Indian J. Vet. Pathol., 50(2) : 184-186, 2026: DOI: https://doi.org/10.56093/engsh030

CASE REPORT

Cavernous splenic hemangiosarcoma in a dog - A pathological study

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Received: 18.2.26; Accepted: 18.3.26

ABSTRACT

A 12-year-old non-descript male dog was presented with a history of lethargy, vomiting, and loss of appetite. A complete blood count revealed elevated haematocrit, neutrophilia and thrombocytopenia. Abdominal ultrasonography revealed a mass at the splenic tail with a characteristic honeycomb appearance. Cytological examination showed large, pleomorphic, oval to spindle-shaped cells exhibiting nuclear hyperchromasia and a high nuclear-to-cytoplasmic ratio. Splenectomy was performed and the excised mass was subjected to histopathological evaluation. Histological examination revealed large cavernous vascular spaces lined by markedly pleomorphic and plump endothelial cells. Based on the histopathological features, a diagnosis of splenic hemangiosarcoma was made.

Keywords: Dog, hemangiosarcoma, histopathology, spleen, ultrasonography

INTRODUCTION

Hemangiosarcoma (HSA), a malignant mesenchymal tumor originating from the endothelial cells lining blood vessels, poses a serious threat to canine health. Known for its aggressive behaviour, it grows rapidly, spreads easily to other organs, and is associated with a poor prognosis. Current evidence from recent investigations[1] indicates that the cells giving rise to hemangiosarcoma (HSA) originate from pluripotent bone marrow cells at an early, pre-differentiation stage that are capable of migrating to areas of active vascularization, where they may undergo neoplastic transformation[2].The exact causes and biological processes that lead to the development of HSA are still not fully understood. A few studies have proposed a potential association between infections caused by organisms such as *Bartonella* spp. and the development of HSA in dogs, as prolonged exposure to these pathogens can lead to chronic inflammation and angiogenesis both of which are key processes in the initiation and progression of vascular tumors like HSA[3].The most common breeds affected are German Shepherd, Boxer and Maltese Terrier[4].

HSA occurs more frequently in the dog than other species, may originate anywhere in the body with a blood supply and represents 5% of all non-skin primary canine malignant neoplasms[5]. The most common primary sites of visceral HSA include the spleen, right atrium, auricular appendage and liver. The spleen is the primary site for 35–62% of all primary HSAs[6]. Splenic HSA is widely recognized as the leading cause of non-traumatic hemoperitoneum in dogs[7]. In dogs with splenic hemangiosarcoma, the cause of death has been attributed to hypovolemia from tumor rupture, metastatic disease, disseminated intravascular coagulation, and cardiac arrhythmias. Early diagnosis remains a significant challenge, often delaying intervention until the disease is already advanced. The diagnosis of splenic hemangiosarcoma (HSA) requires a combination of imaging and laboratory evaluations, including abdominal ultrasonography, three-view thoracic radiographs, cytology and histopathology. Fine-needle aspiration cytology (FNAC) has limited diagnostic value in diagnosis because the samples are often heavily contaminated with blood, and the procedure carries risks such as tumor cell seeding that may promote metastasis, as well as hemorrhage resulting from rupture of the tumor capsule. A definitive diagnosis of splenic hemangiosarcoma (HSA) is established through histopathological evaluation of the tumor tissue. IHC is not usually needed to diagnose most cases of hemangiosarcoma but can be helpful to identify solid hemangiosarcoma and poorly differentiated neoplasms. Factor VIII-related antigen (von Willebrand factor) typically exhibits diffuse or punctuate cytoplasmic staining appearance in neoplastic endothelial cells.

How to cite this article : Bharadwaj, M, Balaram, P., Chowdary, S.R., Divya Ch and Revathi, P. 2026. Cavernous splenic hemangiosarcoma in a dog - A pathological study. Indian J. Vet. Pathol., 50(2) : 184-186.

