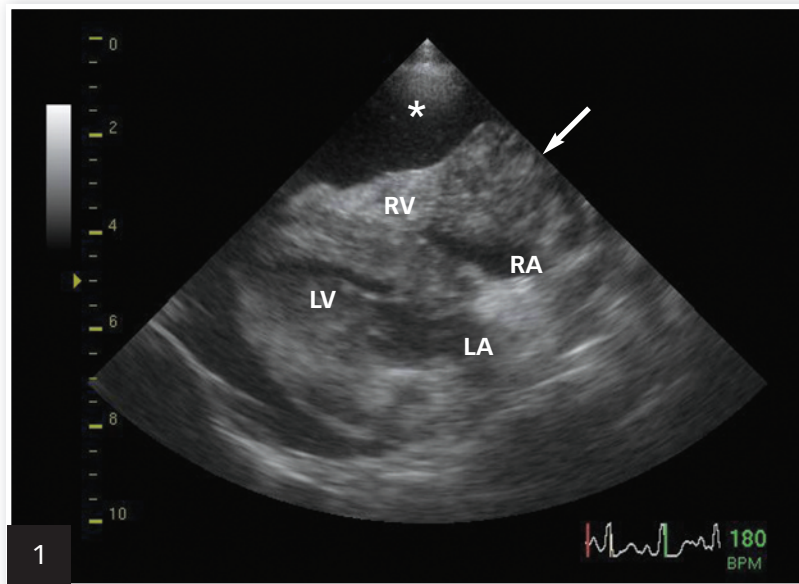


# Hemangiosarcoma in a Dog

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A 10-year-old, spayed Labrador retriever crossbreed with acute-onset weakness and lethargy was presented on emergency to a referral institution.



Echocardiography revealed pericardial effusion (asterisk) and a right atrial (RA) mass (arrow). (LA = left atrium, LV = left ventricle, RV = right ventricle)

## History

The dog had no history of travel or trauma and was current on vaccinations and appropriate parasite control. At presentation, it was recumbent but conscious and responsive.

## Physical Examination

Examination findings included muffled heart sounds, poor peripheral pulses, pale mucous membranes with a CRT of 2 seconds, rectal temperature of 98.7°F, and distal extremities cool to the touch. ECG suggested ventricular premature contractions. Echocardiography revealed pericardial effusion and a right atrial mass (Figure 1).

## Imaging & Laboratory Results

A peripheral catheter was placed and shock fluid therapy initiated, followed by ultrasound-guided pericardiocentesis; this resulted in immediate clinical improvement. Following stabilization, staging tests for suspected hemangiosarcoma were performed. No visible metastatic disease was identified on thoracic radiographs and abdominal ultrasound (Figure 2, next page).

