Periaortic haemangiosarcoma in an African wild dog (*Lycaon pictus*)

A Newell-Fugate[a*] and E Lane[b]

ABSTRACT

A 9-year-old apparently healthy male African wild dog (*Lycaon pictus*) was found dead in its enclosure at the De Wildt Cheetah and Wildlife Centre. Necropsy revealed a pericardium distended by approximately 250 mℓ of thick blood. A soft, red, lobulated mass was attached to the periaortic fat between the level of the aortic valves and the pericardial reflection. Histologically, the mass was consistent with a haemangiosarcoma. Other findings in the heart included mild to moderate ventricular hypertrophy and moderate, acute perivascular myocardial necrosis. Sudden death was attributed to acute heart failure precipitated by cardiac tamponade.

Keywords: African wild dog (*Lycaon pictus*), cardiac tamponade, heart failure, haemangiosarcoma, pericardium, ventricular hypertrophy.

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INTRODUCTION

Cardiac neoplasms are rare in domestic dogs, with reported incidences of between 0.12 %[3] and 0.19 %[7]. Primary cardiac tumours are more common than metastatic tumours, such as lymphoma, melanoma, thyroid carcinoma and sarcoma[2,6,7]. The two most common primary cardiac tumours in dogs are haemangiosarcoma and aortic body tumours (chemodectomas, nonchromaffin paragangliomas)[2,7,8]. In domestic dogs, cardiac haemangiosarcomas are most frequently associated with the right auricle, but also occur in the body of the right atrium, the atrial wall, and down the atrioventricular junction into the right ventricular wall[7]. Cardiac haemangiosarcomas may result in pericardial effusion, cardiac tamponade, arrhythmias and right heart failure due to decreased cardiac output[8]. Reports of neoplasms in wild canids are sporadic in the literature[1,5]. A survey of neoplasia in a small population (n = 62) of red wolves revealed a wide range of neoplasms but not cardiac haemangiosarcoma[1]. African wild dogs in captivity apparently suffer a relatively low rate of neoplasia (3 %, n = 35) (De Wildt Cheetah and Wildlife Centre, Unpubl. records 1977–2005). To our knowledge, this is the first report of cardiac haemangiosarcoma in a wild canid species.

CASE HISTORY

A 9-year-old male African wild dog (*Lyacon pictus*) without previous history of disease was found dead overnight in its pen. On gross necropsy, the dog was in excellent body condition with moderate *post mortem* changes. The pericardium was severely distended by approximately 250 mℓ of thick, unclotted blood. A soft, red lobular mass (~2.5–3 cm in diameter) was found in the tissue adjacent to the aorta, between the level of the aortic valves and the reflection of the pericardium (Fig. 1). There was mild right concentric ventricular hypertrophy and moderate left concentric ventricular hypertrophy. Other necropsy findings included mild hypostatic congestion of the cranial right lung lobe and mild splenic follicular lymphoid hyperplasia.

Histologically, the cardiac mass was expansive, incompletely encapsulated (Fig. 2) and composed of multiple anastamosing small to large vascular channels filled with blood and scattered fibrin clots, lined by pleomorphic plump endothelial cells with large oval vesicular nuclei and prominent magenta nucleoli, supported by variable amounts of pale eosinophilic fibrillar stroma (Fig. 3). Mitotic figures were rare (1/10 HPF). A small unencapsulated aggregate of similar neoplastic endothelial cells was found on the epicardium (<0.5 mm). Additional histological findings included moderate

