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**Expectations following Colic Surgery**

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**What should I expect following hospital discharge?**

The goal following hospital discharge is to return the gastrointestinal tract to normal function and ensure body wall healing, with the eventual objective to have the horse return to its previous use. Horses need to be monitored closely for long-term complications particularly during the first month and then the first year following colic surgery.

Postoperative colic patients need to be monitored following hospital discharge for: incisional problems; appetite; water consumption; fecal and urine output; body weight; demeanor; and signs of colic. Laminitis is relatively uncommon following colic surgery but can be devastating.

If there is any indication that the horse is not doing well, the horse’s rectal temperature should be taken. Differential diagnoses for a horse with a fever following hospital discharge include incisional infection, salmonellosis or other causes of colitis, pneumonia, viral infection, and rarely peritonitis.

Medication is usually unnecessary following hospital discharge. Antimicrobial drug use should be confined to the peri-operative period. Treatment with NSAIDs is usually discontinued at least 24 hours before to hospital discharge. Some surgeons may treat horses with an incisional infection with antimicrobial drugs; however, any benefit of antimicrobial drugs for resolution of celiotomy incisional infection remains to be shown.

**Incisional care**

Following hospital discharge, patients should have stall rest for 3-4 weeks followed by a stall with a small run for an additional 4 weeks to allow the body wall to heal. Hand walking and grazing should be encouraged during the stall rest period. Horses should then be turned out for an additional 4 weeks prior to commencing training. Light riding can also be performed during this time period if there have been no incisional problems.

The incision should be monitored for signs of infection including excessive edema formation, pain on palpation, and drainage. If incisional drainage is observed following hospital discharge, the area should be prepared and a sample collected for bacterial culture and sensitivity testing. While antimicrobial drugs are not used by many surgeons to treat incisional infection, it is potentially useful to monitor trends for infecting bacteria and antimicrobial sensitivity patterns.
Management of incisional infections involves opening the skin wound to allow sufficient drainage and keeping the surgical site clean. The main complication following incisional infection is hernia formation, which may be managed conservatively.

**Feeding**

Horses should be reintroduced to their regular diet gradually over a period of several days to weeks. Horses should be monitored closely for weight loss or weight gain and the diet modified accordingly. It is common for horses to lose some body weight and condition following colic surgery particularly if they developed postoperative complications. Some horses may require dietary modification following colic surgery depending on the primary lesion and surgical procedure performed including feeding a complete pelleted feed or corn oil to increase body weight.

**What long-term complications should I be monitoring?**

The most common long-term complications are related to recurring gastrointestinal disease and incisional problems including colic, postoperative intraperitoneal adhesions, and incisional hernia formation. Colic occurs in approximately 25-35% of horses following hospital discharge after colic surgery,\(^1,2\) with most horses having sporadic or recurrent colic (3 or fewer episodes) and only a small percentage having >4 colic episodes or with signs severe enough to require hospital readmission (8%) or a second surgery(3%).\(^1,3\) Most colic episodes occur within the first 2-3 months after surgery.\(^3\) Serosanguinous peritoneal fluid, small intestinal obstruction, intestinal resection, and postoperative ileus were associated with signs of colic long-term. Large colon displacements and volvulus have about a 15% recurrence rate.\(^4-6\) If these lesions recur, colopexy, large colon resection, or nephrosplenic space ablation can be performed to prevent recurrence. Importantly, horses with large colon displacement or volvulus that had experienced an episode of colic prior to the episode necessitating surgery were significantly more likely to have an episode of colic after surgery compared with horses that had not experienced a previous colic episode indicating and underlying predisposition.\(^6\) Horses with small intestinal lesions tend to develop complications associated with stenosis at the anastomosis site or adhesion formation. Stenosis can occur typically with side-to-side anastomosis techniques and requires a second surgical procedure with revision of the anastomosis.

Postoperative intraperitoneal adhesions occur in approximately 8% of horses\(^1\) and up to 20% of horses with small intestinal lesions. Severity of pain at admission, serosanguinous peritoneal fluid, small intestinal lesions, intestinal resection, postoperative ileus, incisional complications, and repeat celiotomy are associated with adhesion formation.\(^1\) Adhesions can occasionally be managed medically using analgesic drugs as needed (e.g. flunixin meglumine or firocoxib) and nutritional modification (e.g. pasture and pelleted feed). Horses with persistent signs of colic associated with adhesion formation require either a repeat laparotomy or laparoscopic adhesiolysis.

Incisional infection can also occur as a long-term complication following hospital discharge (typically at ~10-14 days postoperatively), with abdominal hernia formation and adhesions
between the bowel and body wall being the most important long-term complications following incisional infection.

