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COLIC SURGERY OF THE SMALL AND LARGE INTESTINE - PREOPERATIVE CONSIDERATIONS AND TECHNIQUES

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Summary

Preoperative management of acute abdominal pain in the horse is one of the greatest challenges faced by the equine clinician. It is well accepted that the vast majority of horses with colic will respond to an initial treatment or improve spontaneously. A smaller percentage will respond to more intensive or prolonged medical treatment. A minor but critical percentage will require surgical intervention as the best or only possible treatment. It requires vigilance, to determine as early as possible this minority, as to escalate diagnostics and treatment. Timely decision making will maximize outcome success and minimize patient suffering.

Decision making regarding the acute abdomen is straight forward when the evidence is either black or white, it results in the gray zone that require the greatest efforts in diagnostics and client communication.

Evaluation of the acute abdomen can be divided into several major decisions.

1) Is the horse surgical at this time?

2) If the horse is not surgical at this time, what is the best treatment and monitoring program to implement?

3) If the horse is surgical, what needs to be done before surgery to insure minimal duration and risk of the anesthesia and maximal success of the operation?

Diagnosis

History and signalment

It is important to bear in mind the three basic decisions that need to be made. Specific questioning aimed to discover any recent changes in management can provide possible causes for the onset of abdominal pain. Changes in feeding or watering, housing, exercise or stress level as well as medication should be determined. Inquires should always be made about deworming history and previous; illness, colic ,and abdominal surgery.

Signalment is important in helping the clinician prioritize rule outs for acute abdominal pain. When combined with history a list of likely conditions can be constructed. It should be appreciated that no single aspect of history, physical exam or diagnostic test should be the sole determinant, regarding surgical treatment of the acute abdomen. It is through timely acquisition and integration of all pertinent aspects regarding the horse, owner and veterinarian that these decisions arise. That being said there are several sets of signalment and history combinations that can be helpful during the decision making process. The following colic scenarios are examples of isolated bits of history and signalment leading to presumptive diagnosis. With these horses the presumptive diagnosis is held till proven otherwise. A brood mare within 90 days of foaling presents with severe acute abdominal pain (colon torsion). A miniature horse presents with abdominal distention and lack of fecal output (small colon impaction). An adult horse of normal to obese body condition from the Southwestern U.S. with a history of mild to moderate colic and passing mineral oil but no feces (enterolith). An old horse with a history of a high heart rate and serosanguineous abdominocentesis (strangulating lipoma).

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Physical examination

Clinical observation

Observation allows rapid assessment of the current overall condition of the horse allowing prioritizing of diagnostics and treatments. Sweating, muscle fasciculations and abrasions of the head reflect a serious condition. Horses restrained in stocks may not show behavioral signs of pain as well as when they free to move about. Briefly putting the horse in a stall or small paddock for observation will offer the best means to assess behavioral alterations.

Signs of Pain

Evaluation of pain is a very important factor regarding indications for surgical treatment.

Abdominal pain is often rated as mild, moderate or severe and intermittent or continuous. These grades are subjective at best but can be stratified roughly in the following way. When in severe pain a horse is usually uncontrollable and is a danger to itself and the people around them. The pain behavior takes president over everything and the horse's actions cannot be altered with even a marked outside stimulus. Horses in severe pain either do not respond to routine analgesics at all or for only 3 to 5 minutes. Moderate pain is often manifested by repetitive, almost stereotypical behavior patterns, but these actions can usually be interrupted for varying periods of time by distracting the horse, such as by handwalking or hauling in a trailer. Usually responds to analgesics for 2 to 4 hours. Mild pain is inconsistent in presentation and is usually half-heartily displayed and is easily altered by outside stimuli. Generally abates for 8 to 12 hours after analgesic treatment.

Determination of temperature, pulse and respiration are vital to the evaluation of the colic patient. Elevation of body temperature not attributable to physical exertion should be thoroughly explored as surgical lesions of the gastrointestinal tract seldom are a cause. In general a body temperatures greater than 102 ˚F indicates an infectious or inflammatory cause of abdominal pain. Heart rate is variable and not always proportional to the degree of abdominal pain expressed. Heart rate often is more indicative of cardiovascular status rather than pain. A horse with severe pain from a colon torsion may have a heart rate of 40 bpm whereas a horse exhibiting depression may have a heart rate of 100 bpm, related to a segment of devitalized small intestine. Heart rate as well as pulse quality and the color and perfusion of mucous membranes give a good indication of cardiovascular status. It is important to remember that one of the most crucial aspects of pulse character is the mean pressure which is best estimated by the amount of finger pressure required to occlude the artery. This is not necessarily related to how obvious the pulse is, which is more a reflection of the difference between the systolic and diastolic pressures.

