

# Aural Hematoma Secondary to Hemangiosarcoma in a Domestic Cat—Case Report



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## A B S T R A C T

A 7-year-old, white, domestic short hair, female cat was presented with an aural hematoma of the right pinna, which had been partially resected a year previously. A 3 × 4 cm mass, macroscopically similar to an auricular hematoma, was visible on the convex surface and a smaller vascular lesion was present on the ear margin. Cytological examination of the smaller mass was suggestive of hemangiosarcoma, and a diagnosis confirmed by histopathologic and immunohistochemical tests. Complete pinnectomy with a wide margin was performed and during the 3-year follow-up, the cat had no local recurrence or metastasis. We conclude that hemangiosarcoma should be considered as a potential differential diagnosis in white-coated cats with an unusual clinical presentation of aural hematoma.

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## Introduction

Aural hematomas are characterized by the accumulation of hemorrhagic fluid between the skin and the concave or convex face of the aural cartilage plate of 1 or both aural pinnae. This alteration can occur in dogs and cats of any breed or age. Aural hematomas usually occur as a result of trauma to the head or ears or secondary to otitis externa, though underlying immune disease has also been reported.<sup>1</sup>

Several infectious or neoplastic skin diseases can affect the pinna of dogs and cats.<sup>2</sup> Basal cell tumor, mast cell tumor, squamous cell carcinoma, and fibrosarcoma are the most common tumors diagnosed in cats, comprising 77.1% of all skin tumors.<sup>3</sup> Hemangiosarcoma (HSA) is a malignant neoplasm that originates in vascular endothelial cells, occurring commonly in dogs, and infrequently in cats. This neoplasm is commonly described in the skin and subcutaneous tissues<sup>4,5</sup> although it has not been reported as a cause of aural hematomas in cats. Although tumors of epithelial and mesenchymal origin are the most common skin tumors reported in feline ears,<sup>6,7</sup> they have not been reported as a cause of aural hematomas.

This case report describes a case of an aural hematoma occurring secondary to HSA in a domestic cat, highlighting the clinical aspect, diagnosis, and case outcome.

## Case Description

A 7-year-old, female, white, domestic short hair cat that had previously had a partial pinnectomy of the right ear to treat an aural hematoma, was presented to the Veterinary Hospital of the Federal University of Campina Grande, in Patos, Paraíba, Brazil. On the

previous occasion, histopathologic examination of the excised area was not performed. The client reported that the cat had free access to outdoors, was often exposed to the sun, and the aural hematoma had recurred 2 months prior to presentation.

## Clinical Findings

On physical exam, the cat was in good body condition and physiological parameters were within the normal range for the species. Otoscopy and otologic cytology indicated that the right and left ear canals were normal; however, a rounded, mobile, painless, purple blood-filled mass, measuring 3 cm × 4 cm × 3 cm was observed on the dorsal right pinna (Fig 1A). On the edge of the cartilage of the same pinna, a 0.5 × 0.2 cm red, vascularized, irregular mass was noted (Fig 1B). The macroscopic findings led to an empiric clinical diagnosis of an aural hematoma. Cytologic examination of the small nodule at the edge of the cartilage was performed and the results suggested HSA (Fig 2), as described by Raskin & Meyer.<sup>6</sup>

Following the results of cytologic diagnosis of HSA, the cat was then staged. Complete blood count and serum biochemistry were performed, and all measured parameters were within normal ranges. Three-view chest radiographs and abdominal ultrasound were performed, and no clinically significant abnormalities were observed.

## Treatment and Outcome

Pinnal resection with wide margins (3 cm × 3 cm) was performed. A curvilinear (S-shaped) incision was made on the concave surface of the ear and staggered longitudinal sutures were placed across the ear. No complications were associated with the surgical procedure.

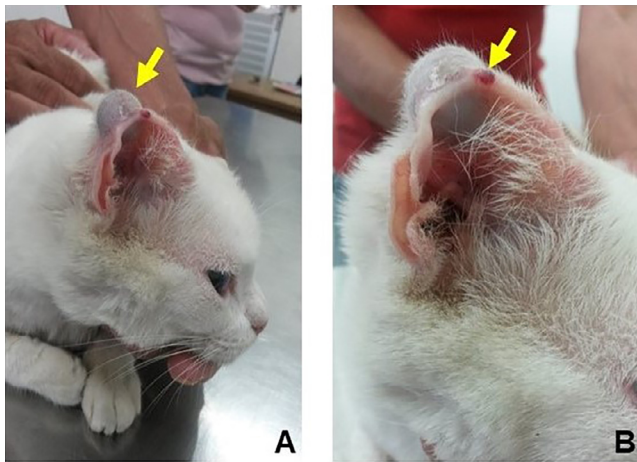
Histopathologic analysis of the resected tissue showed the tumor to be non-encapsulated with an infiltration into the dermis and epidermis, however, no malignant cells were seen in the cartilage or subcutaneous tissues. The tumor was characterized by mesenchymal cells supported by collagen and the presence of sinusoidal blood-

