COMMUNICATION

Comunicação

Bacterial endocarditis associated with pheochromocytoma in a horse

(Endocardite bacteriana associada a feocromocitoma em eqüino)

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At the Veterinary Hospital Jaboticabal, UNESP, a seven year old Mangalarga mare weighing 370 kg was examined which presented edematous thoracic and pelvic limbs, profuse sweating, a stiff walk, and bristling and lackluster hair. The following semiologic parameters were determined: body temperature = 39.1°C; heart rate = 88bpm; respiratory rate = 56rpm; conjunctival, oral and vaginal mucosae of normal color. Upon auscultation of the cardiac region, hypophonesis and a grade II diastolic murmur were detected at the aortic level. The animal was placed in a corral with other clinically normal mares, but kept a distance from them. Clinical history indicated that appetite and thirst were normal.

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Blood counts were obtained on the first, 15th and 45th days after admission to the hospital. Blood samples were collected and immediately processed by routine laboratory techniques (Birgel, 1982). Normochromic normocytic anemia (3.4-5.4 x 10^6 erythrocytes/mm³) with no signs of regeneration and also leucocytosis (16.5-21.3 x 10^3/mm³) due to neutrophilia (9.6-17.0 x 10^3 cells/mm³). Examination of urine obtained by catheterization of the bladder showed normal results.

Liver and kidney function was evaluated by serum biochemical tests. Urea, creatinine, total serum proteins, bilirubins and ammonia were determined using commercial kits and Celm E - 225D spectrophotometer. No changes were observed in any of these parameters, and serologic tests for the diagnosis of equine infectious anemia and leptospirosis were also negative.

Blood culture and an antibiogram were performed on the first day of admission. Blood was collected by the technique of Young (1990) by puncture of the jugular vein with strict antisepsis. There was growth of Staphylococcus aureus that was sensitive to the following antibiotics: cephalothin, cephalzin, carbenicillin, cephoxithin, nethylyycin, tobramycin and nitrofurantoin. For financial reasons, and while waiting for the blood culture and antibiogram results, treatment consisted of a combination of various penicillins and streptomycin, with temperature returning to normal levels after 5 days of treatment.

Electrocardiography was performed with an RFT 6 Neck 4 electrocardiograph using lead II for analysis of the results, at a speed of 50 mm/s, with a calibration of 1 mV = 1 cm. Sinus tachycardia (120 bpm) with left atrial and ventricular enlargement and suppression of millivoltage were observed, suggesting a process of left congestive heart failure.

The animal died on the 54th day after admission to the Veterinary Hospital and its autopsy was immediately performed. Gross examination revealed presence of gelatinous subcutaneous edema, ascites, pulmonary congestion, pericardial effusion, marked thickening of the base of the heart with epipericardial adhesions, white hard patches on the aorta and coronary intima arteries and epicardic region, and bilaterally increased adrenal volume; left and right adrenals showed approximately the same size (8 x 4 cm). Figures 1, 2 and 3A show some of the aspects described. Microscopic features of tissue samples collected and fixed in 10% formalin, and afterwards processed according to routine

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histotechnology, revealed multifocal aortic, coronary and epicardial dystrophic calcification and metaphasic ossification, verrucose aortic valvular endocarditis and a functional pheochromocytoma characterized by the presence of cells ranging from cuboid to polyhedral, with a hyperchromatic nucleus and slightly eosinophilic and granular cytoplasm, arranged in small lobules separated by a fine connective stroma (Figure 3B).

Bacterial endocarditis is an uncommon infection in horses, involving vegetative lesions in the aortic and mitral valves in most cases (Collatos, 1992). Its pathogenesis includes structural damage to the mural or valvular endocardial surface followed by later adhesion of circulating bacteria to the affected valvular surface, with consequent survival and propagation of endocardial vegetation (Kasari & Roussel, 1989). In the animal under study, blood culture demonstrated the growth of *Staphylococcus aureus*, in agreement with literature data that shows *Staphylococcus aureus, Streptococcus zooepidemicus, Actinobacillus equuli, Escherichia coli, Pseudomonas aeruginosa*, and *Erysipelothrix rhusiopathiae* as the microorganisms most frequently isolated from horses with this pathology (Roussel & Kasari, 1989; Young, 1990).