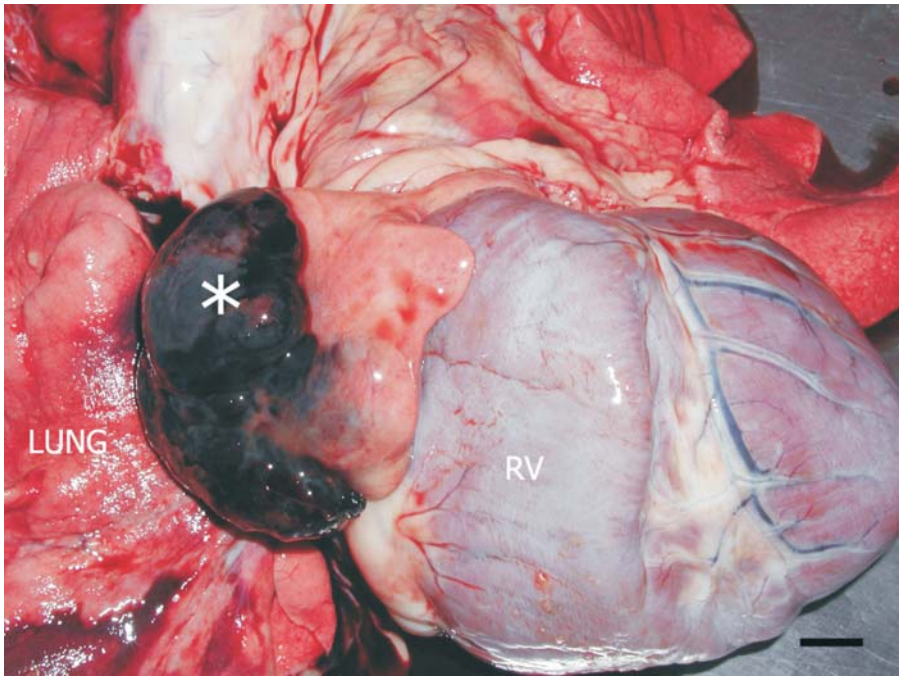

Fig. 1: **Cardiac haemangiosarcoma in an African wild dog. Note the lobular black mass (✻) in the fat tissue at the base of the right ventricle** (RV)**.** Scale bar = 5 mm.

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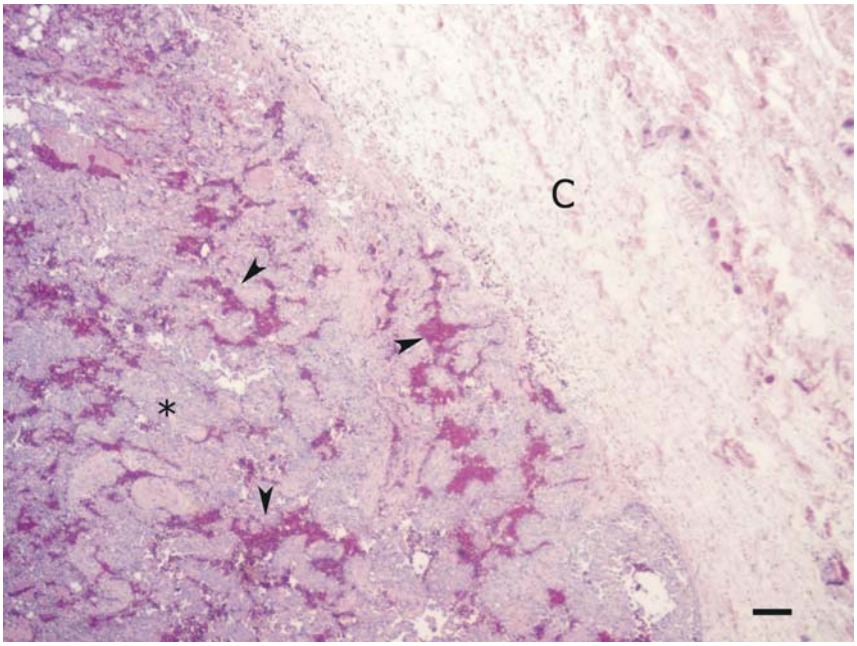

Fig. 2: **Micrograph of a cardiac haemangiosarcoma in an African wild dog. Note the blood-filled channels** (arrowheads) **separated by cords of neoplastic endothelial cells (*) and fibrous connective tissue capsule** (C)**.** H&E. Scale bar = 100 µm.

acute perivascular myocardial necrosis; moderate periacinar hepatic congestion; hepatocellular atrophy and microvesicular cytoplasmic degeneration and bile stasis; marked mucosal congestion in the gastrointestinal tract; mild bone marrow congestion and active erythropoeisis; mild, acute cerebral perivascular haemorrhage. A peripheral blood smear showed mild erythrocytic regenerative response. Death in this African wild dog was attributed to heart failure as a result of cardiac tamponade due to pericardial haemorrhage from the cardiac neoplasm.

DISCUSSION

Haemangiosarcoma is the most common primary cardiac tumour in the domestic dog with one study finding that haemangiosarcomas comprised 46 % of cardiac neoplasia[2,6,7]. Cardiac haemangiosarcoma is malignant and affected dogs may suffer heart failure, sometimes suddenly, due to neoplastic invasion of the heart muscle, cardiac tamponade due to haemorrhage into the pericardial sac, or abrupt rupture of the mass. Alternatively, slowly developing symptoms of heart failure like lethargy, anorexia, syncope, ascites, and jugular vein distension may be seen[6].

