

ABDOMINAL DISTENTION IN THE ADULT HORSE



BASICS

DEFINITION

Process by which the abdomen becomes enlarged, changing its normal contour and shape.

PATHOPHYSIOLOGY

The accumulation of fluid, gas, or ingesta in the peritoneal cavity, presence of abdominal masses, increased size of abdominal organs, or abdominal wall abnormalities such as edema may result in the distention and/or change in shape of the abdominal contour.

SYSTEMS AFFECTED

- GI—any condition, physical or functional, resulting in the vascular or nonvascular obstruction of the GI transit may lead to accumulation of gas and ingesta, resulting in abdominal distention
- Cardiovascular—secondary to GI obstruction, fluid sequestration and accumulation may lead to a hypovolemic shock. Vascular compromise of the GI tract leads to decreased GI protection, access of bacteria and/or toxins to the systemic circulation, and extravasation of a transudate/exudate into the peritoneal cavity. Intra-abdominal blood loss (hemoperitoneum) may occur from trauma or rupture of mesenteric or other (i.e. uterine, renal, ovarian) vessels due to increased traction or trauma (e.g. during foaling), from any other abdominal viscera (e.g. rupture of the spleen, liver, or ovarian follicle or cyst), or ascites secondary to heart failure. Electrolyte abnormalities from endotoxic shock or uroperitoneum may lead to secondary arrhythmias and death. Alterations in oncotic or hydrostatic pressure may also lead to edema on the peritoneal cavity or intramurally in the intestinal wall
- Respiratory—abdominal distention may lead to increased pressure of the diaphragm, resulting in a shallow and fast respiratory pattern associated with atelectasis and hypoventilation due to failure of the alveoli to open. Occasionally rupture of the diaphragm resulting in internal entrapment and obstruction of the GI tract may be the initiating cause. In this case the presence of abdominal viscera in the thorax prevents the lungs from fully expanding, compounding the effects that pain and distention may have on the respiratory system
- Musculoskeletal/nervous/ophthalmic/skin—these systems may be injured through self-inflicted trauma secondary to abdominal pain. In cases of abdominal wall hernias, produced by trauma or lack of muscular tone with an eventual muscle rupture in older horses, the GI tract may become incarcerated, leading to its obstruction and potentially its vascular compromise, further promoting

abdominal distention. Lack of condition and fitness may over time lead to loss of abdominal muscular tone

- Reproductive—advanced pregnancy, either single or twin, will result in a marked change in the abdominal contour. Occasionally uterine torsion may be responsible for altered abdominal contour. Hydrops and ruptured of the prepubic tendon can be seen in pregnant mares and will manifest as change in the abdominal contour

SIGNALMENT

- All horses without exception may develop abdominal distention
- Pregnant mares may develop hydrops (any time during pregnancy), uterine torsion (mid-term), uroperitoneum (postpartum), or rupture of the mesocolon (postpartum), leading to hemoperitoneum and large colon torsion (peripartum)
- Rupture of the prepubic tendon occurs in older, sedentary mares in late pregnancy
- Miniature horses are predisposed to development of fecaliths, enteroliths, and small colon impactions
- Older horses are predisposed to pedunculating lipomas causing intestinal obstruction and are overrepresented in the incidence of tumors leading to hemoperitoneum, such as mesotheliomas, splenic hemangiosarcomas, and renal carcinomas
- Geographic distribution is important to consider the incidence of selected conditions such as ileal hypertrophy (southeast USA), enteroliths (south USA), and sand impactions (south USA)
- Uroperitoneum occurs mostly in male horses as a result of a ruptured bladder or urethra

SIGNS

Historical Findings

The clinical progression should help differentiate between vascular and nonvascular GI obstructions and other non-GI causes of distention.

Physical Examination Findings

A careful evaluation of clinical progression, historical facts, and of the horse including all systems may provide the information to determine the nature of the distention. Rectal examination, although practical, inexpensive, and quick, may not give a complete picture of the entire abdomen and may become less important if access to a good US machine and technique are possible.