In the present case, the degenerative and inflammatory structural damage to the endocardial surface may be attributed to the high gradient of arterial pressure associated with the presence of a pheochromocytoma. Pheochromocytomas are tumors derived from chromaffin cells of the adrenal medulla originating from neuroectodermal tissue-neural crista (Yovich et al., 1984; Dukett et al., 1987) and secreting adrenaline and/or noradrenaline (Capen, 1978; Jubb et al., 1985; Dukett et al., 1987; Young, 1990). These are the most common tumors of the medullar portion of the adrenals in animals (Appleby & Sohrabi, 1978; Capen, 1978; Jubb et al., 1985). In cattle and in humans, they are associated with tumors of C cells of the thyroid gland which secrete calcitonin. This seems to represent a neoplastic transformation of multiple types of endocrine cells of neuroectodermal origin in the same individual (Jubb et al., 1985). Although this was not investigated in the present case, the presence of this type of tumor cannot be excluded in view of the detection of extensive areas of calcification and ossification in the aorta, coronary artery and epicardium. Clinical symptoms are caused by excessive catecholamine release (Buckingham, 1970; Appleby & Sohrabi, 1978; Capen, 1978; Dukett et al., 1987; Young, 1990) promoting tachycardia, tachypnea, edema, cardiac hypertrophy, profuse sweating, muscle tremors, and hypertension (Yovich et al., 1984; Dukett et al., 1987). These symptoms, taken together with those of endocarditis, which in horses include fever, tachycardia, limb edema and usually systolic murmurs (Roussel & Kasari,
1989), agree with those presented by the animal during the clinical examination performed after admission, and were confirmed by blood culture and autopsy.

Anemia and leucocytosis, which are usually present in patients with endocarditis and are generally found to be related to inflammatory processes (Roussel & Kasari, 1989), were also observed in the present case.

The survival rate of horses with bacterial endocarditis has not been reported, but prognosis is considered poor (Roussel & Kasari, 1989).

After the animal’s death and gross and histologic examinations, in addition to the presence of endocarditis and right and left congestive heart failure, a bilateral increase of the adrenals associated with the presence of a functional pheochromocytoma was observed. The need for a more detailed clinical diagnosis is emphasized for the animal under study. Thus, the clinical picture should be evaluated by biochemical analysis of blood or urine for catecholamines and their metabolites and measurement of arterial blood pressure (Johnson et al., 1995). In cases of unilateral and benign pheochromocytomas, the tumors can be surgically removed (Parry, 1984) under general anesthesia and with blood pressure monitoring and use of appropriate hypotensive drugs (Johnson et al., 1995), although this technique is extremely difficult in horses (Duckett et al., 1987).

The animal presented here signs of right and left congestive heart failure identified by the electrocardiogram and respectively characterized by peripheral edema and pulmonary edema. The clinical diagnosis was aortic valvular endocarditis, with pericardial effusion and bilateral congestive heart failure.

A review of the literature suggests that in the present case, the high pressure gradient caused by the pheochromocytoma may be the cause of damage to the endocardial surface, predisposing to bacterial endocarditis, with the clinical signs observed being compatible with this pathology.
Figure 1. Vegetating or verrucose valvular endocarditis in the aortic (A and B) valvular valve of a mare associated with a pheochromocytoma. The arrows indicate the vegetative valvular formations.

Figure 2. Dystrophic calcification and metaplastic ossification on the epicardial surface (A) and in the intima of the aorta (B) of a mare associated with a pheochromocytoma. The arrows indicate the affected areas. The entire brachycephalic trunk of the aorta shows extremely severe alterations as described in the text.
Figure 3. Gross (A) and microscopic (B) aspects of the right adrenal (arrow) of a mare presenting a functional pheochromocytoma. The adrenal gland measured 8 x 4 cm, the cells being cuboid to polyhedric in shape, with a hyperchromatic nucleus and a granular eosinophilic cytoplasm. The cells are arranged in small lobules. H.E. (Obj. 20x)

Key words: endocarditis, pheochromocytoma, horse.
RESUMO

Os autores relatam, pela primeira vez, um caso de endocardite bacteriana em equíno associada à presença de feocromocitoma funcional, e apontam a necessidade de exames complementares para o diagnóstico clínico do tumor.

Palavras-chave: Endocardite, feocromocitoma, equíno

REFERENCES