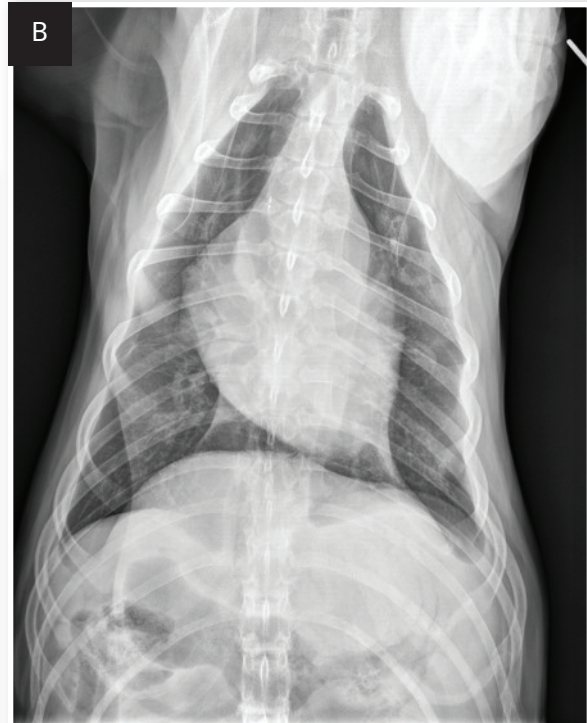
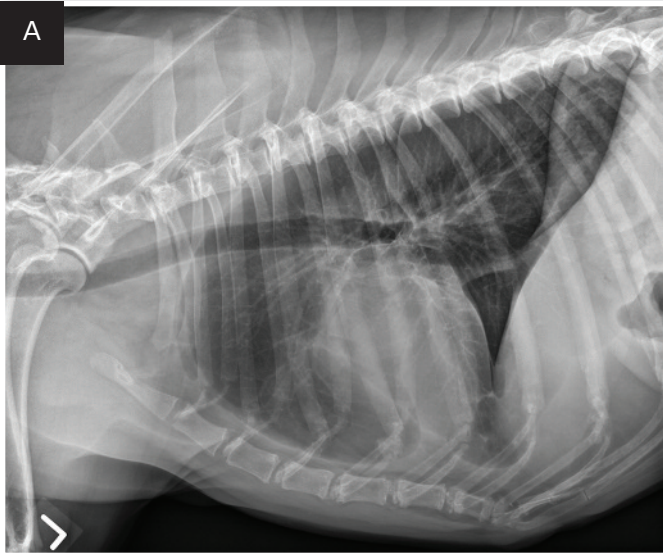
CBC results were suggestive of anemia (hematocrit 35%; range, 39%–57%) and RBC morphology changes (2+ poikilocytes and acanthocytes per HPF, 1+ crenation RBCs per HPF) but no other abnormalities. Significant abnormalities on serum biochemistry profile included elevated alanine aminotransferase levels (117 U/L; range, 3–69 U/L) and aspartate aminotransferase (95 U/L; range, 21–53 U/L). Pericardial fluid analysis showed hemorrhagic effusion with no evidence of neoplasia.

## Initial Treatment

The clients opted to have the dog undergo pericardiectomy to prevent further episodes of tamponade and, if possible, resect the tumor. Before surgery, crossmatch was performed and prothrombin time (8.8 sec; control, 8.6 sec) and partial thromboplastin time (17 sec; control, 14.5 sec) were noted. The right atrial mass was surgically removed. Histopathology confirmed hemangiosarcoma.

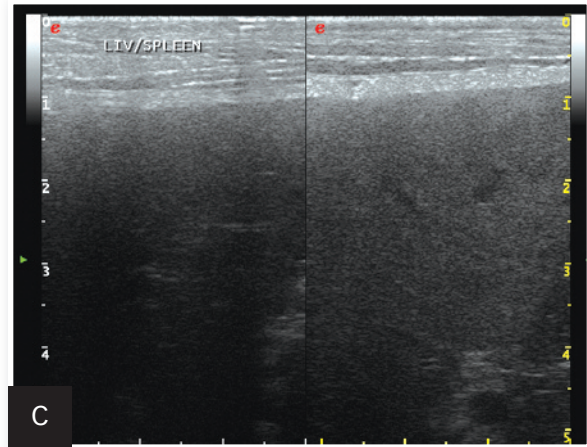
The patient was released the day after surgery and had a seemingly uncomplicated recovery; however, 7 days later, the patient

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Thoracic radiographs (A, B) and abdominal ultrasound (C) failed to identify any visible metastatic disease.



was again presented with acute-onset weakness and lethargy. Physical examination revealed a palpable fluid wave consistent with abdominal effusion, and ultrasonography suggested a large cavitory splenic mass and peritoneal effusion.

Abdominocentesis and centrifugation of the fluid sample were compatible with hemorrhage based on comparison of PCV/TS of the abdominal fluid with that of peripheral blood. Shock therapy with isotonic crystalloids was initiated, and hematology results were compatible with anemia (hematocrit 24%), thrombocytopenia (90,000/ $\mu$ L; range, 175,000–500,000), and leukocytosis characterized by mature neutrophilia (18,000/ $\mu$ L; range, 2,600–10,000). RBC morphology changes continued (2+ anisocytes and polychromasia per HPF, 1+ schistocytes and target/leptocytes per HPF).

The dog's clinical condition continued to deteriorate despite resuscitative efforts, and the client elected emergency splenectomy. A packed RBC transfusion was initiated preoperatively, and the dog received a second unit of RBCs during surgery. Surgery and anesthesia proceeded without complication; the dog recovered well and was released 2 days after surgery.

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### Ask Yourself



Which is the best recommendation for ongoing management of this patient?