CAUSES

Accumulation of Gas

- Functional obstruction—primary or secondary ileus. Primary ileus due to increased sympathetic drive. Secondary ileus due to pain (visceral or musculoskeletal), ischemic necrosis (e.g. verminous arteritis) post surgery, electrolyte abnormalities (e.g. endurance horses), dehydration,

inflammation of the bowel (enteritis) or abdominal cavity (peritonitis), and sedative or anesthetic drugs (e.g. α_2 agents, opioids)

- Physical obstruction: either vascular (large colon volvulus, mesenteric root volvulus, strangulating lipoma) or nonvascular (impaction, enteroliths, nephrosplenic entrapment)
- Cecal tympany from abnormal cecal motility patterns
- Excessive feed stuff fermentation—grain overload
- Free gas within the abdominal cavity secondary to trauma or anaerobic infections
- Colitis

Accumulation of Fluid

- Hemoperitoneum—ruptured viscera, vessel, ovarian cyst/follicle or tumor
- Uroperitoneum—ruptured bladder secondary to trauma, or obstructive urolithiasis
- Hydrops amnion or allantois
- Ascites—peritonitis, neoplasia, hypoproteinemia, right-sided heart failure
- Colitis or enteritis—secretory process leading to accumulation of fluid in lumen of large colon or small intestine
- Cecal impaction with fluid due to abnormal motility patterns
- Pyometra/mucometra

Solid Mass

- Abscess
- Neoplasia—lymphosarcoma, squamous cell carcinoma, mammary adenocarcinoma, mesothelioma, hemangiosarcoma, renal carcinoma, ovarian granulosa cell tumor

Body Wall Abnormality

- Hernia
- Prepubic tendon rupture

RISK FACTORS

- Cribbing predisposes horses to tympany of the colon and epiploic foramen entrapment
- Gastric ulcers predispose horses to gastric rupture
- Sudden exposure to large amounts of carbohydrate-rich feed or diets consisting of increased proportions of highly fermentable feedstuff (especially whole-grain corn) and decreased amounts of roughage can predispose to gastric, cecal, large colon tympany, and large colon displacement or volvulus
- Colonic impactions often occur in horses that are old or debilitated or that have poor dentition or in horses eating a diet with a large amount of fiber or following water deprivation
- Sudden change in physical activity or sudden stall rest imposed by another injury may lead to cecal or large colon impaction
- Sudden change of diet, even hay batch, has been associated with colic and abdominal gas distention
- Enterolithiasis occurs frequently in the states of California, Florida, and Indiana

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(CONTINUED)

- Sand impactions are seen frequently in the southern and coastal states
- Ileal hypertrophy has been associated with ingestion of Bermuda grass hay
- Periparturient mares are at increased risk of large colon volvulus, particularly if it has happened before
- Miniature horses are predisposed to small colon impactions
- Overconditioned and old horses are predisposed to strangulating lipomas



DIAGNOSIS

DIFFERENTIAL DIAGNOSIS

Differentiating Similar Signs

Other conditions with the appearance of abdominal distention include:

- Marked subcutaneous edema along the ventral abdomen and thorax
- Pregnancy—diagnosis may be made via rectal palpation with or without ultrasonography
- “Hay belly”—may be diagnosed on history (malnourished, old, or nonfit horses or severely parasitized horses, diets high in poor quality roughage) and by fecal examination
- Pendulous abdomen secondary to pituitary adenoma and Cushing disease—usually accompanied by other distinctive signs, such as abnormal haircoat and failure to shed winter coat
- Extreme obesity—ribs not palpable, fat deposits evident along crest of neck, over tail-head, etc.
- Subcutaneous emphysema from penetrating chest wound, ruptured trachea, or subcutaneous anaerobic infection—characteristic crepitus noticed on palpation of the skin

Differentiating Causes

Signalment, history, physical examination, laboratory work, rectal palpation, and US examination findings often provide sufficient information to permit a tentative diagnosis. Some conditions are associated with characteristic findings:

- GI gas accumulation (bloat)—reduced GI sounds may be heard, and increased gaseous distention may be identified on percussion as a hyperresonant sound colloquially termed “ping”; depending on the inciting cause and the degree of distention present, various degrees of abdominal pain are present. Hypermotile sounds can also be auscultated in cases of spasmodic colic, which can be associated with an excessive amount of gas being produced
- Ascites from right-sided heart failure—tricuspid insufficiency results in findings including heart murmur, exercise intolerance, jugular distention and pulse, and

edema of the ventral abdomen, pectoral muscles, and distal limbs

- Ascites from intra-abdominal mesothelioma—because this tumor originates from the fluid-producing cells of the peritoneum, several liters of peritoneal fluid may be produced within a 24 h period; ascites may be more dramatic than is noted with other conditions
- Body wall defect from prepubic tendon rupture—one of the only causes of unilateral abdominal distention in the horse; also results in cranioventral positioning of the mammary gland, cranial tilting of the pelvis, and severe ventral abdominal swelling
- Presence of diarrhea may point towards colitis or enteritis. Evaluation of nasogastric reflux may be useful in this situation

CBC/BIOCHEMISTRY/URINALYSIS

Results are dependent on the cause. It is important to assess PCV, TP, and WBC, including a differential evaluation of WBC.

