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Laparoscopy of the GI tract in the horse

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The aim of this lecture is to highlight the most common laparoscopic procedures involving the GI tract in the horse and to give the practitioner some update of what can be done laparoscopically in the standing and recumbent horse.

The most common procedures are:
- Closure of the nephrosplenic space
- Closure of the vaginal ring (internal inguinal ring) to prevent strangulated inguinal herniation in stallions.

Less common procedures are:
- Collection of small intestinal biopsies
- Laparoscopic repair of incisional hernias after colic surgery
- Laparoscopic nephrectomy
- Laparoscopic assisted cystotomy to remove bladder stones in male horses
- Laparoscopic repair of bladder tears in adults
- Laparoscopic repair of mesenteric rents
- Laparoscopic colopexy
- Laparoscopic adhesiolysis
- Diagnostic laparoscopy in acute and chronic colics and/or chronic weight loss
- Laparoscopic biopsy taking (tumours)
- Laparoscopic treatment of intra-abdominal abscess.

Laparoscopic closure of the nephrosplenic space

Laparoscopic closure of the nephrosplenic space is a surgical procedure that has been performed over the last 10 years and has proven to be very successful to prevent recurrent LDDLC (left dorsal displacement of the left colon) with entrapment into the nephrosplenic space. Laparoscopic ablation of the nephrosplenic space should be considered in horses that are predisposed to recurrent LDDLC with entrapment into the nephrosplenic space. The recurrence rate of LDDLC varies around 20%.

Our hospital policy at the moment is to treat the nephrosplenic entrapments (LDDLC) with phenylephrine hydrochloride infusion. Surgical treatment is only performed if the left colon is very gas distended and the horse suffers from a lot of abdominal pain or when the medical treatment is unsuccessful. Laparoscopic closure of the nephrosplenic space is not performed as standard after a first LDDLC but owners are informed of this type of surgery.

Surgical procedure

The dorsal border of the spleen is sutured against the dorsal aspect of the nephrosplenic ligament in a continuous pattern. The surgery is performed on the standing horse. Horses can be discharged 24 h after surgery. Rehabilitation time: ± 4–6 weeks.

Results

Laparoscopic nephrosplenic space closure has been proven to be a very effective way to prevent colon entrapment within the nephrosplenic space. A successful surgery will result in a complete ablation of the nephrosplenic space. A fibrous layer will connect the dorsal border of the spleen with the nephrosplenic ligament. Closure of the nephrosplenic space will prevent entrapment of the left colon within the nephrosplenic space; however, displacement of the left colon between spleen and left abdominal wall is still possible.

Contraindications

None. The technique is safe in the hands of an experienced laparoscopic surgeon.

Closure of the vaginal ring (internal inguinal ring) to prevent strangulated inguinal herniation in stallions

Indication

Preventing strangulated inguinal herniation (scrotal hernias) without performing a hemicastration.

After a successful reduction of a strangulated loop of intestine in a stallion suffering from a strangulated inguinal hernia the owner may decide not to have the horse castrated unilaterally. This is often the case in (potential) breeding stallions.

In many cases the testicle is still viable and if there is the desire to retain both testicles the size of the vaginal rings should be restricted to avoid recurrence of the inguinal herniation.

This can only be performed by a laparoscopic approach.

Surgical procedure

Closure of the vaginal ring can be performed on the standing horse or recumbent horse but the standing position will be the preferred approach by many. The most effective way to close the vaginal ring is by using a peritoneal flap hernioplasty as described by Wilderjans et al. (2011). Horses can be discharged 24 h after surgery. Rehabilitation time: ± 6 weeks.

Results

Standing laparoscopic peritoneal flap hernioplasty, with closing the entire vaginal ring has been proven to be very successful in preventing scrotal hernias in stallions (Wilderjans et al. 2011). There seems to be no effect on their breeding soundness.

Contraindication

None but the horse needs a viable testis after reducing the strangulated hernia. If this is not the case, hemicastration can prevent reherniation.

In very large scrotal hernias in adults, which are often nonstrangulated, a peritoneal flap alone may be insufficient and a mesh should be used to close the vaginal ring.

Closure of the vaginal ring (internal inguinal ring) to prevent nonstrangulated inguinal herniation in foals

Indications

Nonstrangulated inguinal herniation in foals, are often a nonsurgical condition. Most of them disappear on their own within 3 months after birth. In those cases where the hernia remains or in those cases where the hernia is very large a laparoscopic closure of the vaginal ring can be performed. Strangulated cases always need surgery.

Surgical technique

The surgery is performed under general anaesthesia with the foal in dorsal recumbency. In foals up to 4 months, the vaginal ring can be closed by using simple interrupted sutures or staples. For older foals good if the surgery is performed before the age of 4 months. Very good if the surgery is performed before the age of 4 months.

Results

Standing laparoscopic closure of the vaginal ring has been proven to be very successful to prevent recurrent LDDLC (left dorsal displacement of the left colon) with entrapment into the nephrosplenic space. A successful surgery will result in a complete ablation of the nephrosplenic space; however, displacement of the left colon between spleen and left abdominal wall is still possible.
pulled out resulting in reherniation. In older foals a peritoneal flap technique should be considered.

Collection of small intestinal biopsies
Indications
Candidates for intestinal biopsies are horses suspected of inflammatory bowel disease, enteritis, neoplasia or grass sickness.

Results
Full thickness biopsies can be taken safely when the loop can be exteriorised through an enlarged flank incision. Intra-abdominal full thickness biopsies can be performed but are technically more difficult and there is an increased risk in leakage and contamination of the abdominal cavity. However, some areas such as distal ileum and proximal duodenum are only accessible by laparoscopic surgery.