- A. Tyrosine kinase inhibitor monotherapy
- B. Piroxicam therapy
- C. Doxorubicin chemotherapy
- D. CHOP chemotherapy
- E. Metronomic chemotherapy

## Correct Answer

### C. Doxorubicin chemotherapy

Doxorubicin chemotherapy remains the standard of care for dogs with hemangiosarcoma. Dogs with minimal residual disease postoperatively have a better prognosis than dogs with measurable disease. Veterinary oncologists continue to investigate therapies to better control this common, biologically aggressive disease.

### Postsurgical Treatment

About 2 weeks after surgery, doxorubicin chemotherapy was initiated at 30 mg/m<sup>2</sup> IV q3wk for 5 doses<sup>1,2</sup> (see **Treatment at a Glance**). This therapy was well tolerated and followed by treatment with toceranib (2.75 mg/kg PO q2d), which has potential antiangiogenic activity through both antivascular endothelial growth factor and anti-platelet-derived growth factor activity.<sup>3,4</sup>

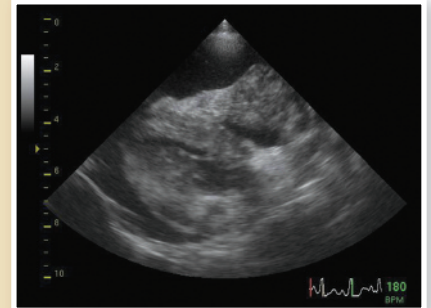
As part of the minimum database before toceranib is started, a CBC, serum biochemistry profile, urinalysis, urine protein:creatinine ratio, and blood pressure measurements were conducted, with no significant findings.<sup>3</sup> Weekly CBC tests after starting toceranib were normal, but a serum biochemistry profile at week 4 showed elevated BUN (48 mg/dL; range, 7–32 mg/dL) and creatinine (1.9 mg/dL; range, 0.5–1.5 mg/dL) levels. Urine-specific gravity was 1.023 with rare, finely granular casts identified on sediment analysis. Blood pressure was normal. The toceranib was discontinued, and follow-up renal profile 2 weeks later showed mildly progressive azotemia (BUN, 57 mg/dL; creatinine, 2.4 mg/dL); however, the urine protein:creatinine ratio was normal at 0.10.

### The Take-Home



- Right atrial hemangiosarcoma may be associated with splenic disease or disease at other distant sites.
- No studies correlate echocardiographic appearance with tumor amenability to resection.
- Ultrasonography may miss small metastatic lesions.
- Surgery and chemotherapy remain the standard of care for hemangiosarcoma.
- New therapeutic options for this disease are continually being evaluated.

## TX at a Glance



- Surgery to eliminate gross disease and bring the patient to a microscopic disease setting and delay further hemorrhage
- Doxorubicin chemotherapy (30 mg/m<sup>2</sup> IV q3wk for 5 doses)<sup>1,2</sup>
- Metronomic options to consider following chemotherapy:
  - Cyclophosphamide (15 mg/m<sup>2</sup>/day PO) and piroxicam (0.3 mg/kg/day PO)
  - Chlorambucil (4 mg/m<sup>2</sup>/day PO)
- Potentially more direct antiangiogenic options to consider following chemotherapy:
  - Toceranib (2.75 mg/kg PO q2day)<sup>3,4</sup>
  - Masitinib (12.5 mg/kg/day PO)

At diagnosis of renal failure, the dog was 5 months post-hemangiosarcoma–diagnosis and clinically normal. The client requested other treatment options for hemangiosarcoma; metronomic chemotherapy with cyclophosphamide and piroxicam or with single-agent chlorambucil was offered.<sup>2,5,6</sup> Because of client concern about hemorrhagic cystitis with cyclophosphamide, metronomic chlorambucil was initiated at 4 mg/m<sup>2</sup>/day PO. Aside from a Veterinary Cooperative Oncology Group (VCOG) score of grade 1 diarrhea, the drug was well tolerated.<sup>7</sup>

### Outcome

Approximately 10 months after the initial diagnosis, the dog was euthanized because of signs compatible with intracavitary hemorrhage. Necropsy was not performed. ■ **cb**

See **Aids & Resources**, back page, for references & suggested reading.