

Minimally Invasive Abdominal Surgery: LAPAROSCOPY

LAPAROSCOPY GENERAL: Surgical techniques easier on horses

Laparoscopic surgery is most commonly performed procedures involve ovariectomy, cryptorchid castration, nephrosplenic space closure and castration without testicle removal.

A laparoscope is a specialized camera that allows the veterinary surgeons to examine the inside of the abdomen (belly). The laparoscope is attached to a video camera, which displays the image on a monitor. Unlike traditional abdominal surgery techniques, which require large openings to allow the surgeon's hands to enter the abdomen, laparoscopic surgery is performed through very small incisions. Specialized long handled surgical instruments are passed through separate cannulas (tubular ports) into the abdomen. The surgeon uses these instruments while watching the procedure on the television screen, dissecting, cutting, suturing and cauterizing. During most laparoscopic procedures, the abdomen is kept distended, or filled, with carbon dioxide ("insufflation") to allow visualization of the organs.

Some procedures are performed using a combination of laparoscopy and traditional surgeries, known as "hand-assisted laparoscopy". The excellent view provided by the laparoscope allows surgeons to see up close what their hands and instruments are doing within the abdomen.

The laparoscope also provides direct magnified visualization of the surgery site. Therefore, surgeries can be performed in areas that cannot be seen with traditional surgical approaches. Also, surgical sites can be critically evaluated for control of bleeding (hemostasis) and placement of sutures or other implants. Many laparoscopic procedures are performed with the horse standing under sedation and local anesthetic, reducing the inherent risks associated with general anesthesia and recovery.

Laparoscopy is a less invasive procedure, requiring three or four 1-cm incisions. These small incisions decrease the time required in surgery and in closing the surgical incisions, as well as decrease the time required for the horse to be off work while the incision heals. In addition, there is a decreased chance of accidental trauma to the abdominal organs during the surgery.

The major benefits of minimally invasive surgery include: smaller incisions, tension-free dissections, better visualization, and a more rapid return to function. Laparoscopic procedures in horses are less invasive and are associated with less postoperative pain and inflammation.

Benefits of Laparoscopy

Laparoscopy is a minimally invasive surgical technique. This means that the surgery is performed through several small incisions. Advantages include:

1. Decreased hospitalization and rehabilitation time
2. Reduced discomfort associated with incisional healing and therefore decreased need for postoperative medications
3. Excellent cosmetic outcome

Procedures

Procedures which can be performed laparoscopically include:

- * Ovariectomy (Removal of both ovaries for colic or behavioral problems)
- * Ovarian tumor removal (e.g. granulosa-thecal cell tumor)
- * Castration
- * Cryptorchidectomy (Removal of abdominal testicle(s))
- * Abdominal or thoracic exploration
- * Biopsies of organs (e.g. lung, liver, intestine)
- * Adhesiolysis (Management of adhesions after abdominal surgery or peritonitis)
- * Inguinal hernia repair
- * Incisional hernia repair
- * Nephrectomy (Removal of a diseased kidney)
- * Colopexy (attachment of the colon to the body wall to prevent displacement) and nephrosplenic space ablation (closing the space for prevention of displacement of the large colon)
- * Ruptured bladder repair
- * Closure of mesenteric defects

These procedures are currently being performed laparoscopically at New England Equine Medical & Surgical Center. The ones carried out the most routinely are ovariectomy, “routine” castration without testicle removal and cryptorchid castration. These procedures can be performed standing with sedation and regional anesthesia (local block) or under general anesthesia in dorsal recumbency (on the horse’s back).

A laparotomy is the typical procedure used to castrate cryptorchid stallions and perform ovariectomies. A laparotomy requires general anesthesia and is an invasive surgery, resulting in a larger incision in the body wall.

OVARIECTOMY

Standing laparoscopic ovariectomy is used to remove ovaries bilaterally in mares with behavioral problems and unilaterally in mares with granulosa-thecal cell tumors.

Granulosa-thecal cell tumors in mares can produce abnormal levels of testosterone. The mare can have behavioral changes such as anestrus (not coming into heat) or create stallion-like behavior, such as aggressiveness and herding and mounting of other mares. Removal of the tumorous ovary alone can not only resolve the behavioral issues, but the remaining ovary can start to cycle again so the mare can be used potentially as a broodmare.

