

CASE REPORT

Multifocal Neoplastic Involvement of Spleen and Liver with Peritoneal Effusion in a Labrador Retriever: A Case Report

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Haemangiosarcoma (HSA), also known as malignant haemangioendothelioma or angiosarcoma, is a mesenchymal neoplasm originating from the endothelial cells of blood vessels (De Nardi *et al.*, 2023). Among the domestic species, HSA is most frequently diagnosed in dogs and less common in cats (Griffin *et al.*, 2021). HSA is again classified into two types based on their location as: non-visceral (cutaneous) affecting the skin, subcutaneous tissues, muscles, and visceral (internal) affecting the organs such as spleen, liver, heart, lungs, kidneys, oral cavity, bones, bladder, uterus, tongue, and retroperitoneum (De Nardi *et al.*, 2023). Breeds such as Golden Retriever, Labrador Retriever, German Shepherd, Boxer, Cocker Spaniel, and mixed breeds show a greater predisposition to splenic HSA. Splenic HSA is highly metastatic in nature and it is assumed that the main mechanisms of metastasis are via the haematogenous route or by seeding cells in organs of the abdominal cavity due to tumor rupture, with the liver, omentum, peritoneum, lung, right atrium and brain being the most common sites of metastasis, and less commonly the bones and skeletal muscle (Carloni *et al.*, 2019). This case report communicates the findings of multifocal neoplastic involvement of liver and spleen presenting with peritoneal effusion in a Labrador Retriever.

CASE HISTORY AND OBSERVATIONS

A nine year old male Labrador Retriever was presented to the small animal medicine ward, Department of Veterinary Clinical Complex, College of Veterinary Science, Proddatur (AP, India) with history of exercise intolerance, dyspnea, vomiting, anorexia, weight loss and abdominal distension for past 10 days (Fig.1). Clinical examination of the patient revealed dull demeanor, pale white conjunctival mucous membrane, normal rectal temperature (102° F) and severe tachycardia (180 bpm). On tactile percussion of the abdomen, a prominent fluid thrill was detected. Haematology revealed severe anaemia and lymphoblasts with vacuolated cytoplasm. Serum biochemistry showed elevated blood urea nitrogen (BUN), creatinine and decreased albumin while the other parameters were within normal limits (Table 1).

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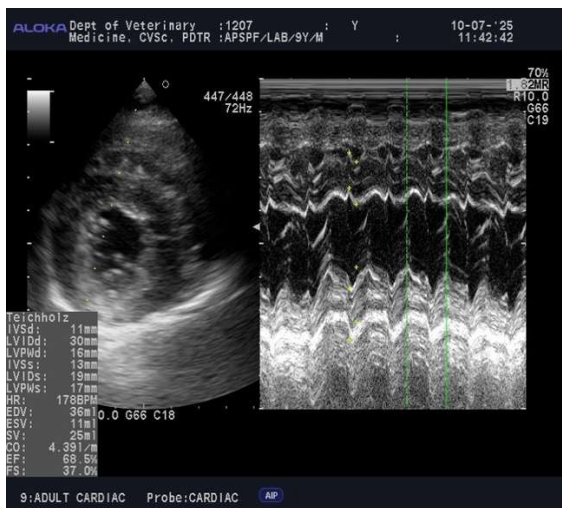
Fig. 1: Abdominal distension

Table 1: Haemato-biochemical profile of a dog

Parameters	Patient	Reference value
Hb (g/dL)	5.3	12-18
WBC ($\times 10^3/\mu\text{L}$)	16.9	6-17
Neutrophils (%)	72	60-77
Eosinophils (%)	2	2-10
Basophils (%)	0	rare
Lymphocytes (%)	26	12-30
Monocytes (%)	0	2-4
BUN (mg/dL)	43	10-28
Creatinine (mg/dL)	1.74	0.5-1.5
Calcium (mg/dL)	10.2	9-11.3
Total proteins (g/dL)	5.48	5.4-7.1
Albumin (g/dL)	1.8	2.3-3.8
SGPT (IU/L)	139	21-102
ALP (IU/L)	130	20-156

Abdominal ultrasonography showed multiple mixed echogenic masses in spleen (Fig. 2), multiple nodular lesions on liver parenchyma (Fig. 3) and anechoic effusions with floating cellular material and intestines suggestive of hemorrhagic or serosanguinous effusion (Fig. 4). Transthoracic B-mode and M-mode echocardiography revealed left ventricular hypertrophy (Fig. 5). Doppler echocardiography identified mild regurgitation of mitral valve (Fig. 6a) and tricuspid valve regurgitation (Fig. 6b). Electrocardiogram depicted deep Q wave and tall T wave.

