Key Points

- Recent advances in diagnosis and treatment
- Risk factors for complications and survival

Lactate measures in horses with Colic

Lactate has been used for several decades as a prognostic indicator, which reflects poor perfusion and shock. As a single measurement it is not always predictive since resuscitation may successfully alter the blood volume and perfusion. In a recent report measurement of lactate after recovery from anesthesia found a significant increased risk of complications after surgery when post recovery lactates were > 6.5 mmol/L. Lactate concentrations >7 mmol/L after recovery had 11.27 times the risk of death than those with a lower lactate concentration.

Serial measurements of peritoneal fluid lactate can help classify the disease severity. In a study by Peloso and Cohen peritoneal fluid lactate concentrations were significantly increased one to six hours after the initial measurement of peritoneal fluid lactate concentrations in horses with strangulating lesions compared to non-strangulating lesions. Peritoneal fluid lactate concentrations which increase from less than 4.0 mmol/L to more than 4.0 mmol/L had a 61.7 greater chance of having a strangulating lesion. Using the serial detection of a lactate increase was highly sensitive compared to detecting strangulating lesions based on a single lactate measurement at admission.

Comment: The use of serial lactate analysis is valuable to detect strangulating lesions but should not be used exclusively to determine the need for surgery.

Medical management of large colon displacement

Surgery for large colon displacement is often delayed to attempt medical treatment specifically for colon entrapment in the nephrosplenic space. Use of exercise, analgesia, sedation and phenylephrine are effective for treating left dorsal displacement (LDD) in a high percentage of cases. Recently medical treatment for large colon displacement including right dorsal displacement (RDD) has been shown to be highly effective. Medical treatment was successful in sixty four percent of horses with RDD and 76% of horses with LDD.

Comment: Because the initial decision to treat suspected colon displacement medically is based primarily on the rectal or ultrasound examination and not a definitive diagnosis, monitoring of the horse for signs of bowel comprise is needed during medical therapy so surgery, if needed, can be completed in a timely manner.

Risk of recurrent colic

Horses experiencing a colic episode are approximately 3 times more likely to suffer another episode compared to a horse that never had colic. The annual rate for recurrent colic can be as high as 50% when considering both owner and veterinarian reported colic. There is a higher risk for horses with dental problems or horses that crib-bite or “windsuck”. In this particular study 12.5% of horses with recurrent colic episodes required surgery.
Comment: Though there are proposed mechanisms for colic in horses with aerophagia, dental problems and adhesions after surgery, the cause for a majority of the recurrent colic episodes remains unknown.

Myenteric ganglia inflammation
Colic has been associated with myenteric ganglionitis and loss of myenteric nerve cells and is known to occur in intestine exposed to prolonged obstruction of the large colon. It is not clear if the ganglionitis is a cause of the motility dysfunction or if the intestinal distention causes inflammation in the ganglia. The subsequent loss of neurons may predispose the intestine to motility disorders. The possibility that ganglionitis can cause or prolong colic is illustrated in the paper by Blake et al. and further suggests primary ganglionitis can be associated with and potentially cause colic.6

Comment: Colic due to primary ganglionitis is thought to be rare, but examination of the myenteric plexus in biopsies and necropsies for inflammation is not common so the incidence is unknown. This is an area that needs more study to determine if myenteric ganglionitis is associated with the high rate of repeat colic episodes.

Mechanical injury to the intestine
Manipulation of normal intestine has long been associated with serosal damage and can lead to adhesions. In fact local inflammation of the intestine including neutrophil migration into the serosa and altered motility has been observed in rats and humans after intestinal manipulation. Serosal and mucosal irritation of the large colon caused migration of granulocytes toward the lumen and increased neutrophil migration in the submucosa and serosa.7 Furthermore, experimental manipulation of the small intestine increased colonic mucosal eosinophilic infiltration.

Comment: Inflammation occurs in the intestine distant from the primary area of distention or strangulation. This systemic effect is hypothetically a response to cytokine production in response to the primary injury. The severity of the inflammatory response is difficult to assess at surgery because the reaction continues during the postoperative period. The use of systemic anti-inflammatory drugs is warranted to nullify the expected response in the unaffected bowel particularly if it was manipulated during surgery.

Survival after surgery for small intestinal disease
Freeman reported the survival after discharge for horses that had surgery for small intestinal strangulating lesions.8 Quoted from his abstract at the 2011 Colic Research Symposium “Horses that had no resection had similar long-term survival data as horses that had jejunoccecostomy or jejunojejunostomy, but were less prone to colic after discharge. Data for colic and mortality after discharge were similar for jejunoccecostomy and jejunojejunostomy.”

Comment: The difficulty in determining viability of a segment of strangulated small intestine is still a major challenge. This work suggests that when surgeons are unable to make definitive decisions about viability, the decision for resection does not affect survival.

Hospitalization and colic
Based on unpublished data the frequency of colic in hospitals is higher than the general population. A change in diet, chronic use of NSAID’s and colic in horses treated for eye problems are cited as reasons for the increased incidence. A retrospective study by Patipa et al. found a high colic rate in horses hospitalized for eye problems.9 There was a significant
association with age, length of hospitalization and atropine administration. However, when multivariable analysis adjusted for age and hospitalization the association with atropine administration was no longer significant.

Comment: One of the parameters difficult to measure but hypothetically associated with colic in hospitalized horses is acute reduction in exercise, change in diet, and NSAID administration. Pain is also can also affect intestinal function and should be considered a potential risk factor for colic.

Incisional infections

The reported frequency of abdominal incision infection after surgery for colic ranges between 7 and 37% of cases. Variable risk factors have been identified including duration and severity of colic; fever; endotoxemia; suture pattern; and surgical trauma. A recent study concluded that shaving the incision site increases the risk of infection while use of an abdominal bandage decreases risk. In another study pre-surgical and intra-surgical cultures of the incision were rarely positive, whereas a positive cultures after recovery were associated with subsequent incisional drainage.

Comment: Decreasing incisional trauma and contamination during the recovery period is important to minimize incisional infections. An alternative for wound protection during recovery is needed.

Intestinal Anastomosis

Security and function are necessary for a successful outcome after small intestinal anastomosis. In an in vitro experiment bursting pressures or intraluminal diameter were not significantly different when comparing an in vitro single continuous Lembert suture pattern and a two layer closure combining a simple continuous and Cushings pattern. When the same suture techniques were compared in clinical cases with comparable diseases, postoperative outcome for ileus and survival were not different.

Comment: Use of #00 polyglactin 910 suture with an MH needled placed in a Lembert pattern that engages the submucosa and inverts the serosa is faster and just as effective as a two-layer closure with less possibility of stricture.

References