**Long-term survival following colic surgery**

Long-term survival (>1 year) is typically about 80-90% of horses that are discharged from the hospital following colic surgery.\(^1,2\) The survival rates at 6, 12, 24, 36, 48 and 60 months were recently reported to be 95%, 87%, 81%, 77%, 62% and 58%, respectively, in one study,\(^3\) which is about 10-20% lower than that reported previously\(^8-11\) when considering that only horses discharged from the hospital were included in the analysis. Comparison to a similarly aged population that had not undergone colic surgery would provide useful information with regard to the impact of colic and colic surgery on long-term survival. Clinical features associated with decreased long-term survival for horses with large intestinal lesion were increasing age, admission heart rate, admission PCV, re-laparotomy, and resection and for horses with small intestinal lesions, admission PCV, admission TPP, duration of surgery and re LAPAROTOMY.\(^8,9\)

Horses that have long-term problems with colic not surprisingly have a higher long-term mortality compared to horses that do not (26% vs. 12%, respectively).\(^11\) Colic is the reason for euthanasia in the majority of horses following colic surgery (60-70%).\(^1,2\)

**What expectations should my client have for return to use?**

Short-term survival has improved substantially over the past 20 years and is generally good to excellent for horses with most types of lesions. Recent studies have focused not only on long-term survival but also the ability of the postoperative colic patient to return to their intended use including athletic performance. A large majority of horses (86%) resume or start sporting activities after colic surgery, with 84% of owners reporting that horses achieve the same or better performance after surgery.\(^7\) Most horses (68%) perform at their intended use by 6 months following colic surgery and 56% at or above their preoperative performance level.\(^12\) At 12 months following surgery, 76% of horses return to their intended use and 69% at or above their previous performance level.\(^12\) Similarly, 70% of Thoroughbred racehorses return to racing following colic surgery and performed as well as their cohorts from the race preceding surgery from annual quarter (Q) 3 to Q12 postoperatively.\(^13\) Age, admission heart rate, admission TPP, and blood lactate were associated with failure to return to racing following colic surgery.\(^13\) Juvenile Thoroughbreds (< 2 years old) that had a celiotomy were significantly less able to race (63%) than their unaffected siblings (82%), with age at the initial surgery being associated with the percentage of horses racing. However, affected foals that were able to race won as much money, raced as often, and made as many starts as their siblings.\(^14\)

Horses that require surgery for colic during hospitalization for treatment of another performance-limiting problem (e.g., musculoskeletal or upper respiratory tract disease) may not return to their previous level of performance.\(^12\) Laminitis, a relatively uncommon postoperative complication (<1% horses),\(^1\) may also impact the ability of a horse to return to performance.\(^12\) Horses with incisional hernia formation and postoperative diarrhea are less likely to return to their intended use by 6 months.\(^12\) A similar percentage of horses with salmonellosis (75%) return to their intended use postoperatively compared to horses that did not have salmonellosis (81%).\(^2\) Based on this data, owners should not be discouraged from performing colic surgery on athletic horses.
and every effort should be made to prevent complications that may limit a horse’s ability to return to their previous performance level, the most important of which is likely early surgical intervention.

**How can I prevent colic in the future?**

Prevention of colic is a challenge facing equine veterinarians and horse owners. Some horses appear to be either predisposed or at high risk for recurrent problems with colic. Recurrent colic was reported to occur in 37% of horses within 1 year of a colic episode, with approximately 12% of horses with recurrent colic requiring surgery and 12% requiring euthanasia. Recurrent colic was associated with known dental problems and aerophagia (crib-biting or windsucking). In another study, 44% of horses showing signs of colic were reported to have had colic previously, 11% within the previous year. With the improved short-term survival following colic surgery, recurrent colic is becoming an increasing focus and highlights the importance of obtaining an intestinal biopsy in horses with recurrent signs of colic. In any horse with a history of recurrent colic that undergoes colic surgery, 2-3 full-thickness biopsies should be taken for histological evaluation. Biopsies can be taken using an 8 mm biopsy punch and the site closed using 2-0 or 3-0 synthetic absorbable suture material using a cruciate suture which is oversewn with a Cushing suture pattern.

In general, allowing horses access to a well managed pasture, feeding good quality hay, access to fresh water at all times, dental care, strategic deworming, avoiding sand ingestion, minimizing stereotypic behavior such as aerophagia, and making any changes to the diet or exercise regimen gradually over time are likely important preventive measures.

Recently, the importance of colonic microbiota has been investigated with an observed increase in lactic-acid producing bacteria (Bacillus-Lactobacillus-Streptococcus) in grain-fed horses and horses with colic caused by simple colonic obstruction/distention compare to horses fed grass only.  

Gastrointestinal parasites have long been associated with colic. While the importance of Strongylus vulgaris has declined with the use of ivermectin-based anthelmintics, tapeworms, cyathastomes, and ascarids are considered to play a role in some causes colic. Despite conflicting results in the literature, using a targeted deworming program is likely important in colic prevention in some horses.

Exercise regimen has been associated with colic. Some of the key findings have included: (1) an increased risk of colic in horses being exercised at least once a week compared to those turned out with no ridden exercise; (2) simple colonic obstruction/distention associated with a recent change in a regular exercise program, particularly in the week following change, and (3) the association between intensive exercise and gastric ulceration. Horses that have been subject to recent stall confinement do appear to be particularly predisposed to colic. Horses that spend all of their time in a stall are at increased risk of colic when compared to horses at pasture. More hours spent in a stall were also associated with increased risk of simple colonic obstruction/distention, particularly in the 14 days following a change in housing, and a large increase in risk was observed in horses stalled > 19 hours/day.
Epidemiological studies have indicated that horses should be kept at pasture, allowed free access to water, provided good quality hay, and not fed concentrates which is generally in conflict with the athletic demands placed on this species. Future studies should be directed toward optimizing diet and management for performance while maintaining gastrointestinal function. Dental care is recommended as a component of a colic prevention program, along with a targeted deworming program. As part of any colic prevention program, particular attention should be paid to risk factors for colic in specific geographical areas and preventative measures undertaken that are relevant to these regions.


References
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