Surgery

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Third Eyelid Removal Options

Avoiding general anesthesia for surgery in horses, when possible, is not only safer for the horse and surgeons but also more economical for the owner. However, not all surgeries can be performed without general anesthesia, partly because the procedure is too uncomfortable for the horse to remain awake (even if sedated and given pain medications) and also because the area being operated on might be too difficult to access in the conscious animal. A surgery that could go either way—sedation and local anesthesia or general anesthesia—is removal of the third eyelid due to cancer.

Surgeons perform nictitating membrane (third eyelid) removal most frequently in horses with squamous cell carcinoma of the third eyelid. A successful outcome means complete removal of the third eyelid to ensure all cancer cells have been removed and the tumor does not recur.

Amber Labelle, DVM, MS, Dipl. ACVO, of the University of Illinois Urbana-Champaign's Veterinary Teaching Hospital, said, "Proving that the method of anesthesia does not influence the rate of recurrence encourages veterinarians to perform the procedure under local anesthesia, which is safer for the patient.

"The purpose of this study was to compare the outcomes of horses which had their third eyelids surgically removed using sedation and local anesthesia with those who had them removed under general anesthesia. Our hypothesis was that recurrence of cancer would not be more common in the local anesthesia group than it was in the general anesthesia group."

In their study Labelle and colleagues examined the medical records of 26 horses that had their third eyelid removed while standing with sedation and pain medications. They contacted the horses' owners for follow-up data and compared outcomes to those of horses that had the same procedure performed under general anesthesia.

COURTESY DR. AMBER LABELLE

Researchers compared the outcomes of horses that had their third eyelids surgically removed using sedation and local anesthesia with those that underwent general anesthesia for the procedure.

"Recurrence of neoplasia only occurred in two of the 26 horses, which is not any more frequent than what is seen in horses that underwent general anesthesia," relayed Labelle. "In addition, the only long-term complication was a mild ocular discharge that was not associated with any damage to the eye."

Not all horses are amenable to this approach, however. "Third eyelid excision is most likely to be successful when the tumor is confined to the third eyelid alone," Labelle warned.

If a veterinarian pursues this surgery, he or she should submit the excised tissue for laboratory examination to ensure all cancerous tissue has been removed.

Correcting Nephrosplenic Entrapments: Exercise vs. Rolling

While colic surgery is a common and sometimes very successful approach to gastrointestinal problems, veterinarians are always looking for nonsurgical ways to solve certain types of colics. Lisa Fultz, DVM, of the University of Georgia, reviewed a study in which she and colleagues in Ocala, Fla., compared two nonsurgical approaches to correcting a nephrosplenic entrapment of the large colon: exercise and a previously unpublished method of rolling the horse.

This relatively common cause of colic occurs in as many as 9% of all horses treated in referral veterinary hospitals. Gas distension and abnormal intestinal motility cause the ascending dorsal colon to migrate over the ligament that connects the kidney and spleen; historically, this problem has had to be rectified through colic surgery.

Fultz discussed results from medical treatment of 88 cases presented to the Equine Medical Center of Ocala from 2004 to 2010. Following intravenous administration of phenylephrine, a drug that shrinks the size of the spleen to as small as 28% of its original size, treating veterinarians pursued one of two approaches to relieve entrapment: a) jogging the horse, or b) rolling the horse under general anesthesia.

A portion of the horses (24/88) were free-longed for 15 minutes in a roundpen

(jogging), as their initial treatment while other horses underwent the modified rolling procedure (34/88). Horses that continued to show signs of pain after jogging then underwent the rolling procedure (9/88).

Fultz described the modified rolling position: First, the anesthetized horse is hoisted by all four limbs with his back on the floor. Two adults, sitting with backs to the wall, thrust their legs vigorously into the horse's flank to ballotté the abdomen. Then they elevate the horse one foot from the floor as a person thrusts his or her knees into the left flank for five minutes. Then the horse is again lowered onto his back, forelimbs are released from the hoist, and tension is retained on the hind limbs. For the next five minutes, the horse is rotated (rolled) swiftly 180 degrees from side-to-side. The horse is then recovered from anesthesia.