The present paper puts on record the clinical and pathological findings of splenic hemangiosarcoma in a dog.

Case Presentation and Clinicopathologic findings

A 12-year-old non-descript, intact male dog was presented to a private veterinary clinic with a history of anorexia, vomiting, dullness and moaning for two weeks. On clinical examination, the animal showed pyrexia, severe dehydration and slightly distended abdomen The animal evinced pain when the abdomen was palpated. Ultrasonography of the abdomen revealed presence of a mass at the tail region of the spleen with a honey comb texture (Fig.1). The mass was subjected to ultrasound guided aspiration and the contents were smeared on to a glass slide. The smear was stained by Leishman's stain and the cytology revealed large

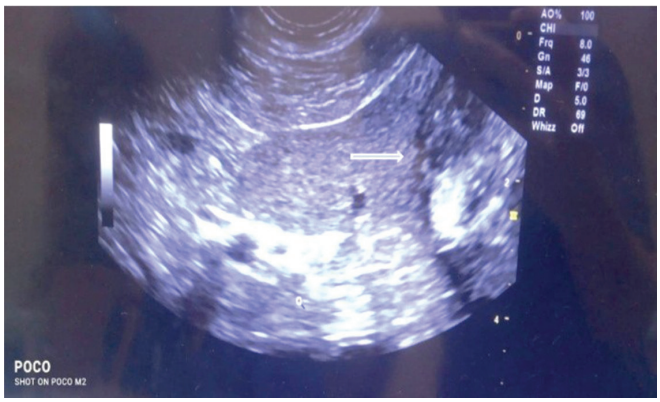

Fig. 1. Abdominal ultrasonography showing a mass at the tail region of spleen (arrow).

number of erythrocytes admixed with a few, moderately pleomorphic, oval to fusiform cells with nuclear hyperchromasia and high nuclear to cytoplasmic ratio. Ultrasoographic and cytologic findings were suggestive of an endothelial tumor. Whole blood was collected from the animal as a pre-operative procedure for complete blood picture. Hematology revealed severe polycythemia, neutrophilia and thrombocytopenia. Subsequently, the dog was subjected to splenectomy by surgical procedure.

Gross and Histopathology

Gross examination of the spleen revealed a soft, reddish brown spherical mass of about 5 cm diameter on the parietal surface at the tail region (Fig. 2). On sectioning the mass, there was severe oozing of blood and the cut sections revealed honey comb like structure. A representative sample of the tumor was collected in 10% formalin and subjected to routine tissue processing by paraffin embedding technique. Four-to-five-micron thick tissue sections were obatained by microtomy and stained by Haematoxylin and Eosin method. Histopathology of the tumor revealed splenic hemangiosarcoma characterized by the presence of cavernous spaces and small to large anastomosing capillaries filled with blood within the lymphoid tissue of the spleen (Figs. 3 & 4). The cavernous spaces were incompletely lined by hyperchromatic, moderately pleomorphic, oval to spindle shaped plump endothelial cells with scanty cytoplasm. In a few foci, endothelial cells were found scattered or are arranged in trabeculae (Fig. 5) in the splenic parenchyma without forming the lumina. There were a few foci of necrosis and presence of hemosiderin in the tumour parenchyma.

DISCUSSION

In the present study, a cavernous splenic hemangiosarcoma was recorded in a non-descript 12 year old, intact male dog. Hemangiosarcoma is the most common splenic neoplasm of the dog, occurring usually between 6 and 17 years of age, and affects many breeds and mixed breeds. In a study on splenic tumors[8], the most common splenic tumor reported was hemangiosarcoma followed by lymphoma and fibrosarcoma. Hemangiosarcoma in dogs occur 80% in spleen[9] as reported. There is no significant sex predilection but a few studies opined that neutering might have an effect on the incidence.