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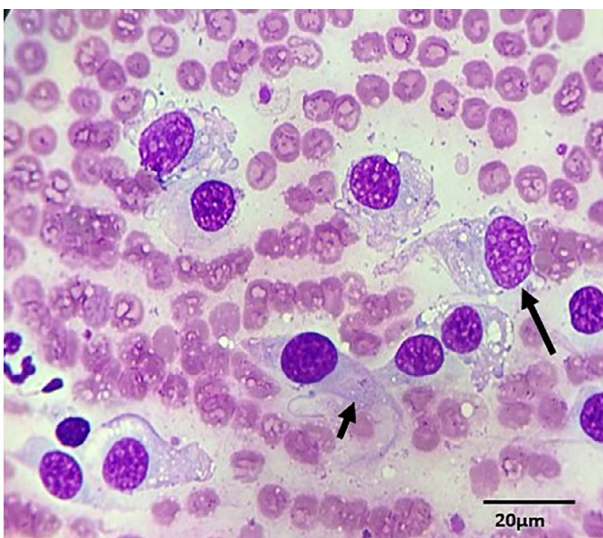
Ethical Approval: This work did not involve the use of animals and therefore Ethical Approval was not required.



**Fig 1.** Aural hematoma on the convex face of the right pinna of a 7-year-old, domestic short hair cat. (A) Gross blood-filled lesion (yellow arrow). (B) Note the red nodule on the edge of the cartilage (yellow arrow). Color version of figure is available online.

filled spaces. The cells had scarce, eosinophilic cytoplasm and elongated nuclei with homogeneous chromatin. Atypical mitoses were present and 8 mitotic figures were seen in 10 high powered fields (original magnification 40 $\times$ ). Discrete pleomorphism and diffuse inflammatory and lymphoplasmacytic infiltrates were associated with the tumor. A thrombus was observed inside a neoplastic vessel. Focal areas of ulceration with crust formation were seen and edema was present beneath the epithelium. The histopathologic appearance confirmed a well-differentiated cutaneous HSA with clean surgical margins. Additionally, immunohistochemistry using anti-CD31 (endothelial cell marker) antibody was performed and the neoplastic cells were positive for CD31 (Fig 3A and B), confirming the histopathologic diagnosis.

Following surgery, recommendations were made to reduce the cat's exposure to sunlight and start the use of daily sunscreen. The cat was re-examined for repeat blood work, thoracic radiographs, and abdominal ultrasound every 6 months for 3 years. In this period, no local recurrence or metastases were observed.



**Fig 2.** Photomicrographs of the cytologic sample from the aural lesion. Note the mesenchymal cells and elongated cytoplasm (short arrow), oval shaped nucleus (long arrow), and multiple prominent nucleoli (Original magnification 100 $\times$ ; Quick Panoptic stain).

## Discussion

The domestic short hair cat was 7-year-old, had a white coat and was often exposed to the sun. These characteristics, although primarily unrelated to an aural hematoma, have been epidemiologically associated with cutaneous HSA in dogs and cats.<sup>7-9</sup> Squamous cell carcinoma often results from chronic exposure to sunlight (ultraviolet light). Older cats and white-coated cats are considered at higher risk.<sup>3</sup> In a study evaluating 340 skin tumors in cats, 6 animals were diagnosed with HSA and 3 of these were on the ear.<sup>3</sup> In addition to not being spayed and having free access to outdoors, this cat lives in an area with a high incidence of ultraviolet radiation.<sup>7</sup> These factors make it at particularly high risk for development of HSA. Moreover, the ear is an anatomic site at high risk of sun exposure as mentioned by the authors of previous studies.<sup>7-9</sup>

The dermatologic findings on the right pinna were macroscopically compatible with aural hematoma. No abnormalities were found during the anamnesis and clinical dermatologic evaluation to suggest trauma, as usually reported with an aural hematoma in small animals.<sup>1</sup> Although external trauma cannot be totally excluded, it is possible that the pathologic changes in the local blood vessels, such as the malignant transformation of the endothelial cells, may have resulted in the development of the HSA, and played a part in this tumor's.

Cytology of the smaller cutaneous nodule on the ear margin, suggested HSA as the etiology for the aural hematoma. Prolonged and repeated exposure to ultraviolet radiation has been described as the main factor predisposing to the appearance of HSA,<sup>5</sup> due to oxidative stress and activation of inflammatory cytokines (AP-1 and NF- $\kappa$ B pathways) in the cell.<sup>10</sup> Since cutaneous HSA is an endothelial cell neoplasm, it is likely that as the tumor expanded it infiltrated the dermis, promoting vessel rupture and subsequent blood leakage into the subcutaneous tissue, resulting in the aural hematoma.

