

Diaphragmatic hernia in a horse - a case report

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ABSTRACT

A case of postaccident diaphragmatic hernia in 10-month old filly is discussed in this article. Auscultation and comparatively percussion of the both sides of the chest were performed. The lateral thoracic radiograph and transthoracic ultrasound were done to support the diagnosis. Clinical status and biochemical blood parameters were checked for the assessment of complications. ECG showed a tendency to progressive lessening of R and T wave's amplitude.

Key words: diaphragmatic hernia, horse, electrocardiography, ultrasound

Introduction

Diaphragmatic hernia (DH) may be congenital or acquired. There appear to be few records of congenital defects in horses (KANEPS, 1992). Diaphragmatic hernias are not seen very often and it must be assumed that such spontaneous defects are extremely rare in the horse. Accidental rupture usually occurs from abdominal crushing, following blunt trauma or penetrating injuries to the abdomen and chest.

Occasionally the clinical findings at presentation include lethargy, respiratory difficulties and exercise intolerance (PERDRIZET et al., 1989). A history of previous trauma, natural covering, dystocia or severe exercise often precede the presentation of a horse with a diaphragmatic hernia (BRISTOL, 1986; EVERETT et al., 1992; WIMBERLY et al., 1977).

The only presented clinical signs in horses with herniated small (PERDRIZET et al., 1989) or large (EVERETT et al., 1992) intestines, described in some previous case reports were lethargy and exercise intolerance.

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The diagnosis of DH can be challenging, and thoracic roentgenography is considered to be most diagnostic (aided by administration of barium), showing abdominal organs within the thoracic cavity in acute cases (MAIR and GIBBS, 1989). Transthoracic ultrasound may help to reveal abdominal organs at unexpected locations, but they must be within the penetrating depth of the ultrasonic image. In some cases rectal examination can reveal “emptiness” of the abdomen, depending on the herniated part. The auscultation of the lungs with gastrointestinal sounds at unexpected locations might provide supportive information (GOEHRING et al., 1999). A definitive diagnosis is often obtained during surgery or necropsy.

This report describes a post accident case of a diaphragmatic hernia, in which partial protrusion of abdominal organs into the chest caused difficulty in breathing, tachypnoea and discomfort throughout hospitalisation.

Case history. A 10-month old crossbred filly (250 kg bwt) was presented with a 3 day history of respiratory distress and tachypnoea (30-40 breaths/min). The signs were seen immediately after the horse had been involved in a truck accident. Prior to referral to the hospital no drugs were administered.

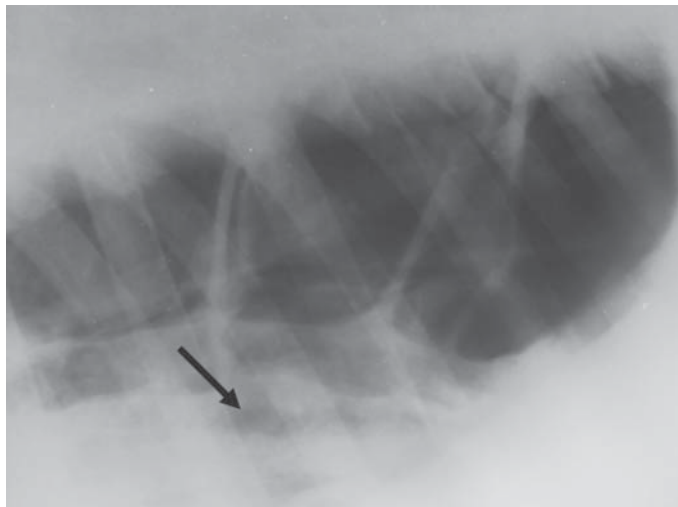


Fig. 1. Radiographic view of the thorax - presence of organs filled with liquid

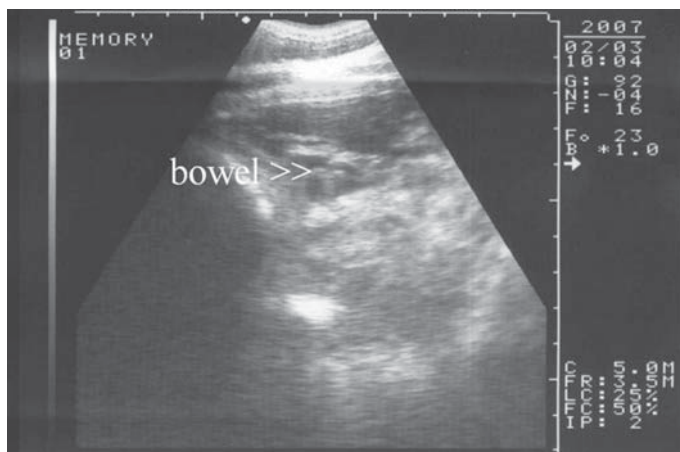


Fig. 2. Ultrasonographic view of the left side of the thorax. Notice the bowel segments with liquid contents within the thoracic cavity.

