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STANDING INGUINAL RING CLOSURE - LAPAROSCOPY

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INTRODUCTION
Small intestinal incarceration in the inguinal canal is a well documented condition in adult stallions. These inguinal hernias are associated with acute onset of abdominal pain and the diagnosis is easily made by scrotal palpation (cold skin and hard testis) and rectal examination. Spontaneous reduction is possible by rolling, lounging or even jumping if the hernia has just occured. Traction on the incarcerated loop via rectal examination in combination with scrotal compression may also resolve the problem if you have a recent case. All other cases need immediate surgical intervention. Some cases reduce spontaneously while the horse is hoisted to be placed on the surgical table. If the testis are not removed during surgery, horses with wide vaginal rings have a high risk for a recurrent hernia in the future. The laparoscopic inguinal ring closure technique is usefull in horses with enlarged vaginal rings to avoid intestinal herniation in the inguinal canal.

INGUINAL HERNIORRHAPHY IN STALLIONS

Indications
Inguinal herniorrhaphy was carried out already in more than 30 adult stallions. Two 3-year-old stallions had intermittent bilateral non-strangulating inguinal hernia. An enlarged scrotal sac was the only obvious sign. Rectal examination revealed extremely wide (one hand) internal inguinal rings. All other horses showed acute strangulations before and the laparoscopic intervention was performed to avoid recurrence.

Technique
The standing cylindrical mesh approach was used in every case. Additional suturing of the vaginal ring edges was used in the larger vaginal rings. Transrectal examination of the abdominal structures and emptying the rectum was performed prior to surgery. Tetanus anti-toxin 3000 iu s.c., sodium benzyl-penicillin 20,000 iu/kg bwt i.v., gentamicin sulphate 2.2 mg/kg bwt i.v. and fluixin meglumine 1 mg/kg bwt i.v. were administered. The stallions were restrained in stocks and sedated with detomidine hydrochloride 0.02 mg/kg bwt i.v. The tail was braided and tied on the opposite side and the paralumbar fossae were shaved, aseptically prepared and draped. Three portal sites were infiltrated with 20 ml of a 2 % mepivacaine solution. A 10 mm skin incision was made about 2 cm dorsal to the crus of the internal abdominal oblique muscle midway between the 18 th rib and the tuber coxae. Three 15 centimeter long piston-valve trocar-cannula units were used in all horses. The first trocar-cannula unit was then inserted with a pressing and rotating action. The rigid, 33 cm long and 10 mm diameter, 0° viewing angle laparoscope was inserted in this cannula. It was then used to introduce a fiberoptic light cable with a videocamera and a 32 centimeter long babcock forceps through portal site 3. A 6 by 8 cm polypropylene mesh was rolled up as small as possible and brought into the abdominal cavity through portal site 2 with another babcock forceps and inserted in the inguinal canal. The mesh was then pushed a little deeper in the inguinal canal until the proximal mesh edge was below the vaginal ring. The conical mesh was fixated to the parietal wall of the inguinal canal with several titanium staples. A polyglecaprone suture was then used to appose the vaginal ring to the parietal wall to cover the mesh with peritoneum and thus avoiding intestinal contact with the mesh. The three portal sites were closed with single skin sutures only. The same surgical procedure was performed on the other side. The horses were reintroduced to feed 6 hours postoperatively and were discharged from the hospital 3 days after surgery.

Results
Almost no intra- and postoperative problems were encountered with the exception of one splenic puncture wound caused by the trocar insertion. This bleeding was managed by intrasplenic epinephrine injection around the puncture wound. The shrunken spleen area stopped bleeding almost immediately. One stallion got a severe colitis, foundered, and was euthanized one month post-operative. CO₂ insufflation was unnecessary in every case. Rectal examination, carried out one month post-op, revealed a satisfying degree of obliteration to prevent reherniation. Follow-up information by telephone (20 horses: more than 6 months) revealed no bouts of colic anymore in all cases. Hindlimb gait improvement was mentioned by the owners in seven stallions.

DISCUSSION
The transabdominal preperitoneal mesh repair (TAPP) as previously described² requires general anaesthesia and is that difficult and time consuming that only one internal inguinal ring can be narrowed in the same anesthesia. The cylindrical mesh repair however does not require general anaesthesia, is quite easy to perform and can be performed bilaterally at the same time. The polypropylene mesh acts as a foreign body in the inguinal canal and is enclosed by inflammatory tissue within two weeks. Apposing the vaginal ring edges with a suture line avoids direct contact of the intestines with the mesh. This is important to avoid intestinal adhesions. This technique can be used to avoid recurrent internal inguinal hernia in horses with enlarged vaginal rings if the owner does not want to castrate the stallion. It is also warranted in stallions with very wide internal inguinal rings to prevent a small intestinal incarceration in the future.

CONCLUSION
Laparoscopic surgery really teaches us a lot more about the life anatomy of the equine abdomen. It opens previously unexploirable areas (f.ex. epiploic foramen, internal inguinal rings, renosplenic space,...) and thus shows us the large anatomical variation in these areas that was unknown before. This strongly contributes to explain certain recurrent conditions. Because of the accessibility of these areas via laparoscopy, we can not only diagnose or explain these conditions, but we can also for the first time treat these conditions or prevent recurrence via laparoscopic tools. The laparoscopic inguinal hernia repair in foals³ and stallions are new surgical procedures with an important clinical value.
REFERENCES


Figure 1: The polypropylene mesh is inserted in the inguinal canal.

Figure 2: After the mesh is inserted, it is fixed with staples to the wall.

Figure 3: A suture is placed to appose the vaginal ring edges.

Figure 4: The suture avoids contact between the mesh and the intestines.