

Diaphragmatic hernia in a Jeju horse (crossbred) broodmare

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Abstract : Diaphragmatic hernias, whether congenital or acquired (traumatic), are rarely observed in the horse. Acquired diaphragmatic hernias typically occur secondary to trauma or an increase in intra-abdominal pressure due to falling, heavy exercise, or parturition. Diaphragmatic herniorrhaphy is difficult to perform in adult horses and the horses with symptomatic diaphragmatic hernias usually die. A 10-year old, 340 kg, Jeju horse (crossbred) broodmare with sudden onset of gait disorder and a moderate emaciation was examined. Findings on physical examination included conjunctivitis, dehydration, shallow breathing, dyspnea, weaken heart beat, lack of auscultatable sounds from the gastrointestinal tract, and anorexia. Rectal temperature was 38.4°C and respiratory rates were moderately increased. There were slight signs of acute colic. The broodmare died one day after non-specific treatment of fluids, nutriment, antibiotics and non-steroidal anti-inflammatory drug. The cause of death was strangulation of the small intestine through a diaphragmatic hernia. The rent was about 2 cm in diameter and located in the central right part of diaphragm. Around 60 cm of small intestine was protruded into thoracic cavity through the rent. The cause of the hernia could not be ascertained. The broodmare had been pastured with many other horses, and the groom had not noticed any aggressive behavior among them. It was, however, speculated that trauma by stallion's attack may have been the cause of the diaphragmatic hernia, because the new horse may be the object of behaviors ranging from mild threats to seriously aggressive kicking, squealing, rearing, and biting.

Keywords : colic, diaphragmatic hernia, Jeju horse, small intestine, strangulation

Introduction

Reports of diaphragmatic hernias, whether congenital or acquired (traumatic), are rare in the horse [3, 19]. Often the history revealed either sustaining a previous bout of strenuous exercise, being struck by an automobile, or taking a hard fall. Pregnant or recently parturient mares also are at risk for diaphragmatic hernias. In some cases, there is no history of any of the above factors. Colic was the primary presenting complaint in most affected horses [4]. Clinical signs included lethargy and exercise intolerance [6]. Only a few horses presented with respiratory abnormalities but no signs of colic [11, 15].

This case report is the first diagnosed case of the diaphragmatic hernia and describes the clinical features

and characteristic of necropsy in the broodmare.

Case report

A 10-year old, 340 kg, Jeju horse (crossbred) broodmare was examined with sudden onset of hooves abscess and hind limbs lameness at a pasture. The multiparous broodmare had history of abortion in early pregnant period before pasture. She was hospitalized and treated in a animal hospital during two months.

On March 22, she returned to a pasture where 30 mares and a stallion are grazed. Two days later, the mare was found in disorder of gait and a moderate emaciation. Findings on physical examination included conjunctivitis, dehydration, shallow breathing, dyspnea, weaken heart beat and lack of auscultatable sounds from the

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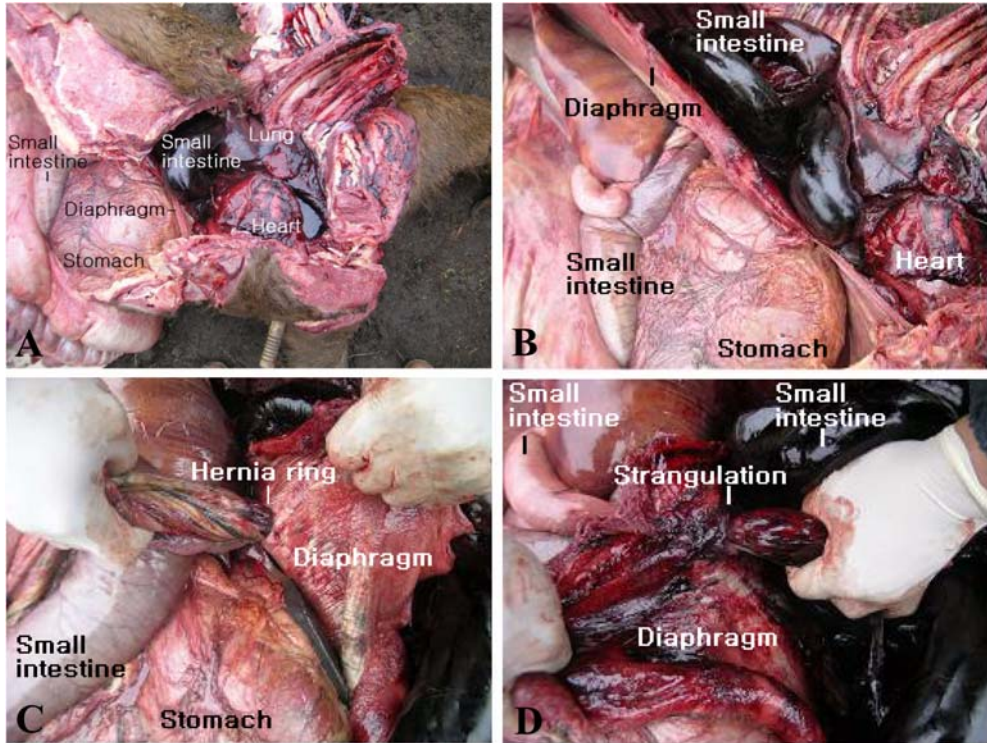


Fig. 1. (A) There is a small intestine in a thoracic cavity. (B) Small intestine strangulated through hernia ring. (C) Small intestine strangulation obstruction. (D) Small intestine strangulation obstruction.

gastrointestinal tract, and anorexia. Rectal temperature was 38.4°C, respiratory rates were moderately increased. There were signs of acute colic including pawing and willing to lay down incessantly. Medical treatment was non-specific: intravenous administration of fluids, nutriment, antibiotics, non-steroidal anti-inflammatory drug without some examinations including clinical pathology, abdominocentesis or ultrasonography. The mare died on next day.