To relieve the respiratory distress, abdominocentesis was performed and approximately 650 mL of serosanguineous effusion was withdrawn. Cytological examination of the effusion fluid showed cluster of large neoplastic cells characterized by marked anisocytosis, anisokaryosis. Cells were polyhedral with foamy cytoplasm & the nuclei were greatly enlarged with clumped chromatin, prominent nucleoli and haematoidin crystals (Fig. 7).

**Fig. 2:** Mixed echogenic mass in spleen parenchyma**Fig. 3:** Multiple nodules on liver parenchyma**Fig. 4:** Serosanguinous abdominal effusion**Fig. 5:** Left Ventricular hypertrophy

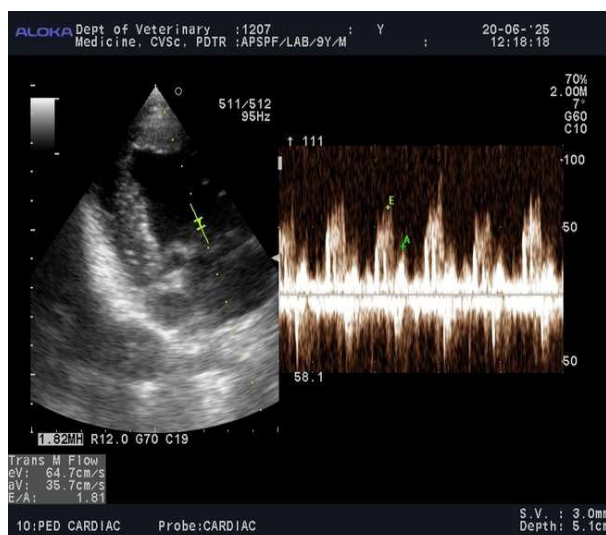


Fig. 6a: Mitral valve regurgitation

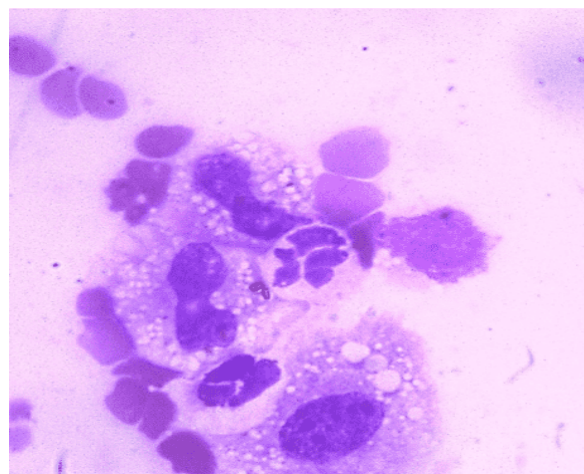


Fig. 7: Cytology showing polyhedral cells with foamy cytoplasm & greatly enlarged nuclei with clumped chromatin, prominent nucleoli and haematoidin crystals

TREATMENT AND DISCUSSION

Therapy was initiated with Inj. Furosemide @ 2.5 mg/kg b.wt. I/M, Tablet Tranexamic Acid @ 12 mg/kg b.wt. PO BID, Oral Hematinic Syrup @ 10 mL/day PO SID and immediate blood transfusion was advised. However, the prognosis was guarded and the dog succumbed to the fulminating illness on the very same day.

