Indian J. Vet. Pathol., 49(4) : 353-357, 2025: DOI: https://doi.org/10.56093/cqx9xf42

CASE REPORT

Capillary haemangioma: Histopathological characterization of a rare gingival mass in a calf

N. Babu Prasath*, D.T. Kaarthik[1] and J. Selvaraj
Department of Veterinary Pathology, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University, Orathanadu-614 625, Thanjavur, Tamil Nadu, India, [1]Department of Veterinary Clinical Complex

Address for Correspondence
N. Babu Prasath, Department of Veterinary Pathology, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University, Orathanadu-614 625, Thanjavur, Tamil Nadu, India; E-mail: vetdrprasad@gmail.com

Received: 28.6.2025; Accepted: 11.8.2025

ABSTRACT

A two months old cross bred Jersey calf was presented with an irregularly oval growth (2.5 cm x 5 mm) in the mandibular gingiva. The mass was greyish-white and ulcerated. The growth was surgically removed and submitted for histopathology. Tissue sample was processed as per standard histological techniques. Microscopically, tissue revealed extensive superficial ulceration with necrosis and bacterial colonies. Underneath, abnormal proliferation of vascular endothelial cells was evident showing plumpy cells with mild anioscytosis, anisokaryosis and low mitotic figures. Deeper tissue revealed abnormal proliferation of vascular capillary network which were separated into lobules by meagre collagenous stroma. Interlobular stroma had loose collagen. Mast cells were scattered in the stromal components of the neoplastic capillary networks. This paper reports the histopathological features of rare case of capillary haemangioma in a two months old cross bred Jersey calf exhibiting multifocal organization of thrombi with recanalization and activity of mast cells in capillary haemangioma.

Keywords: Calf, capillary hemangioma, gingiva, mast cells

Haemangiomas are benign vascular tumours that arise due to abnormal proliferation of blood vessels[1]. Congenital haemangioma is common in children[2] and infrequent in animals[3]. Haemangioma is common in dogs and rare in other domestic animals[4]. Capillary haemangioma is one among the variant of haemangiomas which occur in various organs[5]. Gingival capillary haemangioma is infrequent in calves[6]. Hereditary involvement with mutation in the GNAQ gene is proposed rather environmental cause for haemangiomas[7]. Histologically, multifocal organization of thrombi with florid intravascular proliferation of endothelial cells is a feature which underpin the subject of GNA mutations in haemangioma. Further, mast cells play crucial role as 'double-edged sword' in progression and regression of haemangiomas[8]. Quantity of activated mast cells in stromal cells of haemangioma decide the phase of the tumour[9]. This paper documents the rare gingival capillary haemangioma in a two-months-old crossbred Jersey calf with histopathological features of multifocal well-organized thrombus, exhibiting recanalization and activity of mast cells in stroma of tumour tissue.

A Jersey cross bred calf of two-months-old was presented to Veterinary Clinical Complex, Veterinary College and Research Institute (VCRI), Tamil Nadu Veterinary and Animal Sciences University, Orathanadu, Tamil Nadu with the history of growth in the gingiva of mandibular incisors. The growth was well-defined, whitish-grey and nodular. Surface showed ulceration and had focal area of haemorrhage. The mass was slightly firmer and attached with broad base over the mucosa of labial surface of gingiva of the mandibular incisors. The mass was roughly oval and measured 2.5 cm (length) x 5 mm (width) (Fig. 1). The mass was surgically removed. The tissue was fixed in 10% formalin and submitted for histopathological diagnosis to the Department of Veterinary Pathology, VCRI, Orathanadu. Biopsy tissue was processed as per standard paraffin-embedding technique[10]. Tissue sections of 3-4 µm thickness were prepared and stained as per haematoxylin-eosin staining protocol[11]. Duplicate sections were stained with Masson trichrome stain[12], standard toluidine blue stain[13] and Heidenhain's hematoxylin[11].

How to cite this article : Prasath, N.B., Kaarthik, D.T. and Selvaraj, J. 2025. Capillary haemangioma: Histopathological characterization of a rare gingival mass in a calf. Indian J. Vet. Pathol., 49(4) : 353-357.

