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Research Article

MALIGNANT TRICHOEPITHELIOMA IN ENGLISH MASTIFF DOG: A CASE REPORT

PARMAR R.S.*[1], DESAI K.A.[1], ODEDARA J.D.[1], DESAI G.D.[1], SOLANKI P.G.[1], JAIN R.K.[2], SINDHI P.I.[1], CHAUDHARY D.M.[1] AND PATEL D.K.[1]

[1]Department of Veterinary Pathology, College of Veterinary Science & Animal Husbandry, Sardarkrushinagar, 385505, Kamdhenu University, Gandhinagar, 382010, Gujarat, India
[2]Department of Veterinary Surgery & Radiology, College of Veterinary Science & Animal Husbandry, Mhow, 453446, Nanaji Deshmukh Veterinary Science University, Jabalpur, 482001, Madhya Pradesh, India
*Corresponding Author: Email - drrohit.vet23@gmail.com

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Abstract: Seven-year-old, 58kg English mastiff dog with history of multiple cutaneous nodules was presented to clinic. The nodules were present predominantly on back, limb and flank region of the body. Of these, the cutaneous nodule on right lower flank region was exophytic, measuring 9.2 cm in diameter and had multi lobulated appearance and ulcerated surface. The mass was excised surgically and the representative tissue sample was submitted for histopathology. Microscopic examination revealed islands of neoplastic cells and cystic structures that showed contiguity with overlying epidermis or follicular infundibulum. The neoplastic cells showed incomplete trichogenesis. The islands of neoplastic cells form variably sized keratin filled cysts and exhibit both gradual and abrupt keratinization. The mitotic figures were 64 per 2.37 square millimetre area. Besides these, the multifocal pyogranulomatous inflammation was also noted in tumor areas while ulceration and acanthosis were also noted in overlying epidermis. Based on microscopic findings the tumor was diagnosed as malignant Trichoepithelioma and confirmation was done by immunohistochemical staining with Ki-67 marker that showed high proliferative index of 54% in tumor hot spot area which further confirm the neoplasm as malignant trichoepithelioma.

Keywords: *Trichoepithelioma, Malignant, Hair Follicle, Dog, Ki-67*

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Introduction

Among various structures hair follicle is one of the complex structures and so the neoplasms arising from hair follicles display variable complexity. Anatomically normal hair follicle shows three distinct segments starting from dorsal aspect the infundibulum followed by isthmus and most ventrally inferior segment [1]. The infundibulum segment starts from the level of epidermal invagination to the point where sebaceous gland opens. The portion of hair follicle downward to opening of sebaceous gland up to insertion of arrector pili muscle is designated as isthmus while the final deep portion of hair follicle is inferior segment [2].

Hair follicle associated neoplasms have reported in many animal species particularly in dogs in which the frequency of hair follicle tumors can be as high as 10% [3,4]. Although majority of hair follicle tumors are benign in nature their malignant counterpart may exist [5]. Benign hair follicle neoplasm like benign trichoepithelioma frequently can be removed surgically and has been considered curative [6] but few malignant hair follicle tumors including pilomatricoma may have metastatic potential [1]. The incidences of hair follicle tumor can be varied but among different types of hair follicle neoplasms in dogs trichoblastomas constitute most common type of neoplasm followed by pilomatricomas, and trichoepitheliomas [7].

Material and Methods

Trichoepitheliomas are one of the common hair follicle neoplasm among dog with comparatively less frequencies in cats [1,8]. Reports suggested that the cases of trichoepitheliomas are more in female dogs as compared to male animals and also some breeds like Basset Hounds breed of dog has been considered as most susceptible breed for occurrence of trichoepithelioma. Although dorsal aspect of the neck, trunk and limb are reported to be most common sites for this neoplasm it can occur anywhere on the body [1,9]. The histologic appearance of trichoepithelioma at low power magnification is quite similar to pilomatricomas and at time it may be difficult to differentiate these two neoplasms.

Histologically benign trichoepithelioma is characterized by well demarcated border from surrounding adnexa and also, they are unencapsulated tumor that rarely or may not infiltrate the adjacent stroma. The neoplastic epithelial cells frequently forms islands separated by fibrovascular stroma and cysts [10], which can be lined by both squamous as well as matrical cells. One of the hallmarks of trichoepithelioma is that the cysts are filled with keratinized material which may be gradual or abrupt and another hallmark is the neoplasm shows differentiation towards all three components of hair follicle *viz*., infundibulum, isthmus and the inferior portion. Additionally, trichoepitheliomas are also characterized by presence of both bluish appearing keratohyline and red trichohyalin granules and ghost cells within the cysts [5,11].