Ovary



Radio-frequency devices, such as the Ligasure (Valley Lab/Tyco Healthcare), have been designed to cauterize vessels up to 7 mm in diameter. It has a built-in knife blade that is used to cut the tissue after the coagulation is complete. This device is very effective in cutting and coagulating the ovarian pedicle even in cases of large granulosa-thecal cell tumors.

Regardless, the tension-free dissection causes much less post-operative complications than do the other techniques that have been described and used in the past.

“ROUTINE” CASTRATION FOR OLDER STALLIONS

Castration of older stallions has a higher risk of post-operative bleeding and herniation of intestinal organs through the vaginal rings due to the larger size of the testicles. The vaginal ring is the opening which the spermatic cord passes through from the abdomen to the scrotum. Since the spermatic cord is larger in size in older stallions, the likelihood of an intestinal organ, such as small intestine, to herniate through the opening is greater. With laparoscopy, the spermatic cord can be cauterized within the abdomen, and the testicles are left within the scrotum. The testicles will atrophy to approximately the size of a walnut and become non-functional. Testosterone levels are checked before and about a week after castration to ensure the testicles are no longer functional.

CRYPTORCHIDS

Cryptorchidism is a developmental problem that is characterized by failure of one or both testes to descend into the scrotum. Descent of the testes normally occurs in the male fetus. The testes move from within the abdominal cavity through a space called the inguinal canal, to a position outside the abdomen within the scrotum.

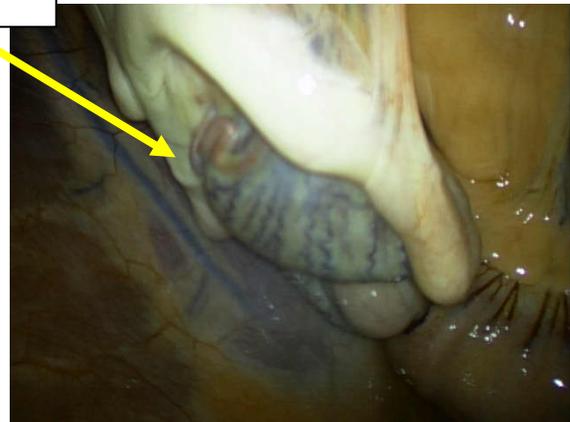
Interruption in this process will result in one or both testes being retained along its route. The testicles may be located inside the abdomen, within the inguinal canal or under the skin in the inguinal (groin) area.

Retained testicles are not fertile (do not produce viable sperm), but do produce testosterone, causing the cryptorchid horse to have the behavioral characteristics of a stallion. There is strong suspicion that cryptorchidism is heritable.

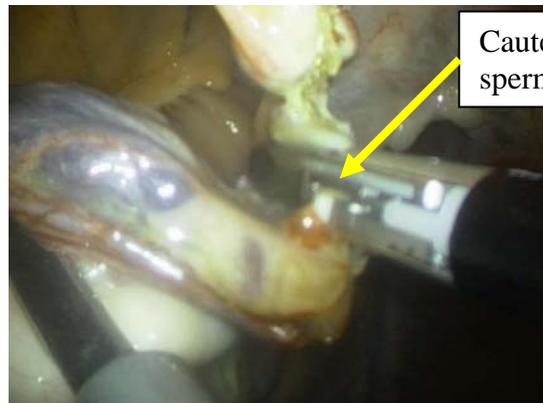
Retained testes also have a tendency to become cancerous in horses, and testes that are retained in the inguinal area may be associated with hind limb lameness.

Laparoscopy can also be very useful for the evaluation and the treatment of male horses with no palpable testes but with a known history of displaying stallion-like tendencies. Often, these horses are required to go through an exploratory

Retained testicle



Cauterized spermatic cord



laparotomy under general anesthesia. This surgery is invasive and requires exploration of both inguinal areas up to the abdominal cavity. Laparoscopy in these horses permits a non-invasive exploration of the abdominal cavity and the accurate distinction between gelding and cryptorchid. During the surgery, if a retained testis is found, it can be easily removed.

If you have any questions regarding laparoscopy please ask your veterinarian or any of the surgeons at New England Equine Medical & Surgical Center.

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