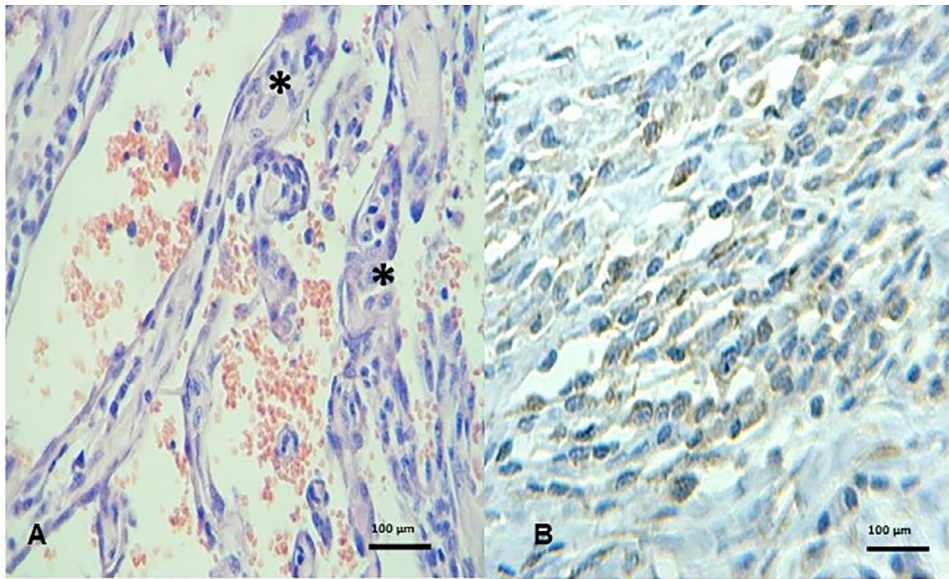
The diagnosis was confirmed by histopathologic and immunohistochemistry examination. As reported by other authors, immunohistochemical analysis to detect the presence of CD31 antigen is useful to confirm a diagnosis of HSA.<sup>11-14</sup>

No evidence of metastasis was found on initial imaging examinations.<sup>15</sup> Three cats in poor body condition were euthanized due to recurrence, and the necropsy was not performed. Thus, the frequency of metastasis and mortality have not been determined. Conversely, the cats that were not euthanized remained clinically healthy, except for local tumor recurrence.<sup>15</sup> However, a study of 53 cases of HSA in cats concluded that cutaneous and subcutaneous HSA may have a greater metastatic potential.<sup>4</sup> Large retrospective studies on feline HSA are uncommon in the veterinary literature and prospective studies evaluating treatment results and survival time have not been identified.<sup>4</sup>

Although a definitive diagnosis had not been achieved on previous examinations, it is likely that the HSA on the right pinnal margin was a recurrence, since the cat had previously had a unilateral partial pinnal resection.<sup>5</sup> Other authors,<sup>1</sup> have reported relapse in 8 of 15 of cats, in a period from one month to 2 years after the surgical excision of cutaneous HSA.

Cutaneous HSA requires complete surgical excision with tumor-free margins to prevent local recurrence.<sup>15</sup> This case report established that radical pinnectomy and postoperative changes to lifestyle were effective, since there was no relapse or metastasis in the period of 3 years after surgery.

In this case, the early diagnosis of neoplasia meant that radical pinnal resection was considered the most appropriate treatment rather than convention treatment of aural hematoma.<sup>1</sup> There are several techniques described for treatment of aural hematomas in dogs and cats (both pharmacological and non-pharmacological treatments). Treatment of any underlying ear disease is also essential to minimize the chance of recurrence of an aural hematoma.<sup>1</sup> However, as shown in this report, a detailed examination of the ear is essential to determine the etiology of the hematoma in order to maximize the chances of success.



**Fig 3.** Histopathology of the sample from the aural mass. (A) Formation of vascular spaces showing red blood cells (malignant endothelial cells) (\*). (Hematoxylin-eosin stain, original magnification 20x). (B) Positive immunostaining (brown) of CD31+ neoplastic vascular endothelial cells. (Diaminobenzidine tetrachlorhydrate chromogen and Harris hematoxylin counterstain, original magnification 40x). Color version of figure is available online.

#### Clinical Relevance

Aural hematomas are usually attributed to traumatic processes and are commonly reported in dogs but less frequently in cats. Temporal association suggests that, in this case, the aural hematoma was associated with cutaneous HSA. Based on this case, HSA should be considered as a differential etiology in white cats with the unusual clinical presentation of aural hematoma. Cytology should be considered to help guide treatment while diagnosis should be confirmed by histopathologic and immunohistochemical analysis. Wide surgical excision should be performed, when appropriate, to help maximize the chances for long-term local disease control.

#### Credit Author Statement

Olivia Maria Moreira Borges: conceptualization, methodology, investigation, writing original draft preparation.

Gabriela Noronha de Toledo: writing original draft preparation, writing reviewing and editing, supervision.

Rosileide Santos Carneiro: methodology, data curation.

Fernanda Vieira Henrique: data curation, visualization.

Jefferson da Silva Ferreira: methodology, investigation, writing original draft preparation.

Antônio Flávio Medeiros Dantas: visualization, supervision.

Almir Pereira de Souza: visualization, supervision.

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