Microscopically, the tumour mass was dome-shaped (Fig. 2) showing extensive superficial ulceration of the mucosa, necrosis with bacterial colonies and a focal area of haemorrhage. A focal area of the mucosa with stratified squamous epithelium was evident towards lower-side of the tissue. Ulcerated areas revealed throngs of infiltrative neutrophils extending a little deep into the dermis (Fig. 3). Underneath, the tissue was highly cellular and revealed the proliferative vascular endothelial cells forming numerous variable sized channels filled with erythrocytes (Fig. 4). The vascular lining cells were

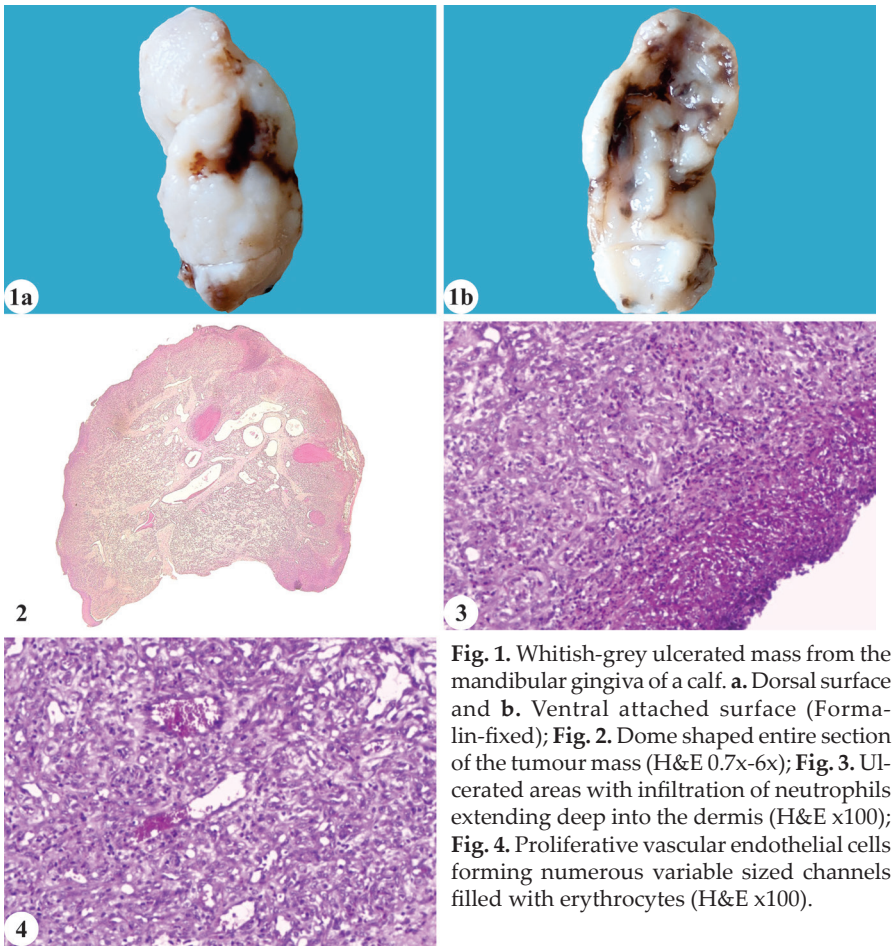

Fig. 1. Whitish-grey ulcerated mass from the mandibular gingiva of a calf. **a.** Dorsal surface and **b.** Ventral attached surface (Formalin-fixed); **Fig. 2.** Dome shaped entire section of the tumour mass (H&E 0.7x-6x); **Fig. 3.** Ulcerated areas with infiltration of neutrophils extending deep into the dermis (H&E x100); **Fig. 4.** Proliferative vascular endothelial cells forming numerous variable sized channels filled with erythrocytes (H&E x100).

rotund. These endothelial cells found to infiltrate deep into the dermis. In the transit area, the cells were corpulent and showed slight pleomorphism (Fig. 5a). These cells had prominent ovoid to spindle shaped vesicular nucleus with stippled chromatin (salt and pepper chromatin pattern) (Fig. 5b) and had very low mitotic figures (0-4/10 high power fields x400). Cells revealed mild anisocytosis and anisokaryosis. Transit area also revealed abnormal capillaries with narrow and or wider luminal area. These capillaries were either filled with blood or serous fluid. Few of these capillaries showed well-formed organized thrombus (Fig. 6). The thrombus had proliferation of endothelial cells into the thrombotic mass (Fig. 7).