Results

The malignant version of trichoepithelioma also has somewhat similar histological features as that of benign variety but the histologic features that differentiate malignant from benign version are the frequent invasiveness of malignant form, and because of this malignant trichoepithelioma poorly demarcated from surrounding structures [5]. Also, malignant trichoepithelioma showed high mitotic activity with high cytoplasmic as well as nuclear pleomorphism, multiple necrotic areas within the tumor areas and metastasis to distant organ through lymphatic invasion [12,13].

In present case a seven-year-old, 58kg English mastiff dog with history of multiple cutaneous nodules was presented to clinic. The patient showed nodules predominantly on back, limb and flank region of the body and particularly the cutaneous nodule on right lower flank region was exophytic, measuring 9.2 cm in diameter and had multi lobulated appearance and ulcerated surface [Fig-1]. Clinician surgically removed the tumor suspected mass and submitted the representative tissue sample in 10 % neutral buffered formalin for histopathology. The tumor tissue was processed and tissue sections of 4-5 micron were taken and stained with standard Haematoxylin and Eosin method [14].

Fig-1 A multilobulated, exophytic, umbilicated, and multifcoally ulcerated cutaneous nodules on right lower flank region that appears light brown, firm and 9.2 cm in diameter,

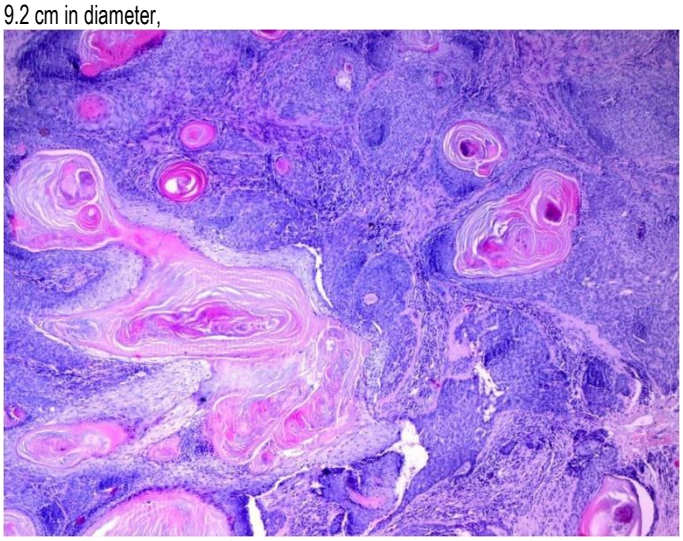

Fig-2 Neoplasm composed of islands and keratin filled cysts and lined by basaloid polygonal cells with frequent peripheral palisading and supported by fibrovascular stroma. Neoplastic cells show differentiation to all three segments of hair follicle. HE 50 X

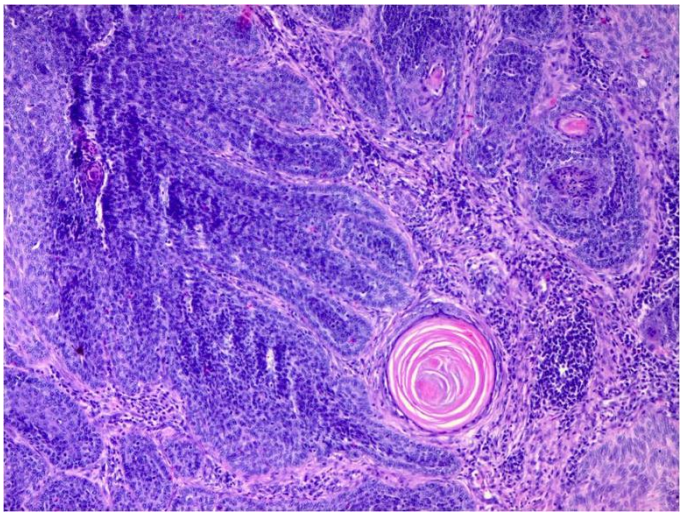

Fig-3 Neoplastic cells showing incomplete trichogenesis. Basaloid cells have scant, pale cytoplasm and uniform, ovoid, euchromatic nuclei. HE 100 X

