Clinical Triage for Gastrointestinal Disorders (16-Dec-2003)

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Abstract

It is frequently difficult to make a definitive diagnosis for a horse with colic. A large number of colic cases are classified as simple colic where a specific diagnosis is subjective or never made. Because determining the need for surgery or intensive care is often critical to the horse’s survival, the diagnostic scheme is geared toward categorizing the disease and using specific signs to help determine the appropriate treatment. Often the physical examination finding and the horse’s response to the initial treatment can help decide whether the horse needs further medical treatment or immediate surgery. The decision for referral is not always an easy one, particularly when clients have economic limits. Because survival of horses with strangulating and obstructive diseases that require surgery is directly related to early recognition and treatment, the decision about the possible need for surgery or the need for immediate intensive care should be made as early as possible.

Diagnostic Criteria

Historical Information and Risk Factors

Using risk factors can help to categorize a disease process in some horses. The following risk should be kept in mind when assessing a horse with colic to help categorize the disease.

Gender - Risk factor for certain diseases.

- Stallion: Inguinal hernia.
- Mare: Large colon volvulus or displacement just before and after foaling.

Age - Some diseases are more common at particular ages.

- Foals, weanlings, and yearlings: Less likely to have colic.
- Neonates: Increased risk of meconium impaction. Weanlings and yearlings: Prone to ileocecal intussusception.
- Horses >12 years old: More likely to have strangulating lipoma.

Breed Predisposition

- Arabians: Found to have a higher risk of colic in some studies.
- Standardbred, Saddlebred, Tennessee Walking horses, and Warmblood stallions: More prone to inguinal hernias.
- Thoroughbreds: Have a higher risk of colic overall (NAHMS 1998).
- Paint foals from overo mares: Can have a recessive genetic trait causing aganglionosis of the intestine, which causes functional obstruction.

Owner Observations - Initial observations (before colic is noticed) often include depression, poor appetite, decreased frequency of defecation, lagging behind the herd, and more frequent recumbency. It is important to document colic duration and the amount of pain:

- Long period of mild pain: More likely to be a simple obstruction
Severe colic with rapid progression: More likely to be due to a strangulating lesion or severe distention.

Owners often know about changes in diet, environment, activity, transport, or treatments, which may be related to the horse’s colic. A thorough history is imperative to ferret out these seemingly innocent changes. Exposure to toxic compounds can cause colic and owners should be questioned about this possibility.

Other Factors

- Evidence of trauma to the head or body may indicate a previous episode of severe colic.
- Recurrent colic during feeding may indicate colic from gastric ulcers.
- Severe pain changing to depression is often the result of a gastric rupture or enteritis with endotoxemia. Some strangulating diseases such as a strangulating lipoma can mimic these clinical signs.
- Evidence of excessive medication administration, exposure to sand or fine gravel, excessive feeding of grain, poor forage quality, and inconsistent feeding or exercise routines are all suspected of increasing the risk of colic.
- Prior surgery for colic increases the risk of a future colic often due to adhesions or mesenteric constriction.

Physical Examination

The physical examination should be thorough and completed in a specific order for all cases so as not to miss important information.

Pain - Determine the severity. This may require releasing the horse in a stall or paddock to allow all signs to be observed. Physical signs that are displayed by the horse with colic include:

- Pawing: Front limb pawing at the ground with no specific target. The horse is often observed staring at the ground.
- Rolling: Different from when a horse scratches its back. Rolling is often violent, with a horse rolling on its back and staying in that position for seconds to minutes.
- Stretching as if to urinate (but no urine produced): Repeated posturing makes it evident that the horse is not going to urinate.
- Kicking at abdomen: This repeated activity is often seen with cramping, circling, and dropping the hindquarters as if the horse is going to lie down.
- Turning the head toward the flank: This is not directed at a specific site but is a general posturing due to visceral pain. A horse may select one side or turn the head to both sides.
- Frequent recumbency: A horse stays recumbent longer than normal and gets up and down several times in 15 - 30 minutes.
- Curling the upper lip: Evidence of discomfort. May be seen with a horse backing into corner of stall.
- Twisting head: Posturing with head in abnormal positions may be seen at the same time as lip curling.
- Dog-sitting position: A sitting position with the front feet stretched out is a rare sign seen when the stomach is distended. The position helps take pressure off the diaphragm and stomach.

Figure 4. - To view this image in full size go to the IVIS website at www.ivis.org.