OTHER LABORATORY TESTS

- Abdominocentesis should be performed carefully in pregnant mares with intestinal distention, where the bowel may be torn easily by inadvertent penetration with a needle or teat cannula despite proper restraint.
 - Abdominal lactate content when compared with systemic circulating lactate may offer valuable information toward the diagnosis of a vascular obstruction
 - WBC count, TP level, and specific gravity of the peritoneal fluid should be measured, and the fluid should be assessed cytologically for evidence of degenerate neutrophils, neoplastic cells, bacteria, or plant material
 - Other parameters such as Cr may also be measured in cases where uroperitoneum is suspected. In cases of uroperitoneum, Cr in the peritoneal fluid exceeds serum Cr levels by a ratio of > 2:1
 - An increase in WBC count and TP levels and the appearance of degenerate neutrophils are indicative of increasing inflammation within the abdomen
 - With hemoperitoneum, free-flowing blood may be evident from the needle or teat cannula during the centesis procedure. This should not be mistaken for puncture of the spleen during the procedure, in which case the PCV of the obtained sample is higher than the circulating blood

IMAGING

- Abdominal radiography may help to diagnose gas accumulation within bowel segments in small horses and ponies. Enteroliths or sand impactions may be evident in adult horses in the mid- to ventral abdomen on the lateral view
- US of the abdomen can be useful in skilled hands and can be used to identify the

location, amount, character, and echogenicity of peritoneal fluid and abdominal viscera, particularly thickness of the intestinal wall. It can also provide information on the condition of the heart, liver, spleen, kidney, and bladder, and can help identify the presence of intra-abdominal adhesions or masses

OTHER DIAGNOSTIC PROCEDURES

- Laparoscopy allows visualization of the abdominal cavity in the standing horse, and can be used to provide a definitive diagnosis of the cause of abdominal distention. It can be used in selected cases (i.e. peritonitis, ruptured bladder) to direct appropriate therapy and treatment. In the presence of GI distention the ability to identify the nature of the obstruction may be compromised
- Exploratory laparotomy through a flank incision in the standing horse is very limiting and should only be performed in selected cases as a therapeutic intervention if a confirmed diagnosis such as nephrosplenic entrapment or uterine torsion has been made
- Exploratory laparotomy through a ventral midline incision in the anesthetized horse should not be delayed unnecessarily as it may be a life-saving diagnostic and therapeutic tool if used appropriately



TREATMENT

- Specific treatment is largely dependent on the cause of abdominal distention. Cardiovascular stabilization through rehydration and correction of electrolyte and acid-base abnormalities should be initiated prior to treatment of the primary disease process
- In horses with severe gaseous distention, trocarization of the cecum and/or large colon may be necessary to improve ventilation and comfort. Although the complications of this procedure are reportedly very low, it is associated with peritonitis and any horse that is trocarized should be treated preemptively with anti-inflammatory drugs and broad-spectrum antibiotic therapy to reduce and minimize the inherent risk of peritonitis
- Mares with hydrops or rupture of the prepubic tendon may require induction of parturition. Horses with abdominal distention should be confined to a stall and monitored continuously until a diagnosis has been made and appropriate treatment initiated
- Feed should be withheld from horses showing any signs of abdominal discomfort
- Prompt and adequate referral to a hospital facility may be required in cases requiring surgical intervention or prolonged nursing care

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**MEDICATIONS**

Drug therapy is dictated by the inciting cause.

**FOLLOW-UP**

Plans for monitoring are based on cause and treatment.

**MISCELLANEOUS****ASSOCIATED CONDITIONS**

N/A

AGE-RELATED FACTORS

N/A

PREGNANCY/FERTILITY/BREEDING

- Termination of pregnancy may be indicated in mares with hydrops or nonresolving uterine torsion
- Induction of parturition may be necessary in mares close to term that have experienced rupture of the prepubic tendon. These mares should be monitored carefully and parturition attended as they may require assistance with delivery due to their inability to perform effective abdominal press for fetal expulsion

SYNONYMS

Bloat

SEE ALSO

- Acute adult abdominal pain—acute colic
- Colic, chronic/recurrent
- Oral stereotypic behavior

ABBREVIATIONS

- Cr = creatinine
- GI = gastrointestinal
- PCV = packed cell volume
- TP = total protein
- US = ultrasonography, ultrasound
- WBC = white blood cell

Suggested Reading

Sanchez C. Disorders of the gastrointestinal system. In: Reed S, Bayly W, Sellon D, eds. *Equine Internal Medicine*, 4e. St. Louis, MO: Elsevier, 2017:709–715.

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