If successful, the colon should reposition itself within 24 to 48 hours, Fultz noted. "If ongoing entrapment is suspected via rectal exam or ultrasound some horses are rolled again while others have abdominal surgery," she added

"The success rate of rolling under general anesthesia was significantly higher than achieved with jogging—84% vs. 63.2%," Fultz reported. "When jogging failed to rectify the displacement, follow-up with rolling resolved 64.3% (of unresolved cases)." Of the 88 horses, 12 (13.6%) required exploratory surgery to correct the problem and three of these had coexisting lesions.

While the general anesthesia required for the rolling technique poses risks, Fultz stressed, "When indicated, medical resolution of a colic crisis (rather than surgical) may improve the perceived value of the horse, with market value in some breeds decreasing in horses that have undergone surgical intervention." In addition, she noted that medical resolution minimizes the convalescent period, with a horse returning to athletic activities relatively quickly. Regardless, she stressed that a thorough workup and appropriate diagnosis are important for preventing delayed intervention in gastrointestinal cases requiring surgery.

Prompt Treatment Key in Resolving Patella Infection in Foals

When dealing with a foal's health, waiting is never a good idea, particularly when

COURTESY DR. ALASTAIR KAY

Osteomyelitis of the patella (seen via radiograph above) is uncommon in foals, and it can result in prolonged and severe stifle joint infection.

infections are suspected. Osteomyelitis in young foals, for instance, requires immediate treatment, explained Alastair Kay, BVSc, MS, Dipl. ACVS, MRCVS, of Minister Equine Clinic, in North Yorkshire, U.K.

"Osteomyelitis is an infection of either bone or bone and cartilage combined," Kay explained. "If infection develops in bone and/or cartilage close to joints, the chances of achieving a high-level athletic exercise may be poor, particularly if the infection is aggressive, a large area is involved, or if treatment is initially delayed."

Osteomyelitis is fairly common in foals less than 4 weeks old, and it can affect all bones. Long bones such as the cannon bone, small bones such as in the lower hock or knee joints, or bones within the foot are most commonly affected.

"Infection of the patella (known as the knee cap in humans) is uncommon in foals, but when it happens can result in prolonged and severe stifle joint infection," said Kay.

Foals with osteomyelitis of the patella often exhibit swollen stifle joints and lameness. Veterinarians can base an infection diagnosis on stifle radiographs and joint fluid analysis, and they can treat affected foals by flushing the infected stifle, injecting the joint with antibiotics, and administering systemic antibiotics (intravenously or orally).

Because the treatment, management, and outcome of patellar osteomyelitis have not been described in significant numbers, Kay and colleagues from various clinics searched their medical records from 2003 to 2007 and identified eight foals with evidence of patella osteomyelitis. Foals with both short- and long-term (i.e., more than 15 months out) follow-up data were included in the study.

Key findings included:

- Six of the eight foals survived long-term;
- Six foals were sound and sold as yearlings, as show or racehorse prospects;
- Two of eight foals remained lame (following treatment other than injection of the patella) and died of additional causes.

"Based on this retrospective analysis of the available data, prompt treatment can result in a sound foal that is still eligible for an athletic career," concluded Kay. "Systemic bacterial infection or other disease that occurs around the time of birth will likely prolong the treatment and recovery periods."

Suture Material Matters for Abdominal Incisions

At least one study has shown that 30% of horses undergoing abdominal surgery had incision-related complications such as swelling, abscess formation, drainage, and the incision bursting open (Wilson, 1995). Stacy Anderson, DVM, of the Western Veterinary College at the University of Saskatoon, in Saskatchewan, Canada, recently described a study in which she and colleagues compared suture materials' integrity.

"There are a number of suture materials available, each with its own set of characteristics that make one more suitable than another for certain surgical procedures," said Anderson. "In closing the equine abdomen during colic surgery, many surgeons in North America use 0.5-mm or 0.6-mm diameter suture. At our hospital, we use a 1-mm diameter braided polydioxone (7 PDS) that is much larger. We were interested in comparing this large suture to smaller suture, 2 Vicryl, which my co-authors and I have used at other practices to close abdomens during colic surgery."

Anderson and colleagues put the sutures to the test using equine cadavers and

a large 200 L "bladder." They created a surgical incision in either the ventral abdomen (in the middle of the abdomen from the sternum to umbilicus, or belly button) or at the side of the abdomen (called a paramedian incision). The team closed the incisions in a simple continuous pattern using either the 7 PDS or 2 Vicryl. Then they inflated the bladder until the incisions or the abdominal wall burst open—referred to as the bursting strength, BS (Anderson noted that the team inflated at 30 L/min, and the time and pressure necessary varied by the horse).