In the present case, the clinical signs at presentation included anorexia, vomiting, pyrexia, distended and

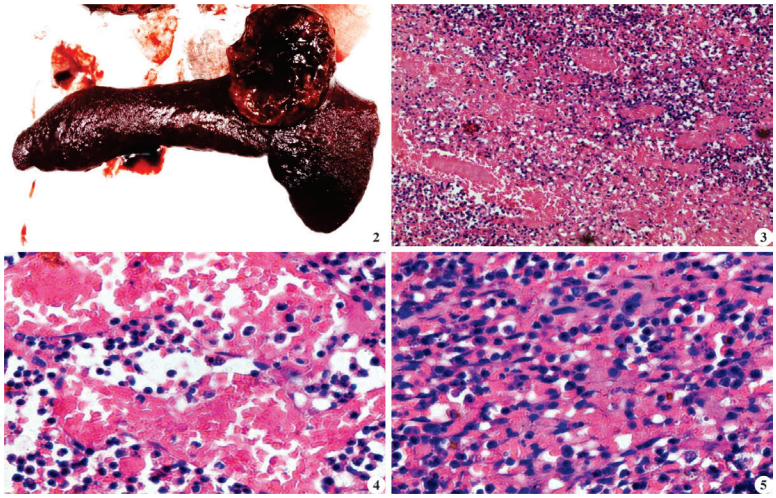

Fig. 2. Spleen showing a reddish brown circumscribed mass on the parietal surface; **Fig. 3.** Photomicrograph showing cavernous spaces and multiple anastomosing capillaries filled with blood within the lymphoid tissue of the spleen (H&E x100); **Fig. 4.** Section of the tumor showing cavernous spaces filled with erythrocytes (H&E x400); **Fig. 5.** Photomicrograph showing loosely arranged plump, moderately pleomorphic and hyperchromatic endothelial cells without formation of definite blood vessels (H&E x400).

sensitive abdomen. Presenting clinical signs in the dog vary and may also include repeated syncope or collapse and subsequent recovery associated with bouts of hypovolemia and autotransfusion following tumor rupture and hemoabdomen. In the present study, the complete blood count abnormalities included polycythemia, neutrophilia and thrombocytopenia. The other abnormalities in dogs with splenic hemangiosarcoma reported were regenerative anemia and reticulocytosis, acanthocytosis, presence of nucleated red blood cells, and schistocytes. The red blood cell abnormalities are helpful aids to the diagnosis, but they are reported in <20% of cases[10].

Polycythemia in the present case could be attributed to severe dehydration caused due to vomiting. In contrast, anaemia could be attributed to hemoperitoneum observed in their study[11] and they also noticed thrombocytopenia in HSA affected dogs like the present study. Dogs with a low platelet count had 21.4 times greater odds of being diagnosed with HSA compared to those with a normal platelet count, while dogs with low haematocrit (HCT) had 3 times greater odds of HSA diagnosis compared to dogs with normal HCT levels[11]. Neutrophilia observed in the present study could be attributed to the inflammatory process occurring in association to the neoplastic process.

In the present study, cytology revealed presence of oval to fusiform, pleomorphic cells with nuclear hyperchromasia like the earlier findings[8]. The gross and histopathological findings of the present study are akin to the findings of Spangler and Kass[12]. HSA can appear as single or multiple nodules of varying sizes[11,13,14] and in some cases, they appear as solid white, tan tumour masses without blood accumulation[14]. In the present study, histopathological examination revealed HSA composed of cavernous spaces and capillaries lined incompletely by oval to spindle shaped plumpy neoplastic endothelial cells in concordance with a previous report[13].

In conclusion, this report throws some light on the occurrence and pathomorphology of splenic hemangiosarcoma in dogs and further prognostic studies could add some insights on the behaviour of HSA in dogs.

Financial support & sponsorship: None.

Conflicts of interest: None.

Use of artificial intelligence (AI)-Assisted Technology for manuscript preparation: The authors confirm that there was no use of AI-assisted technology for assisting in the writing of the manuscript and no images were manipulated using AI.

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