Microscopic examination revealed islands of neoplastic cells and cystic structures that showed contiguity with overlying epidermis or follicular infundibulum. The islands and cystic structures are lined by basaloid polygonal cells with frequent peripheral palisading and supported by fibrovascular stroma [Fig-2]. The neoplastic cells showed incomplete trichogenesis. The islands of neoplastic cells form variably sized keratin filled cysts and exhibit both gradual and abrupt keratinization. Neoplastic cells showed differentiation to all three segments of hair follicles. Basaloid cells have scant, pale cytoplasm and uniform, ovoid, euchromatic nuclei [Fig-3]. The count of mitotic figures is 64 per 2.37 square millimetre area [Fig-4]. Besides these, the multifocal pyogranulomatous inflammation has also been noted in tumor areas with ulceration and acanthosis in overlying epidermis. Based on microscopic findings the tumor has been diagnosed as malignant trichoepithelioma. To confirm the diagnosis tissue sections of 4 micron thickness were taken and immunohistochemistry was performed with immunohistochemical Ki-67, a marker that stains nuclei of proliferating tumor cells [Fig-5] and commonly employed to determine proliferation rate of neoplastic cells. In present investigation we noted high proliferative index of 54% in tumor hot spot area suggested aggressiveness of neoplasm. Based on histopathology finding and immunohistochemical staining the present case has been diagnosed as malignant trichoepithelioma.

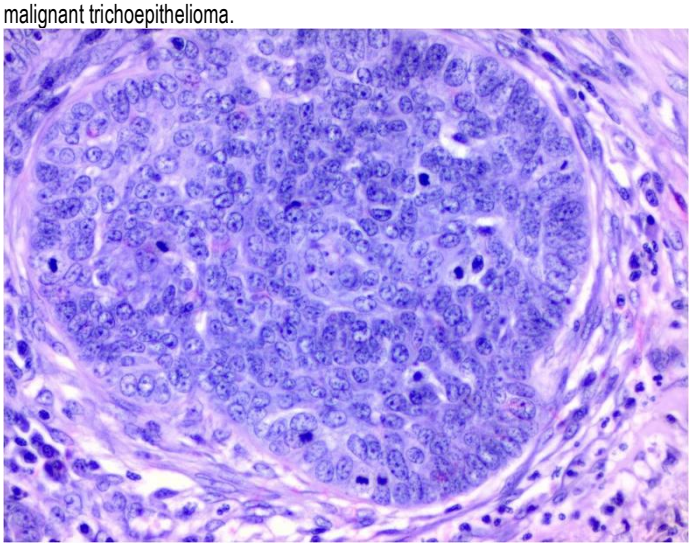

Fig-4 Neoplastic cells have 64 mitotic figures per 2.37 square millimetres. HE400X

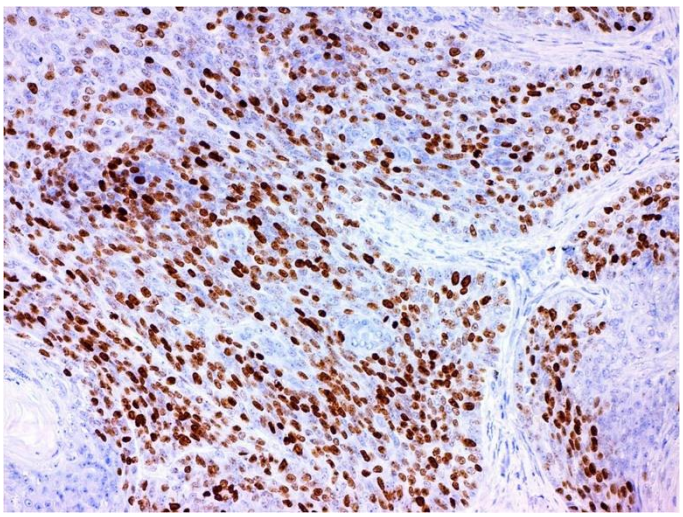

Fig-5 Neoplastic cells showed strong nuclear immunoreactivity with Ki-67. Immunoperoxidase staining, DAB chromogen, Gill's hematoxylin counterstain, 200X

Conclusion

Hair follicle is a complex structure composed of multiple components. There are diverse neoplastic conditions originating and/or associated with hair follicle it's quite difficult to differentiate them. The trichoepithelioma should be differentiated from other similar appearing hair follicle neoplasms particularly trichofolliculoma which also characterized by both these granules and exhibit gradual or abrupt keratinization of cysts but usually devoid of ghost cells within the cystic structures.