Necropsy revealed the cause of death to be strangulation of the small intestines through a diaphragmatic hernia (Fig. 1). Around 60 cm of small intestine was also in the herniated contents. The rent (hernia ring) was in the central-right part of diaphragm, about 2 cm in diameter. The edge of the lesion were clean suggesting a short duration. No adhesions were present.

Discussion

Pauwels *et al.* [9] reported that horses with retrosternal hernias involving the diaphragm can develop clinical

signs of intermittent obstruction of the large colon and chronic colic. However, in this study, clinical feature was obstruction of the small colon and acute colic.

Diaphragmatic hernias are an uncommon cause of acute abdominal pain in horses [7]. Diaphragmatic hernia is the lowest incidence rate (0.3%) of twenty six specific diseases causing an acute abdomen [18]. Of all colic deaths in Prussian military horses, 0.4% were related to diaphragmatic hernias in the late 1800s and early 1900s. Huskamp had 5 cases among his 785 surgical colic cases (0.6%) [12]. The highest case fatality rate (100%) is stomach rupture. Diaphragmatic hernia is relatively high case fatality rate (66.7%) which make it ninth rank among twenty six specific diseases causing an acute abdomen [18]. There is no sex or breed predisposition, but adults appear to be affected more commonly [7].

The small intestine has been found incarcerated and often strangulated in a number of normal or abnormal openings in the abdomen including the inguinal hernia, umbilical hernia, rents in the jejunal mesentery, the mesoduodenum, the epiploic foramen, the mesocolon,

the gastrosplenic ligament, the diaphragm, the cecocolic ligament, the mesometrium, and renosplenic ligament, and eviscerated through tears in the vagina or through the inguinal canal after castration [2, 10, 16, 20]. The rents may be congenital but are more often related to trauma such as foaling or a blow to the abdomen. The intestine apparently migrates into these openings by its normal movement but becomes trapped when the intestine fills with fluid which can not exit [18].

Both congenital and acquired diaphragmatic hernias have been documented in horses [4]. Congenital hernias result from failure of fusion of the diaphragmatic crus during fetal development or from rupture of the diaphragm during birth, and are usually found in the dorsal aspect of the left crus of the diaphragm [1]. The congenital form is a smooth opening in the left dorsal part of the diaphragm [12]. Congenital diaphragmatic eventration was found in a Thoroughbred stillborn foal [8]. Acquired diaphragmatic hernias are induced traumatically usually by foreign body penetration, compression of the thorax or abdomen, or parturition; and there is often a corroborating history. The onset and severity of clinical signs depends on the size of the defect and the degree of impairment of the herniated organs. The most frequent organs to herniate in decreasing order are small intestine, stomach, large colon, spleen, and cecum. Acquired, traumatic, ruptures of the diaphragm may affect any portion, particularly the tendinous part of the diaphragm and the musculotendinous junction [20].

History and physical examination gave little diagnostic significance. Thoracic ultrasonography or radiography, if available, and exploratory laparotomy were the most useful diagnostic procedures. Diaphragmatic hernias can be repaired in horses [5, 13]. The prognosis for successful surgical repair and recovery was poor [5, 6, 17, 20]. Most diaphragmatic hernias in horses are diagnosed during laparotomy or necropsy [13].

In Korea, Yang had reported a case of a large intestine prolapse associated with uterine rupture in a Thoroughbred broodmare [21]. Horses can achieve race records similar to their siblings and can produce foals without recurrence of signs of diaphragmatic hernia [5, 13].

The cause of the hernia could not be ascertained in this study. The broodmare had been pastured with many other horses, but the groom had not noticed any aggressive behavior among them. It was, however, speculated that trauma by stallion's or the others's attack

may have been the cause of the diaphragmatic hernia. Because the new horse may be the object of behaviors ranging from mild threats to seriously aggressive kicking, squealing, rearing, and biting [14].

This report describes a case of diaphragmatic hernia in a Jeju horse (crossbred) broodmare with the major clinical signs of acute emaciation and colic.

In conclusion, Jeju horse (crossbred) broodmare with sudden onset of gait disorder and a moderate emaciation was examined. Findings on physical examination included conjunctivitis, dehydration, shallow breathing, dyspnea, increased respiratory rate, weakened heart beat, lack of auscultatable sounds from the gastrointestinal tract, acute colicky sign, and anorexia. The broodmare died one day after medical treatment.

Necropsy revealed the cause of death to be strangulation of the small intestines through a diaphragmatic hernia. Around 60 cm of small intestine was also in the herniated contents. The rent was in the central-right part of diaphragm, about 2 cm in diameter. The edge of the lesion were clean suggesting a short duration. No adhesions were present.

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