

PERICARDIAL EFFUSION ASSOCIATED WITH PERITONITIS IN A MARE – ULTRASOUND AND HEMATOLOGIC INVESTIGATIONS – CLINICAL CASE

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ABSTRACT

The study described a spontaneous clinical case of peritonitis and pericarditis in a mare showing moderate colic pain. Auscultation of the heart was indicative of pericardial involvement. Clinical examination revealed fever, hemorrhagic changes in the visible mucous membranes, rapid heart rate and respiration. Blood tests confirm leukocytosis, neutrophilia and thrombocytopenia with decreased hematocrit. Blood chemistry was indicative of hyperglycemia and increased activity of CK, LDH, ASAT and AP enzymes. Ultrasound examination of the thoracic cavity and abdomen confirmed the presence of hypoechoic fluid in the pericardial and abdominal cavities. The fluid obtained after an abdominal puncture was hemorrhagic with a high number of leukocytes and protein content.

Key words: horse, pericarditis, peritonitis, ultrasound, hematology.

Introduction

Pericarditis and pericardial effusion are relatively uncommon in horses (Worth & Reef, 1998; Jesty, 2009; Malalana et al., 2011; Reimer, 2013). Etiological factors include bacterial and viral infections (May et al., 2002; Perkins et al., 2004; Bolin et al., 2005), neoplasias (Stoica et al., 2004) and septicemia (Benson & Sweeney, 1984; Jesty & Reef, 2006). According to the clinical findings, three types of pericarditis are distinguished: effusive, fibrinous and constrictive (Marr & Reimer, 2006). The most-common form in the horse is the fibrin effusive pericarditis, occurs when both fibrin and fluid accumulate within the pericardial sac (Worth & Reef, 1998). Myocardial fibrosis is a cause of compromising ventricular compliance and constrictive pericarditis. Most often clinical signs demonstrated by horses are muffled heart sounds, pericardial friction rub, tachycardia, fever, ventral edema, weight loss and lethargy (Worth & Reef, 1998; Jesty & Reef, 2006; Malalana et al., 2011; Reimer, 2013). Echocardiography is undoubtedly the most useful diagnostic tool in identifying of pericarditis. Peritonitis is a serious condition in horses occurs mostly as a complication after surgical interference, gastrointestinal rupture, intestinal ischemia, trauma, rectal tears and foaling injuries (Mair, 2002; Javsicas et al., 2010). Abdominal abscessation (Pusterla et al., 2007), neoplasias (Taylor et al., 2006) and parasitism (Collins & Pirie, 2012) has been documented as potential etiologic factors. Clinical symptoms presented by horses are recurrent mild abdominal pain, inappetance, pyrexia, weight loss, dullness, diarrhoea (Dyson, 1983; Collins & Pirie, 2012). Trans-abdominal ultrasonographic examination, hematology and biochemical analysis together with peritoneal fluid cytology and culture are extremely valuable in diagnostics of peritonitis. There are few scientific data on the simultaneous inflammation of the pericardium and peritoneum in horses (Bernard et al., 1990; Worth & Reef, 1998).

Case presentation

This case describes a four years old Akhal-Teke mare, admitted at the clinic, because of moderate recurrent abdominal pain for 3 days. During this period a treatment with NSAIDs (Phenylarthritis® injectable, Vetoquinol, France), broad spectrum antibiotics (Penstrep 400, Norbrook

Laboratories Ltd., Northern Ireland) and electrolytes (Duphalyte, Pfizer Limited, NJ, USA; Natrium chloride Braun 0.9%, Melsungen AG, Germany) was applied. Four months ago, she underwent colic surgery with subsequent laminitis. Initial clinical exam noted a poor body condition (score 3) and stiff gait. Clinical parameters showed increased body temperature (38.8°C), accelerated heart rate (80 min⁻¹) and respiratory frequency (28 min⁻¹). Capillary refill time (CRT) was two second and mucous membranes were hyperemic. Auscultation of the chest discovered muffled heart tones and pronounced pericardial friction. Abdominal auscultation found decreased peristaltic sounds in both sides. The feces were scanty, small sized and covered by yellow mucous membranes. The rectal examination revealed the presence of non-painful spherical structures about 8 – 10 cm in diameter with a rigid elastic consistency in the pelvic cavity on both sides of the ampoule. These formations restricted further access for exploration of abdominal cavity. Complete blood count was tested by automatic analyzer (Exigo-Eos Vet, Boule Medical AB, Sweden). Chemical parameters of blood examined in the serum by automatic biochemistry analyzer (Mindray BS 120, China). We performed the echocardiography in agreement with standards established by Reef (1998). For chest and abdominal ultrasound we used an ultrasound machine SonoScape S6 V (SonoScape Medical Corp., China), equipped with a linear micro convex probe C 311. A sample with peritoneal fluid collected in EDTA-tube was sent for cytology and cultural investigation. The results from the morphology and chemistry of the blood (Table 1) did not show deviations in the number of red blood cells and the concentration of hemoglobin. Platelet count and hematocrit value showed markedly decrease. The parameters of erythrocyte profile (MCV, MCH and MCHC) were in reference range. There was significant leukocytosis and neutrophilia. The concentration of blood sugar was markedly elevated (11.46 mmol/l) and the activity of enzymes CK, LDH, ASAT and AP was increased. The BUN concentration was elevated insignificantly. Peritoneal fluid taken by abdominocentesis was odorless and hemorrhagic. The protein content amounted to 42 g/l and WBC count was 185 G/l. Cytological investigation revealed a presence of erythrocytes and segmented neutrophils in different stage of nuclear vacuolization and pyknosis. Microbiology was negative for aerobic bacteria. Cardiac echography discovered a presence of effusion in pericardial sac and thickened pericardial layers, as shown in Figure 1. Abdominal echography showed hypochoic fluid occupying the both sides of the ventral abdominal cavity (Figure 2).