- Playing in water: Horses may appear to be drinking but often they submerge the nose and splash water with their lips.
- Lack of fecal output/constipation: Horses with lack of fecal production often have small dry fecal balls. This may be an indication of a colon impaction but can also be present in diseases requiring immediate surgery.
- Bloat: Distension of the abdomen due to gas or fluid accumulation during obstruction and strangulation obstruction.
- Sweating: Seen with severe pain or shock due to a sympathetic release.
- Bruxism: Grinding of the teeth seen with chronic pain such as ulcers.

Temperature - Temperature is usually normal in simple colic, obstruction, or strangulation and abnormally increased (>102°F) with enteritis or peritonitis.

Pulse - The pulse is often normal early in the disease or in simple colic. The pulse can go up with pain but is more consistently increased with dehydration, shock or massive distention.

- Pulse rate may be near normal in horses with severe pain early in the disease.
- Pulse rate may be increased due to severe distention, which causes a lack of venous return to the heart.
- Pulse will be weak or "thready" in horses with shock or severe distention.

Respirations - Respirations can be increased due to pain, restriction of diaphragm, and metabolic acidosis.

Mucous Membrane (mm) Color - The mm color reflects the cardiovascular status and is directly related to the prognosis:

- Pale with sympathetic nervous system stimulation and dehydration.
- Brick red with the initial phase of endotoxic shock.
- Cyanotic with marked increase in refill time indicates severe shock and poor perfusion.

Mucous Membrane Refill Time

- Normal: 1 - 2 seconds
- Slight dehydration: 3 seconds
- Moderate to severe dehydration or shock: >4 seconds

Gastric Reflux - Obstructions in the stomach and small intestine cause blockage of the fluid normally secreted and passed to the cecum and colon. Horses rarely reflux fluid on their own, so the stomach fills with fluid and gas to the point of rupture. Simple obstruction, ileus, small intestinal enteritis, and strangulation obstruction can cause reflux from the stomach. Though less frequent, fluid can accumulate in the stomach of horses with distention of the colon if the colonic distention is sufficient to obstruct duodenal outflow or if pain is severe enough to cause ileus. Passage of a stomach tube must be completed in all horses with colic. In some cases it is life saving and will provide immediate relief by releasing the distension and preventing stomach rupture.
A siphon must be initiated when attempting to get reflux from a horse’s stomach. Using suction from a pump or dose syringe will not always allow fluid to flow from the tube. Once placed in the horse’s stomach, the tube is filled with water and then the end lowered below the level of the horse’s stomach to initiate free flow of any fluid. This is done 2 to 3 times to ensure that there is no retention of fluid in the horse’s stomach. The examiner needs to keep track of how much water was placed in the stomach and how much reflux fluid was retrieved.

**Abdominal Auscultation** - The bowel sounds heard during auscultation originate predominately from the large bowel (cecum and large colon). These include mixing sounds and sounds from propulsive movements. During simple obstruction, pain may be related to hearing a progressive peristalsis whereas strangulation causes cessation of all motility.

- Mixing sounds every 5 - 10 seconds indicate short duration.
- Progressive motility every 30 - 120 seconds, 10 - 15 seconds long, moves from one part of the abdomen to another, and increased during eating, is reduced with obstruction, and is reduced or absent during ischemia or distention.
- Normal sounds may be present from colon during small intestinal disease.
- Increased sounds may be spasm against obstruction or resolution of ileus.

**Percussion** - Rarely of benefit in locating organs, this can detect tympany of the cecum or large colon. A pinging sound heard during percussion over the right paralumbar fossa occurs during cecal tympany.

**Rectal Examination** - Examination of the abdomen per rectum should be performed in consideration for the safety of the horses, handler and veterinarian. The rectal examination helps detect distention and abnormal bowel positioning. The most common findings are distended small intestine due to obstruction or enteritis or a distended large colon or cecum due to impaction, tympany, and/or displacement. In all cases the abnormal bowel distention or position are an indication of bowel obstruction, which requires treatment.

**Steps during transrectal palpation:**

1. Allow rectum to relax around arm prior to deep palpation.
2. Palpation in a clockwise direction.
3. Attempt to palpate all fixed structures (spleen, left kidney, cecal taenia, small colon, pelvic inlet).
4. Examine for malposition.
5. Examine for distention.
6. If possible, identify the affected segment of the intestine.