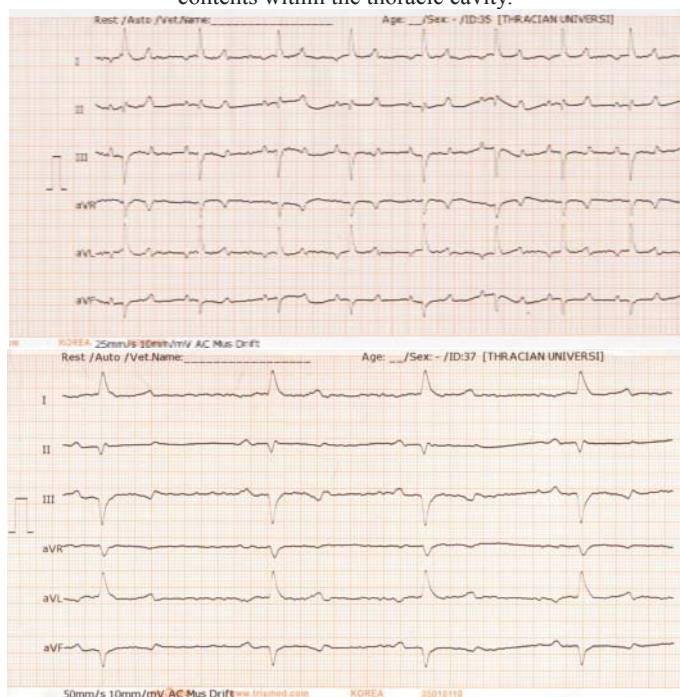


Fig. 3. Electrocardiography

Table 1. Haematological and serum chemistry data in a horse, referred to the clinics of the Faculty of Veterinary Medicine - Stara Zagora on March 2, 2007

Determination	Units	Values
Haemoglobin	g/L	108.5
Haematocrit	L/L	0.24
Erythrocytes	T/L	7.01
Leucocytes	G/L	8.85
MCV	fl	34.24
MCH	pg	15.48
MCHC	g/L	452
ESR	mm	
15 min	mm	10
30 min	mm	36
45 min	mm	60
1 hour	mm	80
2 hour	mm	129
Differential white	blood cells	counts
Ba	%	0
Eosinophils	%	6
M	%	0
Mm	%	1
St	%	4
Seg. Neutrophils	%	41
Lymphocytes	%	47
Monocytes	%	1
Glucosa	mmol/L	5.5
Bilirubin	µmol/L	21.7
Total protein	g/L	69
AST	IU/L	482
ALT	IU/L	33
Urea	mmol/L	3.33
Creatinine	µmol/L	94
GGT	IU/L	8.39
LDH	IU/L	731
ALP	IU/L	247
CPK	IU/L	375
K	mmol/L	3.42
Cloride	mmol/L	87.5

Clinical examination. On arrival at the Clinic of the Veterinary Faculty of the Trakia University, the filly was excited. Rectal temperature (39.1 °C) and respiratory rate (22 breaths/min) were elevated; heart rate was 60 beats/min and pulse was strong and regular. Mucous membranes were pink, light cyanotic, moist, and the capillary refill time less than 2 s. There was an abnormal nasal flaring and serous discharges from both nostrils. The mandibular lymph nodes were of normal size, not painful and tempered. Palpation of the pharynx, larynx and trachea were normal. A cough reflex could be elicited on deep laryngeal palpation. There was decreased movement of the left side of the chest and poor air entry. Comparative percussion of the both sides of the chest was performed and marked dullness in the left half established. Auscultation of right side of the lungs found enhanced respiratory noises. The thorough auscultation of the opposite side of the chest revealed the presence of typical intestinal sounds: bubbling, gurgling etc. The haematological analyses, differential white blood cells counts (Auto Haematology Analyzer BC-2800 Vet, Mindray) and blood biochemistry (Biochemistry analyzer BA-88, Mindray) are presented in Table 1. These results could be interpreted as oligochromemia, markedly elevated MCHC, mild eosinophilia, tendency to left shift to metamyelocytes, almost doubled AST and LDH activity, more than doubled ALT activity, mildly increased CPK and hypochloraemia.

