

Equine colic

Colic is a general term indicating abdominal pain, It is not a disease but a combination of signs that alert us to abdominal pain in the horse ,However Colic is the single most important cause of death in horses.

Classification ...

According to the location colic classified to

True colic : when the colic arising from digestive system only

False colic : when the colic arising from other than digestive system such as liver ,kidney ,lung ,hoof and so on

According to severity or duration colic were classified to

Mild colic: when the pain and sings are mild and might no need to treatment

Acute colic :when pain lasting for 24-36 h with acute violent sings might cause death .

Chronic colic : when pain lasting for more than 24-36H

Recurrent colic : when the animal feel mild or acute pain but during multiple episodes separated by periods of more then 2 days of normality.

According to the cause colic classified to

Spasmodic colic :

It occur when sharp violent pain caused by spasms of the intestinal walls, with loud gut sounds.

Flatulent colic: Flatulent colic is also known as tympanic or gas colic. This results from excessive gas accumulation in the large intestine. High pitch gut sounds are commonly associated with this type of colic. Flatulent colic is caused by food materials fermenting in the digestive tract, this is commonly seen in horses which are fed large quantities of fermentable food such as rich spring grass.

Obstructive colic :

There are various types of obstructive colic. Strangulation and mechanical pressure on the gut, are potentially the most serious types of colic. This is different to the blockage caused by a mass of food (impaction) or foreign material such as sand in the intestine.

A strangulating obstruction disrupts the blood flow, usually when a piece of the intestine becomes twisted commonly referred to as a ‘twisted gut’.

Obstructive have different types

a- Obstructive and strangulating

The two most lethal causes behind colic in horses are strangulation/torsion (a twist in the gastrointestinal system of a horse) and intussusception (when the intestine slides back into itself, causing blockage). In both cases the blood supply may be partially or more likely, completely cut off, resulting in dead tissue, and the passage of food can be blocked. entrapment, pedunculated lipoma, herniation. are aother causes

b- Non-strangulating infarction

This usually occurs if a blood vessel becomes blocked, usually affecting an artery that feeds sections of the intestine which then dies. Parasites are a common cause of this type of colic.

c- Inflammatory (peritonitis, enteritis) .

Inflammation along any portion of the GI tract can lead to colic. This leads to pain and possibly stasis of peristalsis (Ileus), which can cause excessive accumulation of fluid in the gastrointestinal tract. This is a functional rather than mechanical blockage of the intestine, but like the mechanical blockage seen with simple obstructions, it can have serious effects including severe dehydration. Inflammation of the bowel may lead to increased permeability and subsequent endotoxemia. The underlying cause of inflammation may be due to infection, toxin, or trauma, and may require special treatment in order to resolve the colic.

Ulceration of the mucosal surface occurs very commonly in the stomach (gastric ulceration), due to damage from stomach acid or alteration in protective mechanisms of the stomach, and is usually not life-threatening. The right dorsal colon may also develop ulceration, usually secondary to excessive NSAID use, which alters the homeostatic balance of prostaglandins that protect the mucosa.

Enteritis is inflammation of the small intestine. Diarrhea or scouring are clinical signs commonly associated with this type of colic. **Moreover** Peritonitis is an inflammation of the serous membranes of the peritoneal cavity.

d-Impaction

Impaction can occur at various sites within the digestive tract. This type of colic can be caused by indigestible, dry feed such as unsoaked sugar beet pellets that stick together or swell causing a blockage in the digestive tract. Meconium retention (the first faeces passed by a new born foal) is another cause of impaction colic. Horses with impaction colic usually experience low grade pain for prolonged periods. This colic can last for several days and is potentially fatal if the horse is not treated promptly.

Sand Colic....

Sand colic is a type of impaction that occurs when a horse grazes on grass in dusty soil, often collecting upwards of 30-80 pounds of sand and dirt in its gastrointestinal tract before colicking. Horses in sandy regions are highly susceptible and often require additional preventative measures including supplements and feeding methods that keep hay and grain off the ground.

Colic can also classified according to etiology to...

Physical colic :

When the real causes are related to the type of food (Roughage food or highly digestible green diet), food quantity , inability to digestion because of bad teeth or stress or ulcers of digestive system , decrease intestinal mobility due to Twisting, Intussusception, Ileo-cecal valve impaction , Retended meconium, intestinal Hematoma, mesenteric arthritis and Diaphragmatic hernia.

Functional colic :

It were arising from digestive disturbance follow drinking of cold water in large quantities , or in case of chilling , sever enteritis arising from gastrointestinal infection (bacterial ,viral and parasitic).