With the pet parent's consent, a necropsy was performed as per the standard procedure. Gross examination revealed haemoperitoneum (Fig. 8a) and multiple dark red raised nodules on serosal surface of liver, spleen and intestines (Fig. 8b,c,d). Histopathological examination showed spleen with depletion of the lymphoid cells and neovascularization and newly formed blood vessels with presence of RBC in lumen and brownish haemosiderin (Fig. 9a,b). Large islands of dilated blood vessels lined by plumpy endothelial cells were observed in liver along with multiple pleomorphic and dilated newly formed blood vessels lined by endothelial cells (Fig. 10a,b).

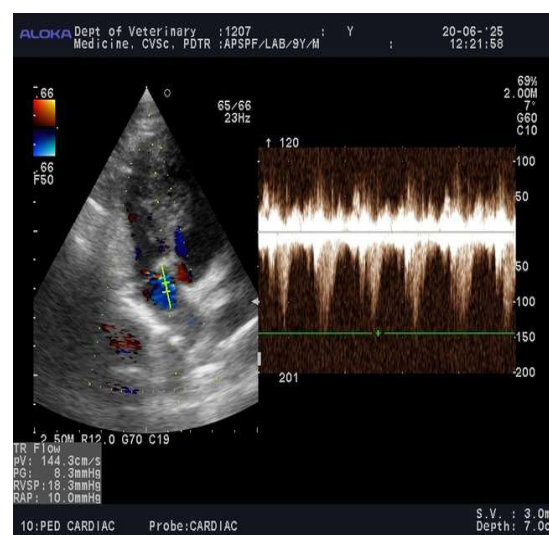


Fig. 6b: Tricuspid valve regurgitation



Fig. 8a: Haemoperitoneum

Correlating all these findings, the case was confirmed as haemangiosarcoma affecting spleen and liver.

The most common primary location for HSA in dogs is the spleen, although right atrium, dermis, liver and subcutaneous tissue are also frequently affected (Griffin *et al.*, 2021). In the present case, patient exhibited vague clinical signs such as unexplained weight loss, lethargy, dyspnea, severe tachycardia, distended abdomen and emesis similar to previous reports by De Nardi *et al.* (2023). The striking haemato-biochemical findings in the case were anaemia and hypoalbuminemia which were in accordance with the findings of Bergman (2020) and Griffin *et al.* (2021). Ultrasonographic evaluation of the abdominal cavity showed peritoneal effusion, nodules on liver, spleen and intestines which were consistent with the ultrasonographic findings of Griffin *et al.* (2021). Although splenic and hepatic B-mode ultrasound evaluation is considered a sensitive method for detecting lesions in these tissues, it may be difficult for differentiating or distinguishing benign and malignant lesions or masses (Watson *et al.*, 2011).



Fig. 8b,c,d: Multiple dark red raised nodules on serosa of liver, spleen and the intestines

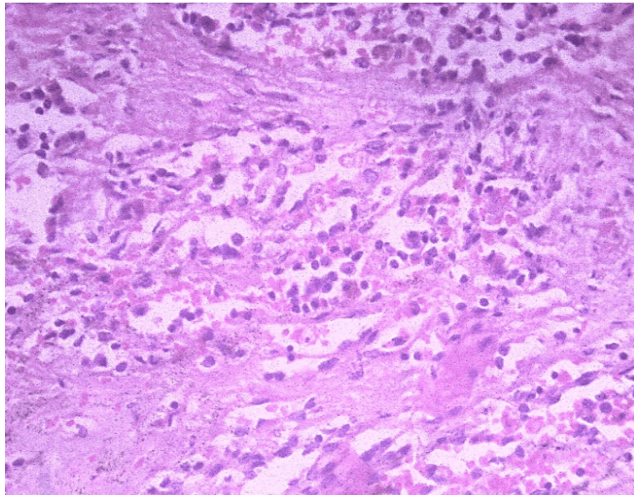


Fig. 9a: Spleen- depletion of the lymphoid and neovascularization (H&E, 400x)