**Technique:** The horse should have a twitch applied and/or a sedative administer ed. Restraint in stocks or using a leg rope may be appropriate for difficult horse but the danger to the horse and the examiner should be considered. Approximately 60 ml Carbocaine® can be of injected into rectum to reduce straining and provide some relaxation. Specific structures, which one should attempt to identify during normal rectal palpation, include:

- Spleen: Fixed position on the left side against the abdominal wall.
- Left kidney: Fixed just axial to the spleen and attached to the dorsal body wall.
• Cecum: The cecal base is fixed and taenia (bands) can be palpated on the right side of the abdomen.
• Pelvic flexure: Not always palpated as it can move within the abdomen; it is usually just below and on the left side of the pelvic brim.
• Small colon: Normally identified by the presence of fecal material.
• Urogenital organs
  o Mare: Bladder, uterus, and ovaries
  o Stallion: Inguinal rings.

**Abdominocentesis** - Abdominocentesis is indicated for horses that do not respond to routine medical treatment. Completed with a needle or teat cannula, fluid is aseptically aspirated or drained from the abdominal cavity. Gross appearance should be clear yellow. Serosanguineous color is an indicator of bowel injury, most likely strangulation. Large numbers of white blood cells (WBC) are indicative of peritonitis, and contamination with bacteria and particles of ingesta indicate bowel rupture.

![Figure 6. A teat cannula is inserted on ventral midline into the peritoneal cavity to obtain fluid. The technique should be aseptic. - To view this image in full size go to the IVIS website at www.ivis.org.](image)

**Normal Features**

- Color: Clear yellow.
- Cell number and type: Up to 3000 WBC/µl 60% neutrophils/40% mononuclear.
- Total protein (TP): 0.7 - 1.2 g/dl.

**Specific Findings**

- Simple colic, ileus, spasmodic colic: Normal fluid.
- Simple obstruction: Increased protein.
- Peritonitis/thrombotic colic: Increased protein and WBC.
- Strangulation: Increased protein, WBC, RBC, bacteria+.

![Figure 7. Bacteria within neutrophils indicate migration of bacteria through injured intestine into the abdominal cavity. - To view this image in full size go to the IVIS website at www.ivis.org.](image)

- Colitis: Normal fluid.
- Anterior enteritis: Increased protein.
- Ulceration: Normal fluid.
- Abdominal surgery, enterocentesis, and castration: Increased protein and WBC may be present (cells are not degenerate unless sepsis is present).

![Figure 8. - To view this image in full size go to the IVIS website at www.ivis.org.](image)

Fecal contamination with bacteria from a ruptured stomach or intestine, a rectal tear, or an inadvertent enterocentesis. If fecal material with massive numbers of bacteria is observed, a second paracentesis distant from the first site should be done to rule out an enterocentesis.
Laboratory Findings - In most cases laboratory tests are not helpful in making a diagnosis in cases of equine colic. Neutrophilia may indicate a mesenteric abscess or peritonitis. Neutropenia may implicate acute enteritis as the reason for the pain. In most cases of colic the CBC is normal. In some cases of colic particularly lactating brood mares serum calcium is low. In most cases of colic the blood pH is normal or slightly increased. In cases of strangulation or in horses in shock the blood is acidic. Helpful tests include:

- PCV and total protein: Hydration status.
- CBC: Infection (neutrophilia) or endotoxemia (neutropenia).
- Blood gas (arterial): Acidosis is evidence of shock.
- Electrolytes: Low calcium is prevalent in horses with obstructions and strangulations.
- Lactate: Evidence of anaerobic metabolism, which occurs with shock.

Examination of the serum for specific enzymes may help diagnosis differential diseases that look like colic:

- Muscle: Creatine phosphokinase (CPK).
- Liver: Sorbitol dehydrogenase (SDH), gamma-glutamyltransaminase (GGT).
- Kidney: Creatinine (may be increased with simple dehydration).

Ancillary Diagnostic Methods

Ultrasound - Helpful for diagnosing distended small Intestine, bowel in the renosplenic space, inguinal hernia, cholelith, adhesions, bowel wall thickness, diaphragmatic hernia.

- Small intestinal distention, ileus, and wall thickening are present with obstruction. Small intestine is normally motile and has a wall thickness of 2 - 3 mm.
- Dorsal displacement of the left colon in the renosplenic space can be diagnosed with ultrasound.
- Small intestine in the chest (diaphragmatic hernia) and vaginal tunic (inguinal hernia).
- Sand in the large colon.
- Edema of the large colon or cecal wall.
- Excess fluid with fibrin in the fluid can be present in peritonitis.

