Unilateral Renal Capsule Hemangiosarcoma in an American Pit Bull Terrier Bitch

Alice Ribeiro Oliveira Lima Albuquerque¹, Flávia Xavier Mendes², Thaís Nascimento De Andrade Oliveira³, Fabiana Lessa Silva⁴, Jéssica Fontes Veloso⁵ & Renata Santiago Alberto Carlos⁴

ABSTRACT

Background: Hemangiosarcoma (HSA) is an endothelial vessel tumor with high malignant potential. While the etiology is unclear, it is known that older animals are most commonly affected, and it is commoner in dogs than in other domestic species. Clinical signs are nonspecific and vary according to the location of the tumor. The prognosis ranges from guarded to poor, owing to the high rate of metastasis, tissue invasion, and biochemical changes during the clinical course. Herein, we describe a case of unilateral renal capsule HSA in a 6-year-old American Pit Bull Terrier bitch.

Case: A 6-year-old American Pit Bull Terrier bitch came to veterinary care with a history of recent abdominal distention and progressive weight loss. On physical examination the animal was apathetic with abdominal distention, pale mucous membranes, and a body temperature of 37.5°C. Abdominal ultrasonography revealed fluid collection in the peritoneal cavity. The origin of the fluid could not be determined because of the extent of the fluid collection, which occupied the abdominal cavity throughout its length. In preoperative hematologic tests, anemia, lymphopenia, monocytosis, and hyperproteinemia were observed. At exploratory laparotomy, a large mass was found in the abdominal cavity, attached to the left renal parenchyma and containing bloody fluid. Owing to its poor state of health, the patient died at the end of the procedure; the owners did not authorize a necropsy. Macroscopically, the affected kidney had altered parenchyma suggestive of hydronephrosis, and the mass inside the capsule was 5 × 4 cm and contained areas of necrosis and a clot. Microscopically, the lesion was diagnosed as renal capsule HSA.

Discussion: Hemangiosarcoma has been reported in a number of breeds such as German Shepherd, Golden Retriever, Labrador Retriever, Boxer, Pointer, Greyhound, Basset Hound, and Beagle. However, there have been no previous reports of the disease in American Pit Bull Terriers. The age of the patient in this case report does not corroborate the literature, which generally shows that older animals are affected. The dog’s clinical signs were anorexia, lethargy, progressive weight loss, increased abdominal size, pale mucous membranes and abdominal distention, which have been reported by previous studies, and some of which can be a result of tumor rupture. Hematology findings of this case (such as anemia) were accounted for by the large amount of bloody fluid from the tumor. Ultrasonography was not conclusive because it was difficult to visualize all the abdominal structures and localize the tumor, since the entire length of the abdominal cavity revealed fluid retention. Thus, exploratory laparotomy was needed to elucidate the diagnosis. During the surgical procedure, besides the left kidney, no adhesions or involvement of other organs were observed. The whole mass in the abdominal cavity was removed after emptying of the bloody fluid, but the poor health of the animal led to fatal cardio-respiratory arrest. Because the owner did not authorize a necropsy, the only histopathological examination performed was that of the material collected during the nephrectomy. The affected kidney had an altered parenchyma suggestive of hydronephrosis, and the mass inside the capsule was 5 × 4 cm and contained areas of necrosis and a blood clot. Microscopic examination revealed renal capsule HSA.

Keywords: tumor, vessel, metastasis, laparotomy, kidney, dog, canine.
INTRODUCTION

Hemangiosarcoma (HAS) is an endothelial vessel tumor with high malignant potential, and may be primary in any tissue, although the most commonly affected sites in domestic species are the right atrium, spleen, and liver [6,10]. Subcutaneous tissue, bone and kidney are less frequently affected [5]. The canine species is the most commonly affected by this neoplasm, which is observed in about 0.3%-2.0% of all canine necropsies without presenting a sex predilection [4,8]. The average age of occurrence of HSA in dogs is 8-13 years, and large dog breeds like the German Shepherd, Golden Retriever, Labrador Retriever, Boxer, and Pointer appear to be predisposed [1,10].