Laparoscopic repair of incisional hernias after colic surgery
Indication
Treatment of incisional midline hernias after colic surgery using a mesh that is attached intra-abdominally over the defect (Caron and Mehler 2009).

Surgery
The horse is positioned in dorsal recumbency and the abdominal hernia is visualised. An appropriate size mesh is introduced in the abdomen and attached with sutures over the defect. The mesh is not covered with peritoneum but left in contact with the intestines. The mesh will be covered with fibrous tissue and adhesions do not seem to be a problem.

Results
Only a few cases have been published (Caron and Mehler 2009) but laparoscopic incisional hernioplasty is seemingly a safe, effective technique for management of ventral abdominal incisional hernia in horses.

Laparoscopic nephrectomy
Indication
Unilateral renal disease that requires removal of one kidney (hydronephrosis, nephrolithiasis, pyelonephritis, abscessation, neoplasia, nephromatosis and ectopic ureter).

Surgery
The surgery is performed on the standing horse (Keoughan et al. 2003; Röcken et al. 2007). The fastest way to perform a standing nephrectomy is by using a combined hand assisted laparoscopic nephrectomy. Hand-assistance simplifies the procedure technically, reduces surgical time, and improves safety by adding a digital component to the visual control. Horses are discharged 5 days after surgery. Rehabilitation time is ± 4–6 weeks.

Results
Laparoscopic nephrectomy is in my opinion the most elegant, fast, safe and noninvasive way to remove a kidney. It avoids general anaesthesia and rib resection, it offers an excellent observation of the regional anatomy, and precise, secure ligation and transection of the renal vessels and ureter under direct observation. Also the post operative recovery period is shorter.

Laparoscopic assisted cystotomy to remove uroliths in male horses
Indications
Removal of bladder stones in males.

Nonlaparoscopic removal of uroliths is a difficult surgery in geldings with many possible peri- and post operative complications.

The bladder wall is often inflamed, thickened and retracted in the pelvis and difficult to exteriorise through a celiotomy wound.

A parainguinal laparoscopic approach avoids damage to the pudendal and superficial epigastric blood vessels and also minimises dead space by avoiding the reflection of the prepuce in paramedian or median approaches. It also allows easy exteriorisation of the apex of the bladder.

Surgery
Horse in dorsal recumbency in Trendelenburg position, the laparoscope positioned through the umbilicus (Röcken et al. 2006). After laparoscopic inspection, a parainguinal instrumental portal can be created under visual control. The advantage of laparoscopy is that this portal can be made under direct visualisation and in such a way that the surgeon is always sure that exteriorisation of the bladder apex will be possible without too many difficulties. In general this portal is made ± 3 cm medial and parallel to the left external inguinal ring. The apex of the bladder is pulled out of the abdomen and the abdominal incision is then enlarged to allow exteriorisation of the distal third of the bladder. The abdomen is desufflated. A cystotomy is performed, the urolith removed and the cystotomy is closed in 2 layers. Portals are routinely closed.

Results
We and other authors (Röcken et al. 2006) have performed this surgery on several occasions and had no complications peri- or post operatively. Laparoscopy will show you the ideal location to make a relatively small parainguinal laparotomy. This avoids the need for extensive manual traction on the bladder when pulling it out of the laparotomy wound.

Contraindications
None, I would advise laparoscopic assisted cystotomy above any other approach, for removal of uroliths in male horses.

Laparoscopic repair of bladder tear in adults
Indications
Rupture of the urinary bladder in adult horses.

This is an unusual problem in adult horses. Standing laparoscopic repair of a ruptured urinary bladder in an adult horse, and especially in a male horse, offers significant advantages over other treatment options.

In mares bladder rupture can be a complication after foaling. Surgery can be performed on the standing horse (Tuohy et al. 2009) or under general anaesthesia in Trendelenburg position (Rijkenhuizen et al. 2008).

Only a few cases have been published but a laparoscopic approach will improve visualisation and access to the bladder rupture in adult horses.

Diagnostic laparoscopy, laparoscopic adhesiolysis, laparoscopic biopsy taking (tumours) and laparoscopic treatment of intra-abdominal abscess
Standing diagnostic laparoscopy is most commonly used in horses with colic or weight loss. In acute cases it will be used when the examiner is not sure if the patient is a candidate for laparotomy (colic case: too good to operate but not good enough response on medical treatment). In chronic cases it will be used after a complete abdominal examination (rectal examination, abdominocentesis, full blood examination, abdominal ultrasound...
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examination) has been performed. Laparoscopy is not useful in colics with distended small or large intestines. In those cases there is very little visibility in the abdomen and there is an increased risk of causing damage to intestines and organs.

Common findings

- Post foaling colics
  - Bruising small colon
  - Bruising uterus
  - Bruising or tear in mesocolon
  - Haemorrhage in uterus or broad ligament
  - Uterine rupture

- Spleen disorders (tumours, haematoma, adhesions, melanoma)

- Liver disorders (tumours, fibrotic livers, liver lobe torsion, fatty liver)

- Peritonitis

- Abdominal abscesses (base of the caecum)

- Adhesions (diagnosis and laparoscopic adhesiolysis)

- Gastric disorders (gastric impaction, squamous cell carcinoma)

- Small intestine disorders (proximal duodenitis/enteritis vs. small intestine strangulation)

- Large intestine disorders (displacement left colon).

- Visceral rupture (contamination of the abdomen with ingesta).

- Neoplasia: often in combination with chronic weight loss, inappetence or intermittent colic. Laparoscopy can be used to visualise the tumour and to take a biopsy.

Some of the above mentioned disorders will be demonstrated with pictures.

References and further reading


