

## **DIAGNOSIS OF EQUINE COLIC**

A diagnosis can be made and appropriate treatment begun only after thoroughly examining the horse, considering the history of any previous problems or treatments, determining which part of the intestinal tract is involved, and identifying the cause of the particular episode of colic. In most instances, colic develops for one of four reasons: 1) The wall of the intestine is stretched excessively by either gas, fluid, or ingesta. This stimulates the stretch-sensitive nerve endings located within the intestinal wall, and pain impulses are transmitted to the brain. 2) Pain develops due to excessive tension on the mesentery, as might occur with an intestinal displacement. 3) Ischemia develops, most often as a result of incarceration or severe twisting of the intestine. 4) Inflammation develops and may involve either the entire intestinal wall (enteritis) or the covering of the intestine (peritonitis). Under such circumstances, proinflammatory mediators in the wall of the intestine decrease the threshold for painful stimuli.

The list of possible conditions that cause colic is long, and it is reasonable first to determine the most likely type of disease and begin appropriate treatments and then to make a more specific diagnosis, if possible. The general types of disease that cause colic include excessive gas in the intestinal lumen (flatulent colic), simple obstruction of the intestinal lumen, obstruction of both the intestinal lumen and the blood supply to the intestine (strangulating obstruction), interruption of the blood supply to the intestine alone (nonstrangulating infarction), inflammation of the intestine (enteritis), inflammation of the lining of the abdominal cavity (peritonitis), erosion of the intestinal lining (ulceration), and “unexplained colic.” In general, horses with strangulating obstructions and complete obstructions require emergency abdominal surgery, whereas horses with the other types of disease can be treated medically.

The history of the present colic episode and previous episodes, if any, must be considered to determine whether the horse has had repeated or similar problems or whether this episode is an isolated event. The duration of the present episode, the rate of deterioration of the horse's cardiovascular status,

the severity of pain, whether feces have been passed, and the response to any treatments are important pieces of information. It is also critical to determine the horse's deworming history (schedule, treatment dates, drugs used), when the teeth were floated last, if any changes in feed or water supply or amount have occurred, whether or not the horse is a "cribber," and whether the horse was at rest or exercising when the colic episode started.

The physical examination should include assessment of the cardiopulmonary and GI systems. The oral mucous membranes should be evaluated for color, moistness, and capillary refill time. The mucous membranes may become cyanotic or pale in horses with acute cardiovascular compromise and eventually hyperemic or muddy as peripheral vasodilation develops later in shock. The capillary refill time (normal ~1.5 sec) may be shortened early but usually becomes prolonged as vascular stasis (venous pooling) develops. The membranes become dry as the horse becomes dehydrated. The heart rate increases due to pain, hemoconcentration, and hypotension; therefore, higher heart rates have been associated with more severe intestinal problems (strangulating obstruction). However, it is important to note that not all conditions requiring surgery are accompanied by a high heart rate.

An important aspect of the physical examination is the response to passing a nasogastric tube. Because horses can neither regurgitate nor vomit, adynamic ileus, obstructions involving the small intestine, or distention of the stomach with gas or fluid may result in gastric rupture. Passing a stomach tube may, therefore, save the horse's life and assist in diagnosis of these conditions. If fluid reflux occurs, the volume and color of the fluid should be noted. In healthy horses, it is common to retrieve <1 L of fluid from the stomach.

The abdomen and thorax should be auscultated and the abdomen percussed. The abdomen should be auscultated over several areas (cecum on the right, small intestine high on the left, colon lower on both the right and left). Intestinal sounds associated with episodes of pain may indicate an intraluminal obstruction (eg, impaction, enterolith). Gas sounds may indicate ileus or distention of a viscus. Fluid sounds may indicate impending diarrhea associated with colitis. A complete lack of sounds is usually associated with adynamic ileus or ischemia. Percussion helps identify a grossly distended segment of intestine

(cecum on right, colon on left) that may need to be trocarized. The respiratory rate may be increased due to fever, pain, acidosis, or an underlying respiratory problem. Diaphragmatic hernia is also a possible cause of colic.

The most definitive part of the examination is the rectal examination. The veterinarian should develop a consistent method of palpating for the following: aorta, cranial mesenteric artery, cecal base and ventral cecal band, bladder, peritoneal surface, inguinal rings in stallions and geldings or the ovaries and uterus in mares, pelvic flexure, spleen, and left kidney. The intestine should be palpated for size, consistency of contents (gas, fluid, or impacted ingesta), distention, edematous walls, and pain on palpation. In healthy horses, the small intestine cannot be palpated; with small-intestinal obstruction, strangulating obstruction, or enteritis, the distended duodenum can be palpated dorsal to the base of the cecum on the right side of the abdomen, and distended loops of jejunum can be identified in the middle of the abdomen.

A sample of peritoneal fluid (obtained via paracentesis performed aseptically on midline) often reflects the degree of intestinal damage. The color, cell count and differential, and total protein concentration should be evaluated. Normal peritoneal fluid is clear to yellow, contains  $<5,000$  WBCs/ $\mu$ L (most of which are mononuclear cells), and  $<2.5$  g of protein/dL.

The age of the horse is important, because a number of age-related conditions cause colic. The more common of these include the following: in foals—atresia coli, meconium retention, uroperitoneum, and gastroduodenal ulcers; in yearlings—ascarid impaction; in the young—small-intestinal intussusception, nonstrangulating infarction, and foreign body obstruction; in the middle-aged—cecal impaction, enteroliths, and large-colon volvulus; and in the aged—pedunculated lipoma and mesocolic rupture.

Ultrasonographic evaluation of the abdomen may help differentiate between diseases that can be treated medically and those that require surgery. The technique also can be applied transrectally to clarify findings noted on rectal palpation. In foals, echoes from the large colon and small intestine are commonly identified from the ventral abdominal wall, whereas only large-colon echoes are usually seen in adult horses. The large colon can be identified by its

sacculated appearance. The duodenum can be identified in the tenth intercostal space and traced around the caudal aspect of the right kidney. The jejunum is rarely identified during transabdominal ultrasonographic examination of normal adult horses, whereas the thick-walled ileum can be identified by transrectal examination.

The most common abnormalities identified by ultrasonography include inguinal hernia, renosplenic entrapment of the large colon, sand colic, intussusception, enterocolitis, right dorsal colitis, and peritonitis. Stallions with inguinal hernia have incarcerated intestine on the affected side; it is possible to identify the intestine and to obtain information concerning the thickness of its wall as well as the presence or lack of peristalsis. In horses with renosplenic entrapment of the large colon, the tail of the spleen or the left kidney cannot be imaged, or the gas-filled large colon is present in the caudodorsal aspect of the abdomen in the region of the renosplenic space. Horses with sand colic have granular hyperechoic echoes originating from the affected portion of the colon. The characteristic finding in horses with intussusception is the “bull’s eye” appearance of the affected portion of the small intestine. Very often the intestine proximal to the intussusception is distended, and the strangulated portion is thickened. Horses with enterocolitis frequently have evidence of hyperperistalsis, thickened areas of the bowel wall, and fluid distention of the intestine. In contrast, horses with right dorsal colitis commonly have marked thickening of the wall of the right dorsal colon. In horses with peritonitis, the peritoneal fluid may be anechoic, or there may be evidence of flocculent material and fibrin between serosal surfaces of the viscera.