Deep in the dermis, the neoplastic endothelial cells formed lobules of irregularly arranged, variable sized, closely packed vascular network. The lobules were separated by moderate collagenous stroma (Fig. 8). Vascular clusters showed irregularly anastomosing thin walled capillaries with uneven lumen (Fig. 9). Capillaries were lined by single layer of plumpy endothelial cells (Fig. 10). Lumen of the neoplastic capillaries either contained few erythrocytes or mostly empty. Some capillaries showed scattered and indistinct lumina. Lobules of capillaries were separated by moderate amount of collagen which was evidenced on Masson trichrome stain (Fig. 11). Stroma between the capillaries contained loose, thin collagenous stroma (Fig. 12). The stroma contained scattered mast cells and plasma cells. Mast cells (MCs) were lesser in the superficial portion and scattered in the stromal elements of the deeper neoplastic capillary network (Fig. 13).

Vascular anomalies were categorized into (a) Congenital vascular malformations (hamartoma) and (b) Neoplastic transformations. Vascular neoplastic transformations (angioma) are classified into benign haemangioma and malignant haemangiosarcoma[14]. Further haemangioma are sorted into capillary, cavernous and epithelioid haemangioma[14] on the basis of the size of the vascular channels[15] and appearance of endothelial cells respectively[16,17].

Haemangiomas were found to be less frequent in animals[18]. It was reported to occur as cutaneous tumour in skin[15,19], subcutis[3] and visceral tumour in internal organs[16]. The occurrence of haemangioma was rare and infrequent in oral cavity[20]. It was reported from the tongue of a dog[21]. Vascular tumours of gums were found to be rare in animals[22] and extremely rare in calves[20]. A unique report of haemangiosarcoma of gingival tissue

