovary was exposed to reveal a CL on its surface as well as the bladder being palpated . After full examination of the contents of the abdominal cavity all exteriorized structures were placed back into the abdominal cavity in the reverse order they were exteriorized . During the surgery the patients pulse rate began fluctuating between 100 beats per minute - 125 beats per minute and was placed on a second LRS 500 without anesthetic to help stabilization.

Suturing

The incision is closed via a three-layer suture pattern.
Layer 1- Suture the peritoneum and transverse and internal oblique abdominal muscles together. A simple continuous pattern was used . 2-0 Vicryl was used to achieve this .

Layer 2 - Suture the external oblique abdominal muscle and subcutaneous tissue. A simple continuous pattern was used . A Vicryl 2-0 was used

Layer 3 - Close the skin. A continuous interlocking suture pattern is ideal. 0 PDS was used

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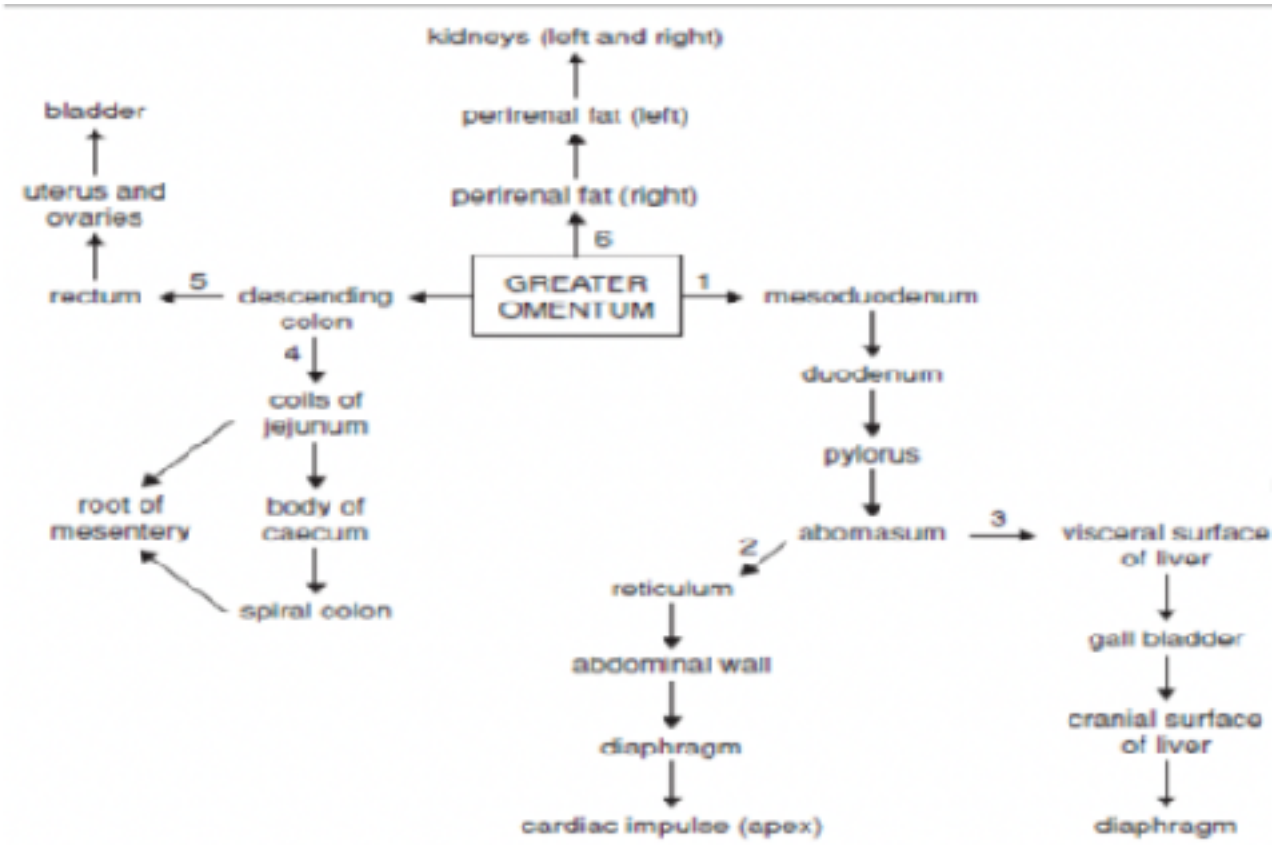
Left- Flank Approach

Unless a left displacement of the abomasum is present, the rumen will be visible following completion of the left- flank laparotomy incision, and the color of its serosa may be noted. The rumen is palpated to determine the nature of its contents. The left kidney is pendulous and also can be palpated straight in from the incision if the rumen is empty. If the rumen is full, the kidney is located by passing a hand around caudal to the dorsal sac of the rumen. Passing a hand forward on the left side of the rumen, the spleen, reticulum, and diaphragmatic area may be palpated, and the presence of adhesions or abscesses in this area may be ascertained. Moving behind the rumen over to the right side, the viscera within the omental bursa are palpated. Further forward on the right side, it is possible to palpate the caudate lobe of the liver and the gallbladder. The pelvic region, including the uterus and bladder, should also be palpated.. Following this exploration, any specific procedures indicated, such as rumenotomy or abomasopexy, are performed.

Summary flow diagram of the examination procedure for the right flank exploratory laparotomy



Summary flow diagram of the examination procedure for the left flank exploratory laparotomy