Cavernous haemangiosarcoma in a free-living red deer (*Cervus elaphus*)

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HAEMANGIOMAS and haemangiosarcomas are neoplasms of vascular endothelium that occur commonly in dogs and rarely in other domestic animals (Goldschmidt and Hendrick 2002). Haemangiomas are benign and are usually solitary masses in the dermis or subcutis; on the basis of the size of the vascular channels, these tumours are classified as cavernous or capillary haemangiomas (Hendrick and others 1998). Haemangiosarcoma is the malignant counterpart of haemangioma, and most commonly presents in dogs as a multicentric disease involving the right atrium, spleen, liver and lungs (Garzotto and Berg 2003, Smith 2003, Waters and Cooley 1998). Haemangiosarcomas are less frequently reported in cats than in dogs, and the lesions are usually observed in the skin of the head, distal limbs, lungs and paws (Moran and Suster 2001, Goldschmidt and Hendrick 2002, Yamagami and others 2006). In horses, neoplasia of vascular origin is also uncommon (Johnson and others 1988, Kennedy and Brown 1993, Berry 1999); haemangiosarcoma was recorded in only three of 1404 horses examined in a study by Stencel and Groteluesche n (1989). Haemangiosarcomas in horses have been reported in the vertebrae, spinal cord, oral cavity, tarsal sheath and frontal sinus (Southwood and others 2000). The few cases reported in cattle were located in the lungs and long bones (Guard and Wilkinson 1984), vertebrae (Zachary and others 1981), cutaneous external nares (Queen and others 1992), muscles and extradural spinal cord (Sutton and McLennan 1982).

In wild ruminant species, only one case of haemangiosarcoma has been described, in a 20-year-old female Père David's deer raised at a zoo in South Korea (Yoon and others 1999). This short communication describes gross and microscopic pathological findings in a free-living red deer (*Cervus elaphus*) with cavernous haemangiosarcoma.

The 14-year-old female red deer was found dead in March 2003 in the region of Bièvre in southern Belgium. Its age was determined based on standardised dental inspection (Mitchel 1963). At postmortem examination, numerous nodular, well-demarcated, red-black, soft to firm masses, 5 to 30 mm in diameter, were scattered throughout the lungs (Fig 1). On section, the masses were dark red and oozed blood. The mediastinal lymph nodes were not enlarged. A soft, invasive subcutaneous mass of approximately 15 cm in diameter on the left flank was dissected carefully (Fig 2). The mass appeared to protrude from the seventh rib, from which a 5 cm segment was missing due to bone lysis. Section of the mass revealed large areas of necrosis and haemorrhages. There were no abnormal findings elsewhere in the carcase. Samples of the rib, paracostal mass and lung nodules were taken and immediately fixed in 10 per cent phosphate-buffered formalin solution for approximately 48 hours before being routinely processed and stained with haematoxylin and eosin for light microscopic examination.

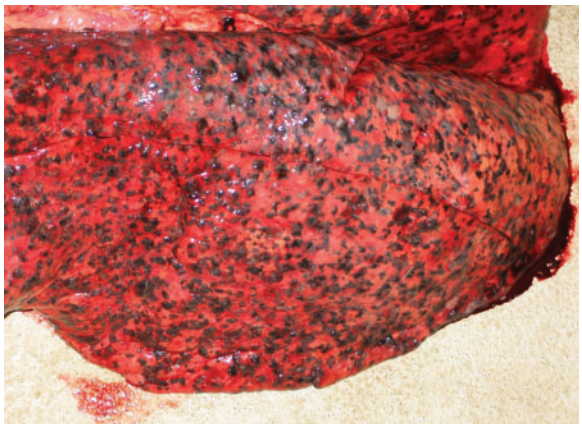

FIG 1: Gross postmortem view showing the left lung covered with nodular red-black masses

FIG 2: Gross postmortem view showing the sectioned paracostal mass (circle)

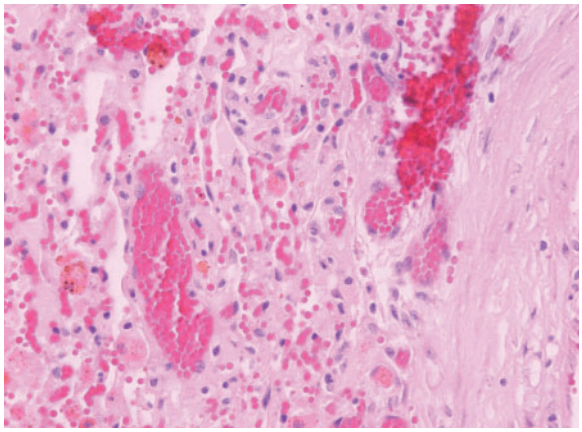

FIG 3: Histological view of a red-black lung nodule showing the characteristic features of an haemangiosarcoma. Haematoxylin and eosin. x **400**

The paracostal mass and the pulmonary masses displayed a similar histopathological pattern (Fig 3). The pulmonary masses had conspicuous accumulations of blood, either filling small clefts or giant cavernous channels, or freely dissecting the tissues (haemorrhages). The clefts or channels were clearly delineated by endothelial cells; some of them were visibly ruptured or thrombosed. The stroma interspersed between the channels and clefts was constituted of neoplastic cells that varied in size and shape but were usually elongated. The nuclei of these cells were round to ovoid, very hyperchromatic and commonly displayed mitotic figures. All of the masses contained numerous macrophages filled with haemosiderin. The paracostal mass also displayed very large areas of necrosis, with foci of neutrophilic accumulation. Osteoid formation was not observed in the paracostal and pulmonary masses, excluding the hypothesis of telangiectatic osteosarcoma (Gleiser and others 1981, Thompson and Pool 2002). The histological features were compatible with a diagnosis of cavernous haemangiosarcoma, a malignant tumour of vascular endothelial cells. The primary tumour probably developed within the seventh left rib, then extended to the pleurae and the thoracic muscles, and finally disseminated as metastases in

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the lungs. To the authors' knowledge, this is the first reported case of haemangiosarcoma in a non-captive cervid.

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