Clinical signs are nonspecific and vary according to tumor location. The most serious manifestation is sudden death as a consequence of severe bleeding in the abdominal and chest cavities resulting from the rupture of the neoplasm [3]. The prognosis ranges from guarded to poor, owing to the high rate of metastasis, tissue invasion, and biochemical changes during the clinical course. Even with the use of surgical procedures in association with chemotherapy, life expectancy is short, and less than 10% of affected individuals survive until 12 months [1,10].

Herein, we report a case of unilateral renal capsule HSA in a 6-year-old American Pit Bull Terrier bitch.

CASE

A 6-year-old female American Pit Bull Terrier bitch weighing 21.3 kg was admitted to a Veterinary Clinic in the city of Ilhéus, Bahia, with a history of recent abdominal distention. The owner reported that the animal showed progressive weight loss, but he was unable to describe the history in detail because the dog lived in his parents’ house. However, he said that the dog had received injectable contraceptives during estrus, but had not copulated and therefore had not given birth.

On physical examination, the patient was lethargic with a large abdomen, pale mucous membranes, body temperature of 37.5°C, and normal cardiopulmonary sounds on auscultation.

The patient was referred for ultrasound examination, which revealed fluid collection in the abdominal cavity; however, it was not possible to accurately determine the affected organ, because the mass occupied the entire length of the abdomen. Therefore, an exploratory laparotomy was indicated.

Preoperative tests included complete blood count and blood glucose. The results of hematological examinations were macrocytic normochromic anemia (3.4 x 10³ red blood cells/mm³), relative lymphopenia (9%), relative mononcytosis (11%) and hyperproteinaemia (10.1 g/dL). Blood glucose was within the normal range (63 mg/dL).

The animal was then submitted to exploratory laparotomy through the midline, during which a mass (Figure 1) was found in the abdominal cavity. The mass was attached to the left renal parenchyma and contained bloody fluid.

Approximately 1.5 L of this fluid (Figure 2) was withdrawn by puncture, and nephrectomy was performed subsequently. Macroscopically, no other abnormalities were observed in any other organs in the abdominal cavity. However, because of the general condition of the patient, she suffered a cardiac arrest and died before the surgical procedure was completed.

Because the owner did not authorize a necropsy, the only histopathological examination performed was that of the left kidney and the tumor attached to the renal capsule.

The tissue collected at surgery was sent to the veterinary histopathology laboratory of the State University of Santa Cruz-UESC for histopathological examination. Macroscopically, the affected kidney had altered parenchyma suggestive of hydronephrosis (Figure 3A). The mass within the capsule was 5 × 4 cm and contained areas of necrosis and a clot (Figure 3B).

For microscopic analysis, fragments of tissues were initially fixed in 10% formaldehyde for 48 h. Tissue samples were subsequently dehydrated in solutions of increasing alcohol concentrations, cleared in xylene, embedded in paraffin, and cut 4-5 μm thick with a microtome, and mounted on slides. The slides were stained with hematoxylin-eosin (HE) and examined under an optical microscope.

In the histopathological examination of the tumor, the findings were intense proliferation of mesenchymal stem cells with pleomorphic nuclei ranging from rounded to elongated, loss of chromatin organization, prominent nucleoli (single in the majority of the cells), and poorly developed vascular spaces. Features of malignancy such as anisocytosis and marked anisokaryosis, moderately developed supporting stroma, low mitotic index, and multinucleated giant cells were also observed (Figure 4).
In the lesion within the renal capsule, vascular spaces filled with blood formations, sometimes delimited by moderately pleomorphic elongated endothelial cells, and sometimes by rounded ones, were observed (Figure 5).