Radiographs

- Distended intestine including the stomach, small intestine, cecum, and large colon can be identified in foals.
- Use contrast studies in foals to time gastric emptying and via the rectum to outline meconium.
- Radiographs may be helpful in identifying enteroliths.

Figure 9. Multiple fluid lines in this radiograph identify loops of small intestine in a foal abdomen indicating small intestinal obstruction requiring surgery. - To view this image in full size go to the IVIS website at www.ivis.org . -

Exploratory surgery

Often needed to make a specific diagnosis.
Gastroscopy - Ulcers.

Laparoscopy

- Chronic colic.
- Condition of bowel as a prognostic indicator for strangulation lesions.
- Adhesions.
- Not all abdominal contents can be visualized.
Differential Diagnoses
Other diseases can cause colic-like behavior.

- Liver: Liver failure/dysfunction, choleliths.
- Musculoskeletal: Rhabdomyolysis, laminitis.
- Urogenital: Uterine torsion, testicular torsion, bladder calculi, renal calculi, pyelonephritis, ruptured bladder, cystitis, hematoma of the broad ligament.
- Respiratory: Pleuritis.
- Spleen: Splenomegaly.

Specific Signs Indicating Surgery (Table 1)

- Pain: Surgery indicated in cases of persistent pain that cannot be controlled with analgesics.
- Temperature: Increased in cases of enteritis, which does not require surgery; however, an increased temperature may be seen in some surgical cases. The temperature is usually normal in other diseases that may require surgery.
- Heart rate, mm, packed cell volume, TP: These signs help determine the patient’s cardiovascular and hydration status. In most cases signs of shock are linked to either complete obstruction or strangulation or to enteritis, however by themselves changes in these signs do not indicate the need for surgery.
- Nasogastric reflux: If present, there is a high likelihood that small intestine is obstructed by a disease that requires surgical treatment. Reflux can also be caused by ileus or anterior enteritis, which can most often be treated medically.
- Auscultation: Reduced or absent intestinal sounds (lack of progressive peristalsis) are common in surgical diseases. If borborygmi do not return after treatment, consider the disease more serious, possibly requiring surgery.
- Rectal examination: Determine if distention is indicative of obstruction of the intestines. Any abnormal distention or abnormal positioning of intestine, which has no accompanying diagnosis, is most likely caused by a surgical lesion.
- Peritoneal fluid: If abnormal abdominal fluid is present, bowel injury requiring surgery is usually present. If the fluid is normal but other physical signs indicate that surgery is necessary, the bowel injury is probably early with no changes in abdominal fluid. This is the best time to do surgery.
- Response to analgesics: Colic should be abolished if analgesic therapy is successful. If signs of pain recur in 1 - 2 hours after administration of xylazine, detomidine, or flunixin meglumine, there is an increased likelihood that a surgical lesion is present.
- If in doubt: If you can’t decide whether surgery is necessary, it probably is; the horse should be referred for a second opinion at a surgical facility.

Early signs in all diseases: Frequently, physical signs such as heart rate and mm color and laboratory values will be normal at the onset of colic. The parts of the examination that are most helpful in the early period are observation of pain, rectal examination, and abdominal auscultation. Disregard normal values for heart rate, mm color and refill, and peritoneal fluid if pain and rectal findings indicate surgery.

<table>
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<tr>
<th>Indications for Surgical and Medical Treatment of Colic*</th>
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<tr>
<td><strong>Indications for Surgical intervention for diagnosis and or treatment</strong></td>
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<tr>
<td>Pain</td>
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<td>Gastric reflux</td>
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<td>Rectal examination</td>
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<td>Auscultation</td>
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<td>Peritoneal fluid</td>
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## Indications for Surgical and Medical Treatment of Colic*

### Contraindications for Surgical Intervention of the Equine Acute Abdomen

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<tbody>
<tr>
<td>Pain</td>
<td>No pain or depression</td>
</tr>
<tr>
<td>Temperature</td>
<td>&gt;102.5°F</td>
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<tr>
<td>CBC</td>
<td>Neutrophilia or neutropenia (&lt;3000/µl)</td>
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<tr>
<td>Auscultation</td>
<td>Progressive intestinal sounds</td>
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*These signs are generalizations and may not fit individual cases.

### Referral procedure

1. Know the directions to and procedures of the referral hospital.
2. Provide detailed history and treatment to date.
3. Provide adequate analgesia for the duration of the trip.
4. Administer treatments for shock and antibiotics if necessary prior to transport.
5. Prepare owner for costs and need for prepayment of a portion of estimate.
6. Refer early and hope for a trailer ride cure.

## References


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