Infiltrative haemangiosarcomas can also disrupt normal heart rhythm or contractility[6,7].

Cardiac haemangiosarcoma is rarely found in the left side of the heart or as an intracavitary lesion, although there have been isolated cases of these two presentations[8]. Frequently this malignant tumour will metastasise to the pulmonary parenchyma[2,7,8]. Dogs with haemangiosarcoma are often anaemic and may have circulating red blood cells in high numbers disproportionate to the degree of anaemia. Older dogs are typically affected, with one study finding 35 % of affected dogs 7–10 years of age and 55 % of affected dogs 10–15 years of age[6].

This wild dog showed no overt clinical signs of cardiac disease, although wild animals are often masters of illness disguise. Furthermore, wild dogs are not observed as intensely as domestic dogs due to the inability to handle them without immobilisation. Sudden death in animals affected with cardiac haemangiosarcoma is often due to acute heart failure from cardiac tamponade and resultant reduced compliance of the cardiac muscle. Blood accumulation in the pericardial sac restricts atrial and ventricular compliance, which results in incomplete filling of the ventricle with blood, usually in mid-diastole[4]. Compliance is directly correlated with the distensibility of the heart. Thus, the higher the compliance of the heart, the lower the fluid pressure of a given volume of fluid. When ventricular compliance decreases, such as with cardiac tamponade, end-diastolic pressure increases and diastolic function decreases[4]. Decreased filling capacity and increased diastolic pressure result in congestive heart failure due to back-up of blood into the pulmonary vein and the lungs on the left side of the heart and the caudal *vena cava* and the liver on the right side of the heart. A further cause of sudden death in animals affected with cardiac haemangiosarcoma and cardiac tamponade is abrupt haemorrhage from the tumour. In this particular case, tissue congestion, periacinar hepatic degeneration and perivascular cerebral haemorrhage support a diagnosis of acute cardiac tamponade in this wild dog. There was no evidence of pulmonary metastasis in this case, nor of vascular infiltration into the myocardium, although some neoplastic cells had implanted on the epicardium. To our knowledge, this is the first case of cardiac haemangiosarcoma in a wild canid species. It is possible that this condition is rare in wild canids due to their relatively short life span, even in captivity, compared with domestic dogs.

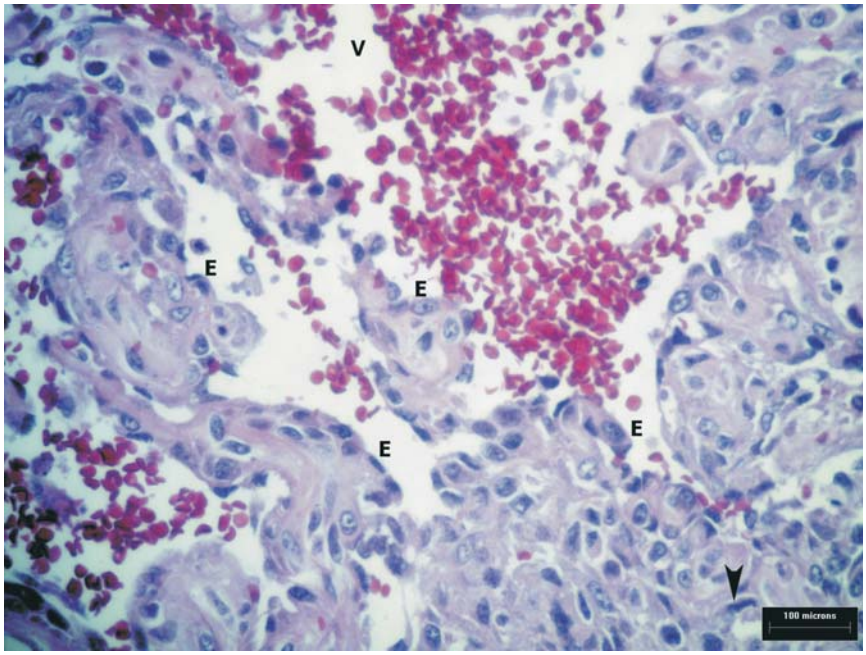

Fig. 3: **Micrograph of a cardiac haemangiosarcoma in an African wild dog. Endothelial cells** (E) **line irregular, anastomosing, blood-filled vascular channels (**V**). Note a mitotic figure** (arrowhead)**.** H&E.

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