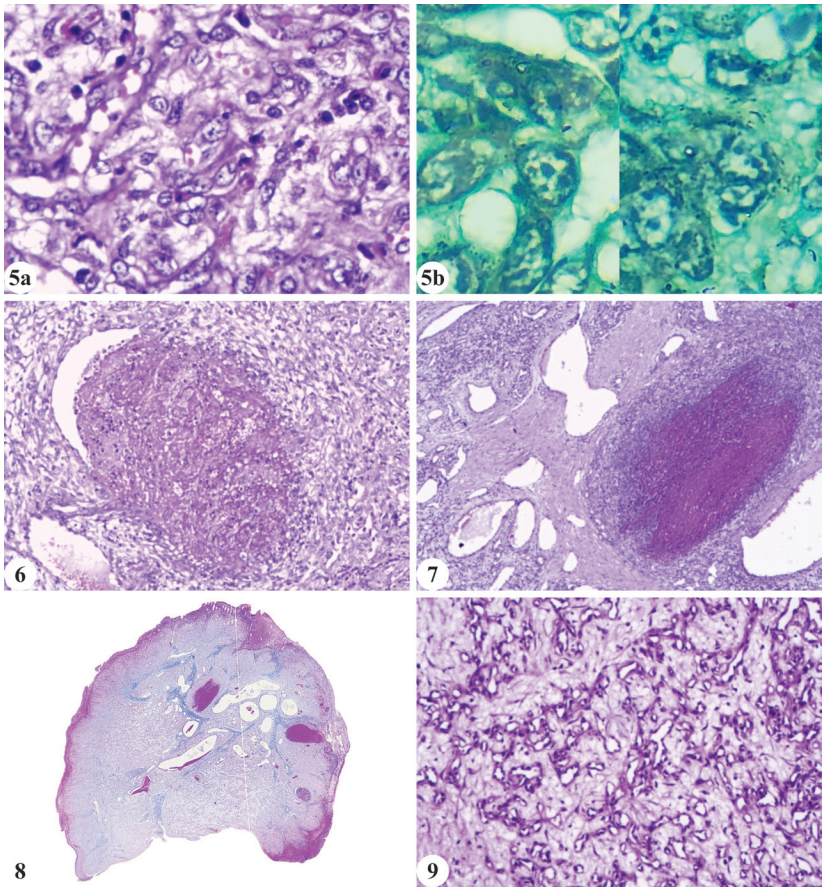

Fig. 5a. Plumpy neoplastic vascular endothelial cells with prominent ovoid to spindle shaped vesicular nucleus with stippled chromatin (H&E x400); **Fig. 5b.** Stippled chromatin (resembling salt and pepper) of proliferating vascular endothelial cells (Heidenhain's hematoxylin with light green counter stain x1000); **Fig. 6.** A neoplastic capillary with well-formed organized thrombus; **Fig. 7.** Organised thrombus exhibiting proliferation of endothelial cells into the thrombotic mass (H&E x40); **Fig. 8.** Neoplastic mass shows meagre collagen in entire tumour mass (Masson trichrome stain 0.7x-6x; **Fig. 9.** Irregularly arranged, variable sized, closely packed capillary network separated by collagenous stroma (H&E x100).

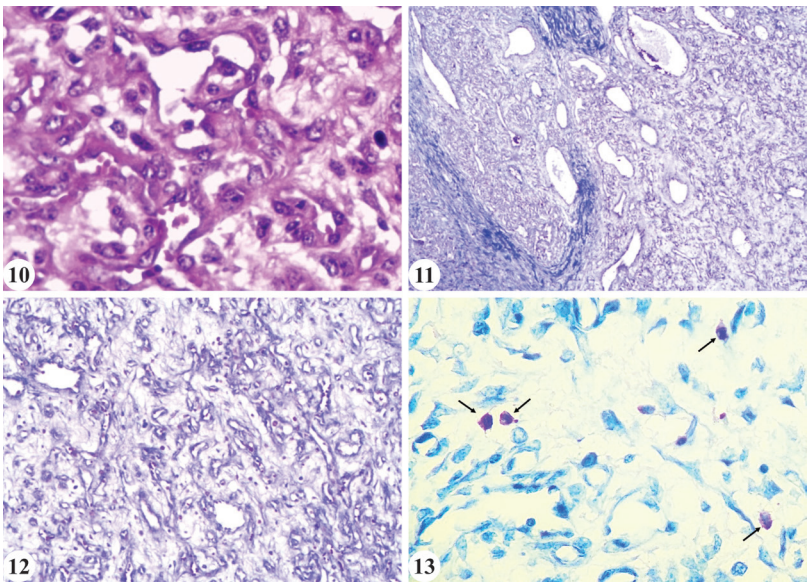

Fig. 10. Neoplastic capillaries are lined by single layer of plumpy endothelial cells (H&E x400); **Fig. 11.** Neoplastic mass shows separation of lobules with collagen bundles (Masson trichrome stain x40); **Fig. 12.** Irregular capillary network separated by loose collagenous stroma (Masson trichrome stain x100); **Fig. 13.** Scattered mast cells (arrow) in stromal tissue of capillary haemangioma (Standard toluidine blue stain x400).

was reported in a 2-months-old calf of native breed in Iran[20].

In the catalog of vascular tumours, the capillary haemangioma of gingiva was found to be uncommon in animals[6,17,23,24]. Infrequently, capillary haemangioma was described in various organs/tissues in animals[4,5,19,25]. The earlier reports documented the glossal capillary haemangioma in bovine[6,23,24,26] and cat[4].

Histopatholgical findings described in the present study was similar with the previous reports[6,19,21,23,24,27]. The feature of capillary thrombus with recanalization recorded in the study was in-line with previous reports[7,20]. Multifocal vascular thrombus, organization of thrombi with intravascular proliferation of endothelial cells, which were streaming into the thrombi were the distinctive features. These changes were observed immediate underneath the ulcerated area and in the transit zone composed of proliferative neoplastic cells.

