

## Sudden Death of a Mare Caused by Rupture of Diaphragm

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**Received:** July 15, 2021

**Published:** July 29-2021

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### Abstract

An 11 year old thoroughbred mare was presented in veterinary Clinical Complex of College of Veterinary and Animal Science, Bikaner with a history of abdominal pain. The mare was examined clinically and the condition is diagnosed as colic. The animal was kicking and rolling over the ground due to severe pain and treatment for colic was initiated immediately. Soon after, she was fall down and her respiratory rate increased suddenly and started trembling. She became recumbent and died within 10 minutes. A 22 cm long rent and rupture of the diaphragm was found in post mortem examination. The lungs were completely collapsed and there was severe hemothorax. The cause of death was determined to be hemorrhagic shock and asphyxia due to lungs collapse.

**Keywords:** Diaphragm; Horse; Rupture; Sudden Death

### Introduction

Rupture (also called rents) of the diaphragm is an unusual incidence and rare in the horse. The diaphragm is a muscular sheet that separates the thoracic cavity from the abdominal cavity and associated for breathing. A rupture in the diaphragm causes herniation of abdominal viscera to move forward and occupy the thoracic space. Diaphragmatic injuries can be consequences of penetrating or blunt traumas. Such injuries are induced by an increase in abdominal pressure that may cause diaphragmatic tear and visceral herniation [1]. The tear is painful condition, and the

intestine and other viscera moving out of position causes colic and dyspnoea. The tear of diaphragm is the most common found after a traumatic injury, serious fall, or forceful exercise like jumping and explosive power drills. Diagnosis of this condition can be definitively established at postmortem.

Few reports have been reviewed for diaphragmatic rupture in animals such in a cat [2], caused by road traffic accidents, by a rib fracture in Sika deer [3] as well as in foals [4] or without history of injury.

The accurate pathogenesis is still unknown and tentative in most cases. Affected horses usually have a history of severe exercise, parturition and external trauma. Clinical signs are vague and most of the affected horses mainly showed respiratory distress, tachypnea, tachycardia and severe colic. Diagnosis of diaphragmatic rent and rupture is very challenging and usually, it needs diagnostic modalities that might not be present in the general veterinary practices. In most of the cases treatment is not possible due to hasty death and complicated surgical intervention. However, if treated early in the line of the disease, it usually does not have good prognosis [5].

### Case Description

An 11 year old thoroughbred mare was presented in veterinary Clinical Complex of College of Veterinary and Animal Science, Bikaner, Rajasthan, India with a history of abdominal pain. The mare was used for patrolling to maintain law and order in the Bikaner city by police. The mare was examined clinically and the condition is diagnosed as colic. The animal was showing colicky signs including kicking on belly region, looking back repeatedly, stretching body, restlessness, tachypnoea, wagging of tail and rolling over the ground due to severe pain. There were no sign of external trauma and conjunctival mucous membrane was congested. The treatment for colic was initiated immediately with potent analgesic flunixin meglumine and fluid therapy. But soon after she was turned out, the animal was fall down suddenly. Her respiratory rate increased rapidly and started vigorous trembling. She became recumbent and died within 10 minutes.

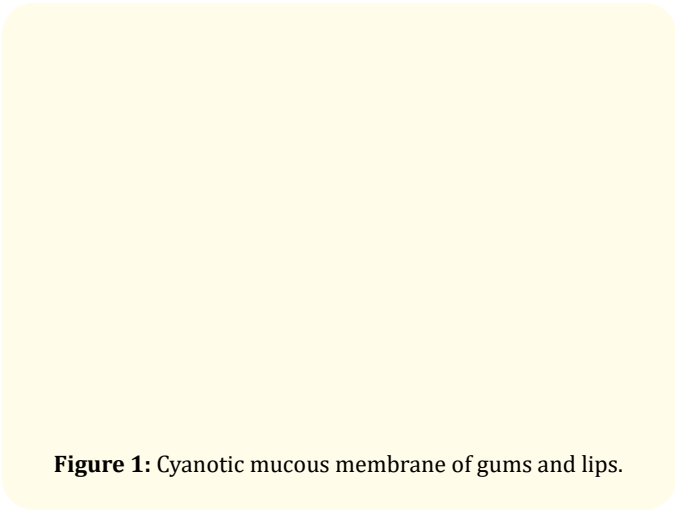
### Post-mortem findings

It was decided to conduct post-mortem immediately to find out actual cause of death of mare. The gastrointestinal tract appeared intact upon opening of the abdominal cavity. There were no intestinal accidents, rupture, strangulation or perforation. The mucous membrane of gums, lips and cheeks was cyanotic (Figure 1). The stomach was empty with necrotized ulcers on mucosa. No lesions were seen in small intestine with normal colour. Large colon and caecum had moderate amount of feed with scattered necrotized ulcers on mucosa. The mucosa of caecum and colon was severely congested and with gas filled (Figure 2). However, there were a few blood clots scattered throughout the abdomen and moderate amount of blood in the abdominal cavity. A 22 cm long rent and rupture of the diaphragm was found in post mortem examination (Figure 3). Diffuse hemorrhagic areas on the diaphragm around the rent were observed and the edges were rough and edematous. The lungs were completely collapsed with ecchymotic hemorrhages and there was severe haemothorax. The rib cage was intact with no

proof fracture so no evidence had noticed of perforation of lungs and diaphragm by broken ribs. The major blood vessels of the thoracic cavity were examined and appeared intact. The cause of death was determined to be hemorrhagic shock and asphyxia due to collapse of lungs.

### Discussion and Conclusion

Case reports of diaphragmatic rupture are rare and unusual in horses. The diaphragm separates the abdomen from the thorax and has an important role in respiration [6]. In humans, the incidence of diaphragmatic injuries ranges from 1% to 7% in cases of blunt trauma and from 10% to 15% in cases of penetrating wounds [1]. In this case, the exact cause of the rupture in mare remains unknown. Diaphragmatic rupture in horses is thought to be associated with trauma or congenital defects [5]. But in this case there was no history and findings indicative of trauma in this mare. This condition might have occurred due to sudden fall down on ground which causes exertion of pressure on diaphragm by the visceral organ of abdominal cavity resulting in rent on diaphragm. Some authors suggested that visceral herniation through the rent, especially after colic attacks that would lead to increased intra-abdominal pressure. In a female zebra Kumar, *et al.* [7] observed moderate amount of blood tinged fluid in the abdominal cavity, severely distended intestine and filled with gas and fluid due to rupture of diaphragm. Many researchers observed the rupture of diaphragm with parts of liver, intestine protruding inside the thoracic cavity [7-10]. Most commonly diaphragmatic defects that lead to clinical signs in adult horses are associated with visceral herniation. Diaphragmatic defects that are not associated with visceral herniation are known to occur in foals and are called diaphragmatic rents. These are usually congenital in origin [5].



**Figure 1:** Cyanotic mucous membrane of gums and lips.

**Figure 2:** Congested and gas filled caecum and colon

**Figure 3:** Rupture of the diaphragm in a horse. Rent which is outlined by arrows. Diaphragm (D), stomach (ST), spleen (S).

### Acknowledgements

The authors are thankful to Incharge VCC, College of Veterinary and Animal Science, Bikaner for providing all necessary facilities.

### Conflict of Interest

The authors of this article do not have any conflict of interest.

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**Volume 3 Issue 8 August 2021**

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