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Understanding the Anatomy of the Equine Gastrointestinal Tract: Look How Far We Have Come!

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Take Home Message

The diagnosis of conditions resulting in clinical signs of abdominal pain in the horse requires a well-founded understanding of the anatomy and physiology of the horse’s gastrointestinal tract. This knowledge will facilitate interpretation of findings obtained during rectal examinations and transabdominal ultrasonography.

Introduction

The term “colic” simply means abdominal pain, but is used to describe a variety of conditions that cause horses to exhibit clinical signs that we associate with abdominal pain. In order to make a diagnosis and initiate the appropriate treatment, veterinarians must understand the most clinically relevant aspects of the anatomy of the horse’s gastrointestinal tract. This presentation will review this topic, while paying particular attention to the use of this information in clinical practice.

For its size, the horse has a relatively small stomach, with a capacity of about 8 to 10 L. The stomach is positioned on the left side of the abdomen beneath the rib cage. Because the junction between the distal esophagus and the cardia functions as a one-way valve, gas and fluid can pass into the stomach from the small intestine but cannot get out. As a result, conditions that interfere with the normal aboral movement of gas and fluid through the small intestine can cause severe dilation, pain and possible stomach rupture. Although the stomach cannot be palpated per rectum and can be difficult to identify on radiographs, it can be evaluated by transabdominal ultrasonography.

The duodenum, jejunum and ileum make up the small intestine, with the duodenum being positioned dorsally on the horse’s right side. It is attached to the dorsal body wall in this region by a thin mesentery that is approximately 3-5 cm in length. As a result, the duodenum cannot be involved in displacements, volvulus or strangulation of the small intestine. After passing around the base of the cecum in the right flank region, the duodenum turns toward the midline. If the duodenum is distended with gas or fluid, as often occurs in horses with proximal enteritis, it can often be identified on rectal examination in the right caudal abdomen.

The jejunum, which is estimated to be about 70 feet in length in most adult horses, is characterized by a long, wide mesentery that permits loops of this part of the small intestine to rest on the cecum and large colon in the ventral part of the abdomen. As a result of its length and long mesentery, the jejunum can be involved in small intestinal incarcerations and volvulus. At its distal end, the wall of the small intestine becomes markedly more muscular and thicker, which
reduces the size of its lumen. This portion of the small intestine, the ileum, is approximately 1.5 feet long and joins the cecum on its dorsomedial aspect. The ileocecal fold that passes from the antimesenteric side of the ileum to the dorsal band of the cecum readily identifies the junction of the ileum and cecum. This ileocecal fold is used during colic surgery to locate the ileum.

The next part of the horse’s gastrointestinal tract is the cecum, which is a large, blind-ended fermentation vat that is positioned primarily on the horse’s right side. The cecum extends from the right flank region to the xiphoid cartilage on the horse’s ventral midline. The cecum holds approximately 30-L of feed and fluid, and is the primary site where the ingesta mixes with the microorganisms that are capable of digesting cellulose. Because the cecum is attached to the dorsal body wall, primary displacement or twisting of the cecum does not occur very often. The cecum may become impacted, which results in a tight medial cecal band and, in severe cases, gas and fluid distention in the right caudal abdomen.

Ingesta leaves the cecum through the cecocolic orifice and passes into the right ventral colon, which is located on the ventral aspect of the abdomen from the flank region to the rib cage. At the level of the sternum, the colon turns toward the left side as the left ventral colon. Both ventral colons are divided into sacculations that help mix and retain plant fibers until they are digested. The left ventral colon passes caudally to the left flank area, where its diameter decreases substantially and the colon then folds back on itself. This portion of the colon, the pelvic flexure, is the initial portion of the unsacculated left dorsal colon. The junction between the left ventral colon and pelvic flexure, where the decrease in diameter is pronounced, is the most common site for impactions.

The diameter of the dorsal colon increases as it becomes the diaphragmatic flexure and then is maximal in the dorsal colon. A short intercolic fold connects the right ventral and dorsal colons, and the right dorsal colon is attached to the body wall by a mesenteric attachment that is common with that of the base of the cecum. However, neither the left ventral nor the left dorsal colons are attached directly to the body wall, and thus can easily become displaced or twisted.

The ingesta leaves the right dorsal colon and passes into the transverse colon, which has a much smaller diameter of ~10-cm. The transverse colon, which is attached firmly to the dorsal aspect of the abdominal cavity by a strong, short, fibrous mesentery, is located cranial to the cranial mesenteric artery. Finally, the ingesta enters the sacculated descending or small colon, which is 10-12 ft in length.

There are several natural openings or spaces within the horse’s abdominal cavity that can be involved in conditions causing colic. The inguinal canal is a natural opening in stallions through which small intestine might pass and become strangulated. Similarly, the epiploic foramen, a natural opening bounded by the caudal vena cava, portal vein, and caudate lobe of the liver can be the site of small intestinal incarcerations. Finally, the space between the dorsal aspect of the spleen and the left kidney, which is created by the renosplenic ligament, creates a shelf over which large colon can become displaced.

References


The author is one of the developers of the Equine Colic CD developed and sold by The Glass Horse Project, www.3dglasshorse.com.