The more remarkable feature was the presence of scattered mast cells (MCs) in the stroma of the neoplastic vascular stroma. These cells were lesser in superficial areas rather moderate in the deeper neoplastic tissue. Evidence of mast cells and plasma cells in the stroma of deeper neoplastic tissue of the present study might not indicate the inflammatory reaction. However, in contradictory to the observation of[19] have described the inflammatory lobular capillary haemangioma in the skin of left ventral neck of guniea pig[19]. It was proposed that MCs plays pivotal role in progression and regression of vascular tumours[28]. It was thought that MCs were found to be low in proliferating phase, increase in early involution phase and later on decrease in late involution phase of the haemangiomas[9]. Biological role of these MCs in haemangioma was studied by[8]. Activated MCs secrete both angiogenic and anti-angiogenic modulators in haemangioma. Among, Type III collagen and fibroblast growth factor (FGF-2) hold the key in endothelial cell proliferation during proliferation of haemangioma, whereas interferons (INF-α, β and γ) downregulate the FGF-2, endothelial cell proliferation and inhibit mitogenesis of vascular endothelial growth factor (VEGF) respectively[8]. Low number of MCs in the superficial lesion with abundant endothelial cells might indicate the proliferative phase of the tumor. The presence of scattered MCs in the stromal capillary network in deeper lesion might possibly reflect the involution phase of the haemangioma in the present study. To summarize, MCs were regarded as paradoxical in vascular tumours as documented earlier[8,9].

Elaborative studies on the role of MCs in haemangioma is imperative for better understanding on the biology of MCs in vascular tumours of animals. This report records the incidence of gingival capillary haemangioma with thrombotic features in a two months old cross bred Jersey calf.

ACKNOWLEDGEMENT

We thank the Dean, Veterinary College and Research Institute, Orathanadu and Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) for the facilities provided. We extend our gratitude to Staff of Department of Veterinary Gynecology and Obstetrics, VCRI, Orathanadu for providing stereo zoom microscope.

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.

REFERENCES

1. Kita AE and Long JL. 2016. Hemangioma. *Ear Nose Throat J* **95:** 19-20.
2. North PE, Waner M, James CA, Mizeracki A, Frieden IJ and Mihm Jr MC. 2001. Congenital non-progressive hemangioma: A distinct clinicopathologic entity unlike infantile hemangioma. *Arch Dermatol* **137:** 1607-1620.
3. Wang X, Xu X, An F, Ren Z, Li Y, Wang K and Hua Y. 2024. Infantile hemangioma in a subadult Chinese pangolin: a case report. *BMC Vet Research* **20:** 31.
4. Kim SE, Lee NY, Oh JS and Kim DY. 2023. Capillary gingival hemangioma in a cat. *J Vet Med Sci* **85:** 1310-1313.
5. Uma Rani R, Sivaseelan S, Sowbharenya C, Arun R and Pazhanivel N. 2023. A rare case of capillary haemangioma with osseous metaplasia in a sheep. *Int J Vet Sci Anim Husb* **8:** 408-410.
6. Tafti AK, Badiet K and Vesal N. 2002. Gingival capillary hemangioma in a calf. *Ind Vet J* **79:** 608-609.
7. Liau JY, Lee JC, Tsai JH, Chen CC, Wang YH and Chung YC. 2020. Thrombotic hemangioma with organizing/anastomosing features: Expanding the spectrum of GNA-mutated hemangiomas with a predilection for the skin of the lower abdominal regions. *Am J Surg Pathol* **44:** 255-262.
8. Xia M, Liu W and Hou F. 2024. Mast cell in infantile hemangioma. *Front Oncol* **14:** 1304478.
9. Sun ZJ, Zhao YF and Zhao JH. 2007. Mast cells in hemangioma: A double-edged sword. *Med Hypotheses* **68:** 805-807.
10. Wolfe D. 2019. Tissue processing. In: Bancroft's Theory and practice of histological techniques. 8th ed. Suvarna SK, Layton C, Bancroft JD, eds. UK: Elsevier: 73-83.
11. Bancroft JD and Layton C. 2019a. The hematoxylins and eosin. In: Bancroft's Theory and practice of histological techniques. 8th ed. Suvarna SK, Layton C, Bancroft JD, eds. UK: Elsevier: 126-137.
12. Bancroft JD and Layton C. 2019b. Connective and other mesenchymal tissues with their stains. In: Bancroft's Theory and practice of histological techniques. 8th ed. Suvarna SK, Layton C, Bancroft JD, eds. UK: Elsevier: 153-175.
13. Francis RF. 1996. Amyloid. In: Theory and practice of histological techniques. 4th ed. Bancroft JD, Stevens A, Turner DR, eds. New York: Churchill Livingstone: 163-164.