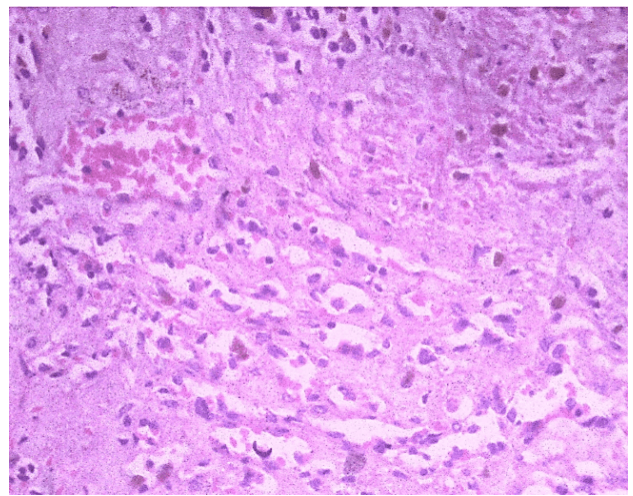


Fig. 9b: Spleen- newly formed blood vessels cells with presence in lumen and brownish of RBC Hemosiderin pigment (H&E, 400x)

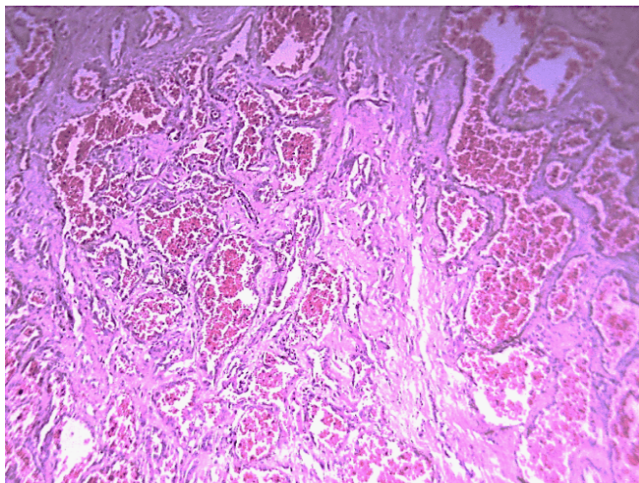


Fig. 10a: Liver- large islands of dilated blood vessels lined by plumpy endothelial cells (H&E, 100x)

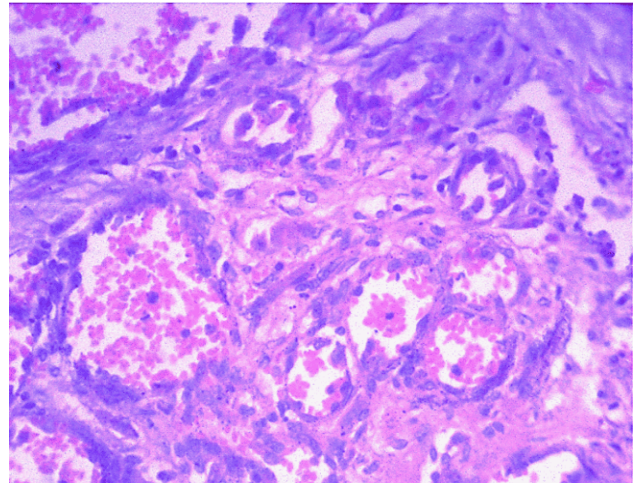


Fig. 10b: Liver- Multiple pleomorphic dilated newly formed blood vessels lined by endothelial cells (H&E, 400x)

In the present case, haemoabdomen was likely the result of haemorrhage frequently associated with splenic HSA tumors, which are considered as the primary cause of non-traumatic haemoperitoneum in dogs (Tinsley, 2020). Haemoabdomen associated with splenic injury in dogs is

correlated with a high probability of malignancy (Davies and Taylor, 2020). The definitive diagnosis of splenic HSA always requires histopathological examination.

The prognosis of splenic HSA in dogs remains to be unfavorable because of the high metastatic capacity of the

tumor and the high rate of metastasis at the time of diagnosis (De Nardi *et al.*, 2023). Owing to this high aggressive nature of splenic HSA, the combination of tumor excision with adjuvant therapies is recommended to increase survival time, disease-free time, and better quality of life for the affected dogs (De Nardi *et al.*, 2023).

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