The lateral thoracic radiograph shows the presence of organs filled with liquid in the thoracic cavity and confirmed the presence of abdominal structures within the thorax (Fig. 1). Ultrasonography of the left side of the chest revealed loops of small intestine within the thoracic cavity (Fig. 2). Electrocardiography (Cardipia 406 NV) on two consecutive days showed progressive decrease of R peak and simultaneously identity change in T wave amplitude (Fig. 3).

Follow-up. During the next 3 days the horse was strictly confined in a boxstall and received flunixin meglumine-0.5 mg/kg bwt, I.V, q 12 h (Banamine sol.-Schering-Plough Animal Health Corp.NJ) and gentamicin sulphate-4 mg/kg bwt, slowly I.V, q 12 h (Vepha-Gent forte - Veyx-Pharma Ltd.). The respiratory rate fluctuated between 22-32 breaths/min. Rectal temperature rose to 39.5 °C. The horse appeared indisposed with decreased appetite. The option of an exploratory laparotomy with possible surgical repair was discussed with the owner, however he opted for euthanasia. A post mortem evaluation was performed 1 h later.

Post mortem findings. A 25 cm long irregular tear in the left tendinous part of the diaphragm was found. Part of the stomach and a large mass of small intestine were located in the thoracic cavity. Moderate edema of the intestinal walls was present and a small quantity of serosanguinous fluid was observed.

Discussion

Diaphragmatic hernias in horses are infrequent findings. Acute abdominal pain is the most common clinical sign, and is related to the severity of the displacement of the intestine through the rent and subsequent development of obstructions. A partially empty abdomen was palpated per rectum in 3 of 18 horses with diaphragmatic hernias by ROBIN and NATHANIEL (1999). The rectal examination in this case revealed the feeling of "emptiness". A diaphragmatic hernia should be suspected in horses with signs of moderate to severe abdominal pain for which a definitive cause cannot be identified.

Acquired lesions usually involve an area where the tendinous part meets the muscular peripheral part of the diaphragm (JUBB et al., 1993; NODEN and DE LAHUNTA, 1985). The size and location of the rent are important factors affecting whether herniation of the abdominal viscera occurs. In this case the post mortem evaluation showed the penetration of the small intestine and part of the stomach through the tear into the thoracic cavity. Tachypnoea is associated with diaphragmatic hernias (SMITH, 1996). Tachypnoea can be attributed to shock or can be compensation for a decreased tidal volume and lung capacity if compressions of the lungs have occurred. It can also be a response to conscious pain perception at the injured site of the diaphragm. In this case there was no evidence of shock and tachypnoea might have been the result of a decrease in lung capacity due to pulmonary compression. Lung auscultation did not reveal signs of lower airway disease. The assumption was made that the tachypnoea originated solely from a conscious pain perception and a cortical response to increase the respiratory rate as compensation for a decrease in tidal volume due to shallow breathing (GOEHRING et al., 1999). Spontaneous healing processes of diaphragmatic tears are not described in the literature, but can be assumed to be complicated due to the relative mobility of the tissues involved and the poor regenerative capacity of the tendinous part of the diaphragm.

Thoracic laparoscopy can also provide additional information or could be used as a therapeutic tool depending on the size and location of the lesion.

Many diaphragmatic hernias are diagnosed incidentally at necropsy or slaughter, which suggests that not all affected horses require treatment.

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SAŽETAK

Prikazana je ošitna kila nastala nakon prometne nesreće u desetomjesečne ždrjebice. Auskultacijom i perkusijom pretražene su obje strane prsnoga koša. Radi potvrde dijagnoze provedena je radiografska i ultrazvučna pretraga bočnih strana prsnoga koša. U svrhu otkrivanja možebitnih komplikacija provjeren je kliničko stanje životinje i provedene su biokemijske pretrage krvi. Elektrokardiogram je pokazivao smanjivanje amplituda R i T valova.

Gljučne riječi: ošitna kila, konj, elektrokardiogram, ultrazvuk