The team's key findings were:

- They noted no overall difference in BS between ventral and paramedian incisions, regardless of the suture material used;
- Older horses had significantly decreased BS measurements as compared to younger horses;
- When the incisions burst open, the suture material itself broke in 60% of the 2 Vicryl group, whereas the body wall adjacent to the sutured incision failed (the suture and knots remained intact but the tissue tore) in the 7 PDS group.

"These data show that 7 PDS is a superior suture material for closing all types of abdominal incisions because it never failed before the abdominal wall. Also, equine surgeons should be aware that older horses may have weaker abdominal walls, although further research is needed to confirm this finding," concluded Anderson.

Intestinal Suture Techniques Compared

Surgeons currently use a number of techniques to suture two pieces of intestine back together (an anastomosis) during colic surgery. The seal must be leak-free to avoid complications that can cause future colics or even death.

"Due to the critical condition of patients undergoing colic surgery, the goal is to execute the anastomosis in the shortest time, yet execute the job perfectly so no leakage occurs," explained Luigi Auletta, DVM, of the Department of Veterinary Clinical Sciences, Surgery Section, at the University of Studies of Napoli Federico II, Italy. To determine the optimal suture (stitch) pattern for anastomosis, Auletta and colleagues collected intestines from horses and placed a rubber tube into two intestinal segments. Air was blown in through one end of each tube and the pressure was measured at the other end.

Then the two pieces of intestine were sutured together using a Lembert single layer, Gambee, or Lembert double layer pattern. Auletta and his colleagues' key findings were:

- The Lembert single layer pattern took significantly less time to complete than the other two patterns;
- The Lembert single layer pattern resisted higher pressures than the other two patterns; and

> **"The Lembert single layer (suture) pattern is faster, stronger, and less likely to impede the flow of intestinal contents than the other two patterns and therefore should be the pattern of choice in most colic cases requiring anastomoses."**
>
> DR. LUIGI AULETTA

- The Lembert single layer pattern, by nature, also left a smaller amount of tissue protruding into the lumen (interior) of the intestinal tract, which means the cross area of the intestinal loop was larger.

"These data clearly indicate that the Lembert single layer pattern is faster, stronger, and less likely to impede the flow of intestinal contents than the other two patterns and therefore should be the pattern of choice in most colic cases requiring anastomoses," concluded Auletta.

Sporting Activity After Colic Surgery

The decision whether to take a horse to colic surgery is one that's generally based on both prognosis and financial considerations. Thus, an equine surgeon must be able to counsel horse owners on the expected surgical outcome and required convalescence following hospital discharge so a timely decision can be made. Mogens Christophersen, DVM, of the University of Copenhagen, presented information about anticipated return of horses to sporting activities following colic surgery.

He explained that in the current study he and colleagues evaluated four characteristics of horses undergoing colic surgery from 2005 to 2010: 1) long-term survival rate; 2) return to athletic activity similar to each horse's prior level; 3) performance quality upon return to athletic activity; and 4) owner satisfaction with results. Most cases involved surgical correction of large intestinal lesions, with a total (both small and large intestine) of 46% undergoing intestinal opening of the bowel (enterotomy) for emptying content or resecting (rejoining) intestine following removal of a portion of bowel. Investigators interviewed owners of 79 horses that survived at least six months following colic surgery.

"Survival rates at six, 12, 24, 36, 48, and 60 months were 95.3%, 86.6%, 80.9%, 76.9%, 62.1%, and 57.6%, respectively," reported Christophersen. Of the 79 horses, 68 (86.1%) resumed sporting activity after colic surgery. Of these, owners believed that 83.5% returned to the same performance quality or better. Owner satisfaction about the post-surgical outcome approached 90%, with owners stating that they would consider or agree to pursue colic surgery again despite the expensive price tag and extended convalescence time.

Christophersen remarked that age did not play a significant factor in post-surgical sporting performance; however, horses were less likely to return successfully to former athletic performance levels if incisional complications developed, such as a hernia near the incision site.

Another important point Christophersen noted was that known survival outcomes might vary widely among different surgical hospitals. He stressed it is important for practitioners to evaluate success rates at their own facilities so they can communicate accurate expectations to clients.

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