Causes

Internal causes ... groups include

- 1-All Intestinal accidents , such as Twisting, Intussusception, torsion, obstructions ,impaction , Strangulation, Mesenteric tension, Pyloric obstruction, lipomas, Ileo-cecal valve impaction, infarctions, proctitis
- 2-Oesophageal obstruction ,hemoglobin uria and hematuria, peritonitis ,pleurisy , laminitis , Rhabdomyolysis, Rupture of prepubic tendon, Pheochromocytoma,
- 3-Urinary system abnormalities and inflammations ,
- 4-Abnormalities and inflammation of liver and Biliary system,
- 5-Splenitis and splenomegaly ,
- 6-Sever enteritis arising from gastrointestinal infection (bacterial ,viral and parasitic),
- 7- Abnormalities of heart and cardio vascular system
- 8-Sever keratoconjunctivitis .
- 9- Enterolithus Fibrous balls, Hair balls

External causes....include

- 1-Types of food
 - a-Consumption of highly concentrate food
 - b-Grain feeding
 - c-Highly indigestible fibrous diet
 - d-Fast digestible green diet
 - e-Sand eating
 - g- Eating of Mouldy and toxic food
- 2-Sever exhaustion because of hard work, Excitement, fair
- 3-Drinking of cold water in large quantities
- 4-Adminstration of oral antibiotics

Pathogenesis ...

The pathogenesis of equine colic is variable depending on the cause and severity of the inciting disease, However there are several features and mechanisms that are common to most causes of colic which include

Pain....

Pain is the important mark of gastrointestinal disease in horses and is attributable to distension of the gastrointestinal tract and stimulation of stretch receptors in the bowel wall and mesentery,

- Gastrointestinal pain has an inhibitory effect on normal gastrointestinal function as will inhibits normal gut motility and function, allowing accumulation of ingesta and fluid, resulting in distension and further pain. Horses can respond very violently to abdominal pain and may injured them selves when rolling or thrashing.

Dehydration...

Dehydration is the loss of water and essential electrolytes for normal body functions resulting in hypovolemia and tissue dehydration .*The effect of dehydration in colicky horses reflected as hyperthermia, dry skin ,rough hair coat , Sunken eyes and Supra orbital fossa. decrease body weight and finally death

Gastrointestinal dysfunction

Colic is almost associated with impaired gastrointestinal function, usually alterations to motility or absorptive function.

- Increased or uncoordinated gastrointestinal motility probably causes pain through excessive contraction of individual segments of bowel or distension of bowel because of the loss of normal propulsive activity.

Ischemia of the intestinal wall

Most forms of lethal colic involve some degree of ischemia of the intestine, with subsequent loss of barrier function, evident in its most extreme form as rupture of the viscus, endotoxemia,bacteremia, cardiovascular collapse and death. Ischemia may be the result of ,impaired blood flow to or from the intestine because of torsion or volvulus of the intestine.

Endotoxemia

Death in fatal cases of colic in which the affected viscus ruptures secondary to distension, or when ischemia and/or infarction damages a segment of bowel wall, is due to the absorption of endotoxins from the gut lumen into the systemic circulation.

Shock

The usual cause of death in severe colic is cardiovascular collapse secondary to endotoxemia and hypovolemia which is due to the loss of

fluid and electrolytes into the lumen of the gastrointestinal tract or loss of protein from the vascular space with subsequent reduction in the circulating blood volume.

Coagulation and fibrinolysis

Severe colic, especially that involving ischemia or necrosis of intestine, is associated with abnormalities in coagulation and fibrinolysis characterized by hyper coagulation of blood and decreases in rate of fibrinolysis. Disseminated intravascular coagulation will result.

Clinical findings.....

Visual examination...

1-Behavior....which characterized by

a-Pain :

- pain is manifested by pawing, stamping or kicking at the belly or by restlessness evident as pacing in small circles and repeatedly getting up and lying down, Other signs include looking at the flank, rolling, and lying on the back. Often the penis is protruded without urinating or with frequent urination of small volumes , Continuous playing with water without drinking.
- The Pain may be continuous or interspersed with similar periods of relaxation.

b- Posture:

- The posture is often abnormal, with the horse standing stretched out with the forefeet more cranial and the hind feet more caudal than normal - the so- called 'saw-horse' stance.
- Some horses lie down on their backs with their legs in the air suggesting a need to relieve tension on the mesentery.

c- Abdomen size

- Distension of the abdomen is an important diagnostic sign . Symmetrical, severe distension is usually caused by distension of the colon, sometimes including the cecum, secondary to colon torsion, or impaction of the large or small colon and subsequent fluid and gas accumulation.

d- Vomiting

- Projectile vomiting or regurgitation of intestinal contents through the nose is very unusual in the horse and is a serious sign suggesting severe gastric distension and impending rupture.

e- Defecation and feces

- in the very early stages of acute intestinal obstruction there may be normal feces in the rectum, and the animal may defecate several times before the more usual sign of an empty rectum with a sticky mucosa is observed.

F- Sever swatting

Physical examination

a-Heart rate and pulse rate ..

- Horses with heart rates less than 40/min usually have mild disease whereas horses with heart rates above 120/min are usually in the terminal stages of severe disease.

b-Respiratory rate..