14. Donnelly LF, Adams DM and Bisset GB. 2000. Vascular malformations and henangiomas: a practical approach in a multi disciplinary clinic. *AJR Am J Roentgeno* **174:** 597-608.
15. Kim Y, Reinecke S and Malarkey DE. 2005. Cutaneous angiomatosis in a young dog. *Vet Pathol* **42:** 378-381.
16. Teankum K, Hauser B, Grest P, Pospischil A, Janett F, Bürgi E and Borel N. 2008. Capillary haemangiomas of the scrotum and testicle in boars. *J Comp Pathol* **139:** 177-186.
17. Gopal K, Vijayakumar M, Kokila S, Thilagavathi K, Arulmozhi A and Balachandran P. 2024. Gingival haemangioma in a Jersey cross bred calf. *Ind J Vet Pathol* **48:** 372-374.
18. Hendrick MJ. 2017. Mesenchymal tumors of the skin and soft tissues. In: Tumors in domestic animals. 5th ed, Meuten DJ eds. UAS: Wiley Balckwell: 159-166.
19. Coppola G, Helm JR, Marchesi F and Morris JS. 2022. Cutaneous inflammatory lobular capillary haemangioma in a guinea pig *(Cavia porcellus)*. *Vet Rec Case Rep* **10:** e219.
20. Azizi S, Amirmohammadi M, Kheirandish R, Davoodian Z and Goodarzi M. 2016. Occurrence of haemangiosarcoma on the gingiva of a calf: A case reports. *Bulg J Vet Med*.
21. van der Gaag I, Vos JH, van der Linde-Spiman JS and Koeman JP. 1989. Canine capillary and combined capillary-cavernous haemangioma. *J Comp Path* **101:** 69-74.
22. Murphy BG, Bell CM and Soukup JW. 2020. Tumors arising from the soft tissues. In: Veterinary oral and maxillofacial pathology, 1st ed. USA: Wiley-Blackwell: 129-165.
23. van der Gaag I, Vos JH and Goedegebuure SA. 1988. Lobular capillary haemangioma in two calves. *J Comp Path* **99:** 353-356.
24. Iselin U, Lischer CJ, Lott-Stolz G and Kaser-Hotz B. 1995. Capillary hemangioma, a rare neoplasm in a calf. *Schweiz Arch Tierheikd* **137:** 87-91.
25. Chapman S, Dobbs P, Strong V, Barlow H, Zebedee D, Childs S and Stidworthy MF. 2017. Diagnosis and management of lobular capillary haemangioma (pyogenic granuloma) in an adult female lactating bonobo *(Pan paniscus)*. *JZAR* **5:** 71-75.
26. Kirkbride CA, Bicknell EJ and Robl MG. 1973. Hemangiomas of a bovine fetus with a chorioangioma of the placenta. *Vet Path* **10:** 238-240.
27. Wilson BB, Greer KE and Cooper PH. 1989. Eruptive disseminated lobular capillary hemangioma (pyogenic granuloma). *J Am Acad Dermatol* **21:** 391-394.
28. Tan ST, Wallis RA, He Y and Davis PF. 2004. Mast cell and hemangioma. *Plast Recons Surg* **113:** 999-1011.