Figure 1: Cardiac echography indicating the presence of fluid in the pericardial cavity (arrows) and thickening of the pericardium.

Table 1: Hematological and biochemical parameters of mare with pericardial effusion and peritonitis

Parameter	Value	Ref. values	Parameter	Value	Ref. values
Haemoglobin	121 g/l	110–190 g/l	Glucose	11.46 mmol/l	3.5–6.3 mmol/l
Haematocrit	30.8%	32–52%	BUN	9 mmol/l	3.7–8.8 mmol/l
RBC	6.19 T/l	6.5–12.5 T/l	Creat.	124.1 μ mol/l	77–175 μ mol/l
MCV	49.8 fl	36–52 fl	Total bilirubin	51.1 μ mol/l	5.4–51 μ mol/l
MCH	19.6 pg	13.5–19.5 pg	Total protein	71 g/l	57–79 g/l
MCHC	393 g/l	340–405 g/l	Albumin	34.3 g/l	25–38 g/l
Platelets	29 G/l	100–600 G/l	CK	414.4 UI	60–330 UI
			LDH	579.6 UI	112–456 UI
			ASAT	391 UI	116–287 UI
WBC	16.5 G/l	5.5–12.5 G/l	GGT	10.6 UI	2.7–22 UI
Lymphocytes	2.9 G/l	1.5–5 G/l	AP	660 UI	70–227 UI
Monocytes	0.9 G/l	0.2–1 G/l	K	3.3 mmol/l	2.8–4.7 mmol/l
Neutrophils	12.4 G/l	3–7 G/l	Na	137 mmol/l	133–147 mmol/l
Eosinophils	0.3 G/l	0–1 G/l	Cl	101 mmol/l	97–110 mmol/l

**Figure 2: Abdominal cavity with hypoechoic fluid (arrowheads). The wall of a large colon is pointed by arrows.**

Discussion

Increase of body temperature and the accompanying tachycardia and tachypnea were a consequence of the ensuing inflammation of the pericardium and the peritoneal membrane. The presence of leukocytosis with a predominance of neutrophils in the blood and pronounced thrombocytopenia confirm this thesis. Similar hematological manifestations in septic horses were documented earlier (Ethell et al., 1993; Jesty, 2009; Reimer, 2013). High concentrations of blood glucose could be a

consequence of the enhanced gluconeogenesis under the influence of catecholamines, accelerated glycolysis because of increased secretion of glucocorticoids and peripheral insulin resistance. A similar hyperglycemic condition in horses suffering from colic, injury, or stress has been reported (Sellon et al., 1996; Stoica et al., 2004). Hyperglycaemia in horses with abdominal pathology is associated with a poor prognosis for survival (Hollis et al., 2007; Hassel et al., 2009). The increased activity of the enzymes CK, LDH and ASAT can be considered as a consequence of traumatic damage to the muscles of the body due to colic, followed by the passage of rich cytosolic enzymes into the bloodstream. Taylor et al., (2006) reported similar changes in the enzyme profile in horses with such pathology. Alkaline phosphatase comprises several isoenzymes, localized in the membranes of the cells lining the liver, bone, kidney, intestines and placenta. The lack of evidence of impairment of the function of other organs gives us a reason to attribute increased AP activity to the intestinal mucosal damage. Ultrasonographic examination of the heart unequivocally pointed to pericardial effusion, and thick pericardium is indicative of the inflammatory nature of the process. The high content of protein in the fluid from the abdominal cavity, and a large number of leukocytes therein are indicative of peritonitis, despite the negative result of bacteriological testing. Similar negative bacteriological test results in horses with peritoneal effusions are reported before (Worth & Reef, 1998; May et al., 2002). Medical history, clinical signs, hematology results and sonographic findings contribute to the diagnosis of peritonitis and pericarditis.

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