- The respiratory rate is variable and may be as high as 80/min during periods of severe pain.

c-Mucous membranes

- Mucous membranes of normal horses is pink
- Dehydrated horses have dry mucous membranes
- Horses with impaired cardiovascular function have pale, dry mucous membranes with delayed capillary refill(more than 2 s).
- Endotoxemic horses will have sever red mucous membranes(with peticheal hemorrhage) to bluish with capillary refilling time up to 3 second.
- Terminal stages of disease are associated with cold, purple, dry mucous membranes with a capillary refilling time of more than 3 seconds, However necrosis of the mucosa of the gingival margins of the gums, the so called 'toxic line', is often seen.

d-Examination of extremities

- Cool extremities may be indicative which reflect peripheral circulatory failure.

e- Auscultation of the abdomen

Auscultation of the abdomen can provide useful diagnostic and prognostic information .

- All four quadrants of the abdomen should be examined for borborygmi sound .(upper left reflect stomach ,lower left reflect transverse colon ,upper right reflect coecum ,lower right reflect transverse colon) .
- Continuous, loud borborygmi sounds indicated intestinal hypermotility and spasmodic colic or diarrhea or the very early stages of a small-intestinal obstructive strangulating lesion.
- The absence of sounds, or the presence of occasional high-pitched, brief sounds, sometimes with a splashing character, is consistent with ileus

f-percussion

Percussion of cecum and lower abdominal wall is important for detection of the presence of tightly gas-distended bowel.

g-Rectal examination

A careful rectal examination is probably the most important part of the clinical examination in colic and should not be neglected. The examiner must know the anatomy of the posterior abdomen in order to make accurate decisions about the location of various organs.

- **Small intestinal distension** is evident as loops of tubular structures of up to 10-15 cm diameter fluid-filled tubular balloon that may extend as far caudally as the pelvic canal.
- **Colonic distension, impaction and displacement.** Gas and fluid distension of the large colon is evident as large (> 20 cm) taut structures often extending into the pelvic canal.
- **Impaction** is evident as columns of firm ingesta in the large or small colon.
- **Distension of the small colon** is detectable as loops of tubular structures in the caudal abdomen.
- **Displacement of the large colon** is evident rectally as tight bands extending from the ventral abdomen cranially; dorsally and to the left or cranially; dorsally and to the right in left and right displacements of the colon, respectively.

h-Nasogastric intubation

Passage of a nasogastric tube is an essential part of the examination of a horse with colic because it detect and relief gastric distension.

i-Ultra sonography

To detect small-intestinal distension, ileocecal intussusception, gastric distension, gastric squamous cell carcinoma, diaphragmatic hernia, peritoneal effusion and etc .

j- Radiology

It help to detect enteroliths and sand accumulation

k- Arterial blood pressure

Arterial blood pressure is a very good indicator of the degree of shock in colic.

Clinical pathology

1- Increase PCV

2- Increase total proteins concentration

3- leukopenia and shift to the left might indicate endotoxemia ,peritonitis and enteritis

4-Abnormal coagulation profile include low anti thrombin activity and prolonged prothrombin and activated partial thromboplastin times.

5- Measures of serum electrolyte concentration are important in providing an assessment of the horse's electrolyte status.

Protocol for evaluating a colicky patient

For evaluation the colicky horse for prognosis we have to evaluate

- 1-Evaluation of pulse and heart rate
- 2-Mucous membranes color
- 3-Evaluation of capillary refilling time
- 4- Evaluation of Body temperature
- 5- Evaluation of Respiratory rate
- 6- Evaluation of Intestinal sounds
- 7-Rectal findings
- 8-PCV value

Treatment

Medical treatment ...

Principles of treatment include

- Provision of analgesia which include
- Flunixin meglumine 0.25-1 .0 mg/kg, IV or IM every 8-24 h
Ketoprofen 2.2 mg/kg, IV every 1 2 h
Phenylbutazone 2 .2-4.4 mg/kg, IV or PO every 1 2 h
Dipyrone 0 mg/kg, IV or IM every 4-6 h

- Prophylaxis and treatment of endotoxemia

Polymyxin (5000 IU/kg intravenously every 8-12 h)

Procaine penicillin 10 000IU/kg) for 3 days mixed may be with metronidazole

- Correction of fluid, electrolyte and Acid base abnormalities
Administration of fluid therapy
- Gastrointestinal lubrication or administration of fecal softeners
Mineral oil , 10-15 mL/kg, via nasogastric tube, every 12-24 h
Dioctyl sodium sulfosuccinate (DSS), 12-25 mg/kg, via nasogastric tube, every 24 h
Magnesium sulfate 0.5-1.0 g/kg, via nasogastric tube, in water
- Others treatment

Heparine and aspirin for the treatment and prevention of coagulopathies

Surgical treatment

Surgical correction for removal of the lesions