Auscultation

Absence of normal intestinal sounds clearly implicates abdominal dysfunction. Although abdominal sounds ausculted are often classified as hyperactive, decreased or absent they can also provide information from their character. Determination of increased or decreased sounds can be achieved within a minute but complete abdominal auscultation for quality and quantity requires a minimum of 5 minutes as some colon contractions require several minutes between cycles. In addition to allowing adequate time for auscultation it is very important that auscultation is performed in a very quiet area, this is often a limiting factor both in the field and hospital environment. Horses with impending enteritis often have a gas/fluid sound with a tinkling quality. Horses with gastrointestinal sand can have auscualtable “sand sounds” generated from the sand particle friction during intestinal contractions. These sounds are best heard on the ventral abdomen, 4-12 inches caudal to the xiphoid. Sand sounds have a crescendo, decrescendo sound from the Doppler effect generated by the propulsive colonic contractions. Sand sounds have been compared to the sound heard in a sea shell or like the sound generated from slowly rolling a paper bag containing sand. In order for sand sounds to be ausculted

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there must be at least several pounds of sand present, the sand containing bowel must be in contact with the abdominal wall and intestinal contractions must be present.

In addition to spontaneous sounds, sounds can also be generated from percussion. This is most useful in determining areas of intestinal tympany, especially of the large colon and particularly in the right paralumbar fossa, detecting tympany of the cecum. Percussion of the entire area of tympany and on both sides of the abdomen can provide an indication as to the degree of distention and provide information on intestinal segments beyond the reach of transrectal palpation.

Rectal examination

Two primary questions should be answered during transrectal palpation of the caudal abdomen. What degree of intraabdominal distention is present. If distention is present is it primarily in the large or small intestine? Additional information may be obtained during rectal palpation, examples are enteroliths of the transverse or small colon, Left dorsal displacement of the large colon, Inguinal ring herniation, abdominal masses (mesenteric abscesses, neoplasia, uterine or broad ligament hematoma etc).

Table 1: transrectal palpation

1. Transrectal landmarks
    a. ventral band of cecum
    b. duodenum
    c. spleen
    d. left kidney
    e. bladder, inguinal rings/ uterus
    f. pelvic flexure + -
    g. Mesenteric root
2. impactions
3. gas distended loops of bowel
4. enteroliths, sand, masses
5. edema
6. displacements preventing access to landmarks

Nasogastric intubation

Nasogastric intubation is one of the few methods available to evaluate the quality and quantity of stomach contents. Nasogastric incubation is important from several standpoints. It is often one of the first procedures performed on a horse exhibiting abdominal pain. As gastric distention causes marked pain and gastric rupture could be imminent, high priority is indicated. The largest tube that can be passed should be used. This corresponds to a tube with a 1/2 inch I.D. and 3/4 inch O.D. for a 1,000 lb horse. A large tube is indicated as the coarse nature of gastric contents can occlude the tube preventing accurate detection of reflux. It is also preferable to use a large tube with a single opening at the end. Tubes with the additional side openings have a tendency to clog and cannot be completely cleared by retrograde flushing. Not only is intubation important to detect reflux but also to allow gastric lavage. The stomach should be generously lavaged until clear effluent is obtained. It can be difficult to determine if the stomach is truly empty, and endscopy or ultrasound should be employed if there is doubt. It is advantageous to empty the stomach to prevent fermenting feed, due to intestinal stasis, from progressing aborally. It is also best to have the stomach empty if surgery is performed, to prevent gastro-esohageal reflux and extra diaphragmatic pressure during dorsal recumbency and anesthesia.

Sym. 9-2/2

Clinical pathology

Blood evaluation of the acute abdomen includes a complete blood cell count (CBC) and a chemistry panel. The minimum preoperative blood data prior to emergency surgery should be the packed cell

volume (PCV) and total plasma solids (TS or TP). The most important baseline data to measure is PCV, TP, creatine, blood urea nitrogen (BUN), glucose, WBC, and electrolytes (sodium, chloride, potassium and calcium). Baseline blood work is important in monitoring the clinical progress in the postoperative phase. Besides value as baseline data, blood evaluation may indicate organ dysfunction, or inflammatory responses, that may alter interpretation of the clinical signs and the treatment.

Abdominocentesis

Abdominocentsis is performed in all horses not responding to routine medical treatment. The only exception are horses in extreme pain where surgical treatment is clearly indicated and requested. In these horses abdominal fluid can be collected at surgery for evaluation. A rapid field evaluation technique is to attempt reading print through the fluid containing collection tube. Normal fluid is transparent and allows easy viewing of the print. WBC count and total protein: should be <8000 and < 2 gm/dl

Table 2: Decision for surgery

1. transrectal indications (distention / edema,displacement, enterolith)
2. persistent pain
3. serosanguineous abdominocentesis
4. persistent gastric reflux
5. absence of intestinal sounds
6. rapid or progressive physiologic deterioration

Once the decision for surgery has been made, final preparations by the surgical team of the patient and operating room are performed. The horse is supported as needed with pain medication and IV fluids, electrolytes, acid-base therapy and perioperative antibiotics. Whenever possible the abdomen should be clipped and scrubbed prior to induction of anesthesia. Once the horse is under general anesthesia and the surgical site is sterilely prepped and draped, a midline celiotomy is made and a rapid but through sweep of the abdomen is performed. Decompression and evacuation of bowel is often required to complete the examination. Following the surgeon's discovery of the pathology involved, a operative plan is derived. Besides decompression and evacuation of ingesta, the most common operative techniques include; repositioning of the large colon and resection and anastomosis of the small intestine. Operative success is directly related to; being presented, intestinal pathology that is correctable with surgery and starting with a horse in acceptable physiologic condition.

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