Another important differential is the pilomatricomas, the neoplasm in which the cystic structures are larger and also fewer in number as compared to trichoepithelioma. Among various available tumor diagnostic techniques immunohistochemistry is a valuable tool, particularly Ki-67 is a good immunohistochemical marker that stains nuclei of proliferating cells and one can determine the aggressiveness/proliferative potential of malignant tumor [15,16].

Application of research: In canine population neoplastic conditions of the skin and adnexa are frequently noted. Proper and timely diagnosis of such neoplastic conditions are useful not only to reduce treatment cost but many a time to prevent its recurrence and ultimately to save the live of patients.

Research Category: Veterinary Pathology and Veterinary Surgery & Radiology

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****Principal Investigator or Chairperson of research: Dr RS Parmar**
University: Kamdhenu University, Gandhinagar, 382010, Gujarat, India
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Study area / Sample Collection: Department of Veterinary Surgery & Radiology, Veterinary College, Mhow, Madhya Pradesh, India.

Breed name: English Mastiff (Dog)

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

References

[1] Goldschmidt M.H. and Goldschmidt K.H. (2017) *In, Meuten DJ, ed. Tumors in Domestic Animals. 5th ed. Wiley Blackwell*, 88-141.
[2] Brown T.M., Krishnamurthy K. (2022) *In, StatPearls [Internet]. Treasure Island (FL), StatPearls Publishing, PMID*, 30422524.
[3] Graf R., Pospischil A., Guscetti F., Meier D., Welle M. and Dettwiler M. (2018) *Veterinary Pathology*, 55, 809-820.
[4] Kok M.K., Chambers J.K., Tsuboi M., Nishimura R., Tsujimoto H., Uchida K. and Nakayama H. (2019) *Journal of Veterinary Medical Science*, 24, 81(8), 1133-1143.
[5] Wiener D.J. (2021) *Journal of Veterinary Diagnostic Investigation*, 33(3), 479-497.
[6] Mohammadi A.A. and SeyedJafari S.M. (2014) *World Journal of Plastic Surgery*, 3, 142-145.
[7] Abramo F., Pratesi F., Cantile C., Sozzi S. and Poli A. (1999) *Journal of Small Animal Practice*, 40(10), 479-81.
[8] Tavasoli A., Golshahi H., Rad M.N. and Taymouri A. (2013) *Asian Pacific Journal of Tropical Biomedicine*, 3(5), 413-5.
[9] Gross T.L., Ihrke P.J., Walder E.J. and Affolter V.K. (2005) *In, Gross T.L., ed. Skin Diseases of the Dog and Cat. 2nd ed. Blackwell Science Ltd*, 604-640.
[10] Hendrick M.J. (2017) *In, Meuten DJ, eds. Tumors in Domestic Animals. Singapore, Wiley Blackwell*, 88-141.
[11] Goldschmidt M.H., Munday J.S. and Scruggs J.L. (2008) *In, Kiupel M., ed. Tumors with Adnexal Differentiation. 3rd ed. Washington, DC, Armed Forces Institute of Pathology*, 107-119.
[12] Goldschmidt M.H. and Shofer F.S. (1998) *In, Goldschmidt MH, Shofer FS, eds. Skin Tumors of the Dog & Cat. Elsevier Health Sciences*, 115-124.
[13] Beck A., Huber D. and Scuric V. (2016) *Veterinarski arhiv*, 86(3), 453-466.
[14] Suvarna S.K., Layton C. and Bancroft J.D. (2013) *eds. Bancro's theory and practice of histological techniques. Nottingham and Sheffield, Churchill Livingstone-Elsevier*.
[15] Hazan C., Melzer K., Panageas K.S., Li E., Kamino H., Kopf A., Cordon-Cardo C., Osman I. & Polsky D. (2002) *Cancer*, 95, 634-640.
[16] Iqbal S., Anderson T. J. & Marson L.P. (2002) *Breast*, 11, 252-256.