In histological sections of the transition area between the tumor and the renal capsule, interstitial inflammatory infiltrates predominantly comprised of neutrophils and multifocal vacuolation of tubular epithelial cells (suggesting degeneration) were observed (Figure 6).

The histopathologic diagnosis revealed hydronephrosis and HSA in the left kidney.

Figure 1. Photographic image revealing a large mass in the abdominal cavity at the start of the laparotomy procedure.

Figure 2. Photographic image of the withdrawal of bloodstained fluid from the abdominal cavity by puncture during the exploratory laparotomy.

Figure 3. Macroscopic view of the left kidney after nephrectomy showing: (A) loss of the normal architecture suggestive of hydronephrosis, (B) tumor mass in the renal capsule (yellow arrow) and presence of blood clots (red arrows).

Figure 4. Histological section of the tumor stained with HE at 400x magnification, featuring: some rounded cells with nuclei (red arrow) and some elongated ones (green arrow), indicating marked pleomorphism. Scant cytoplasm, with mitotic figures (yellow arrow), multinucleated giant cell (black arrow) and moderately developed supporting stroma (blue arrows).
DISCUSSION

This case report is important because HSA rarely occurs in the kidneys. The most common places of occurrence are the right atrium, spleen, and liver [6,11]. Thus far, its occurrence in the renal capsule has not been reported in the national scientific literature.[6,11]

The age of our patient differs from that typically described in the literature, because she was a young adult animal (6-year-old), and the occurrence of this disease is more common in older dogs, over 8 years [1,10] and American Pit Bull Terrier, is not considered to be predisposed to the tumor [9].

Hemangiosarcoma in the renal capsule has never been described prior to this report, and the kidneys are rarely, if ever, involved [5].

The clinical signs presented by the animal (anorexia, lethargy, weight loss, increased abdominal volume, and pale mucous membranes) corroborate those described in the literature [2]. The complaints reported by the owner, such as weakness and abdominal distension, may be a result of tumor rupture and intra-abdominal bleeding, which can lead to death from collapse, according to Hammer [6]. In our case, we observed a large amount of bloody fluid inside the renal capsule, which accounted for the clinical signs.

The hematological alterations, such as anemia, were consistent with descriptions in the literature and accounted for by the large amount of blood contained in the renal capsule [7]. Hyperproteinemia may be associated with inflammation and bleeding caused by the presence of a tumor.

The intra-abdominal mass was confirmed by ultrasound, but this examination was insufficient to diagnose the affected organ because of the huge collection of abdominal fluid. In this case, the left kidney was identified as the affected organ based on exploratory laparotomy. A CT scan could have been performed and would have been useful in the diagnosis, but unfortunately at the time of service this tool was not available in the region. It is likely that there had been continuing sporadic bleeding, because of the history of gradual increase in the size of the abdomen and the observation of the presence of clots in the renal parenchyma. Perhaps even with chronic accumulation of blood inside the tumor, an acute hemorrhage could have happened in the days prior to the presentation at our hospital, worsening the patient’s physical condition. Furthermore, macrocytic normochromic anemia was present, suggesting a bone marrow response.

During surgery there was no macroscopic evidence of abdominal metastasis, only the presence of hydronephrosis in the affected kidney that may have resulted from the compression exerted by the mass in the renal parenchyma. The assessment of involvement of other organs could have been done by necropsy, but this procedure was not authorized by the owner.

Death occurred towards the end of the surgery because of cardiogenic/hypovolemic shock secondary to severe hypovolemia and anemia leading to hypotension and low perfusion in other organs.

Histopathological examination should always be performed in cases of renal or other kinds of neo-
plasm, as this examination defines the origin of the tumor and allows a definite diagnosis.

Our patient had a late diagnosis because the disease progression occurred in a chronic form over months. Although this type of tumor is considered aggressive, early diagnosis can improve the survival rate of the animal when it is associated with treatments such as surgery, chemotherapy, and radiotherapy.

**Declaration of interest.** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

**REFERENCES**


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