



Case Report

Warty Dyskeratoma with involvement of multiple hair follicles in a dog

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Abstract

The warty dyskeratoma is a neoplasm of follicular origin, with uncommon incidence in veterinary medicine, and benign biological behavior. An excisional biopsy sample was received from a dog, female, Shih Tzu, 12 years old, from the left axillary region. Grossly, after section, green and friable multifocal areas were identified, streaked by solid white areas. Microscopically, the analysis revealed multifocal cystic structures, lined by stratified epithelium, with basal area including villous epithelial projections, toward the dermis, and the luminal region featured acantholysis and dyskeratosis, as well as parakeratosis. Those findings were compatible with a warty dyskeratoma affecting multiple hair follicles, thus being the first case report in veterinary medicine with such this unique pattern. Up to now, the literature encompassed only human medicine. This report, besides collaborating to the description of a rare presentation of an uncommon neoplasm, also contributes with new information found for epidemiological studies of this tumor.

Key words: dermatopathology, oncopathology, veterinary pathology, epithelial tumors, comparative pathology.

Introduction

Follicular tumors of neoplastic or non-neoplastic origin are common skin diseases in dogs, counting slightly above 13% of all cutaneous tumours in these animals (11). Despite follicular tumors being frequent, there is a lesion known as warty dyskeratoma, listed as a tumor of follicular origin in veterinary medicine. It occurs infrequently in human medicine, and is very rare in veterinary medicine, as many studies with surveys concerning neoplastic cutaneous tumors in dogs do not report it (3, 8, 13).

Regarding its origin, there is not a well-established agreement between the authors. Some believe this process might develop from pilosebaceous unities, while others have not yet accepted that tumor has a follicular origin, claiming the consecutive cleavages of the samples did not reveal an area that suggests this adnexal association, besides the evidence that they can occur at the oral cavity and other mucosa in humans (2, 13). Because this tumor shows a microscopic morphology similar to the viral verrucous lesions in humans, it was suspected that the human papillomavirus (HPV) could be associated to it (10);

however, research has shown the absence of viral agents within these neoplasms after investigation (10).

Regarding the clinical features, in humans, it appears as papules, with a superficial crust when injured. This can be manifested through an umbilicate aspect, building an endophytic mass, that resembles the veterinary arrangement, which shows in its few reports the development of isolated nodules or in clusters, demonstrating hyperkeratosis and occasionally central tissue depression (5, 8, 13).

Microscopically, the warty dyskeratoma is a very distinctive tumor, and exhibits a cystic lesion that may have a communication and opening in the epidermis, lined by stratified squamous epithelium with dermal filiform projections inserted at the wall adjoining the connective tissue, resembling intestinal villi in the basal cell layer (8). Furthermore, the lumen manifests a unique acantholysis, which sums to orthokeratosis and dyskeratotic keratinocytes, featuring typical *corps ronds* (8, 13).

This tumoral skin disease shows a benign biological behavior and, in human medicine, the main treatments include surgical excision, usage of Tezaratonic Acid, laser therapy and other infrequent methods (1, 15).

Case presentation

An excisional biopsy sample was received from a dog, female, Shih Tzu, 12 years old, from the left axillary region. Grossly, it revealed a tissue fragment with dimensions of 6,0 x 5,0 x 2,5 cm, firm, irregular, tan-black colored. After section, green and friable multifocal areas were identified, streaked by solid white areas.

Microscopic analysis of the sample revealed cutaneous tissue lined by an intact sheath epithelium. Emphatic cystic multifocal formations were seen from superficial dermis to subcutaneous tissue (Fig. 1). In the border of the cysts, it was

observed increased number of sebaceous glands associated to secondary hair follicles (Fig. 2). The cysts were delimited by stratified squamous epithelium, with basal areas including projections analogous to intestinal villi (Fig. 3), toward the dermis, filled by dermal papillae. The luminal surface showed frequent sites of dyskeratosis and acantholysis (Fig. 4). The lumen was filled by parakeratosis and numerous acantholytic keratinocytes. Moreover, there were multifocal regions of moderate pyogranulomatous inflammatory process, associated with free interstitial keratin. There were no signs of malignancy in the examined section. Considering the microscopic findings, it was concluded to be a Warty Dyskeratoma with involvement of multiple hair follicles.

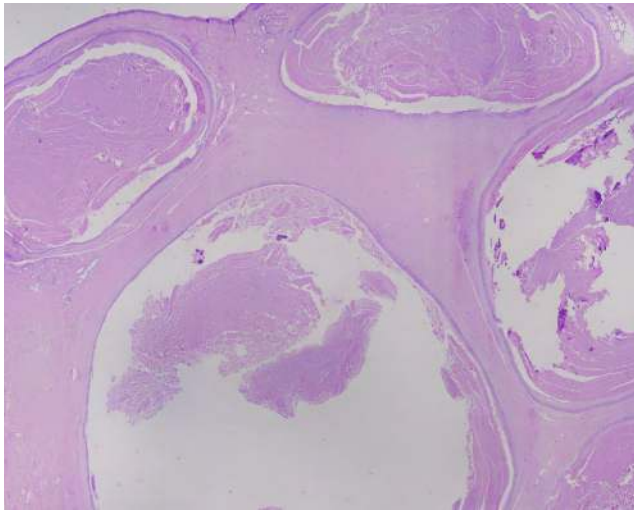


Figure 1. Warty dyskeratoma, panoramic view, dog. Display of five cystic structures filled with keratin in the lumen, streaked by fibrous stroma. Panoramic picture of 7 fields in the objective lens of 2x, without scale. Haematoxylin and Eosin stain.

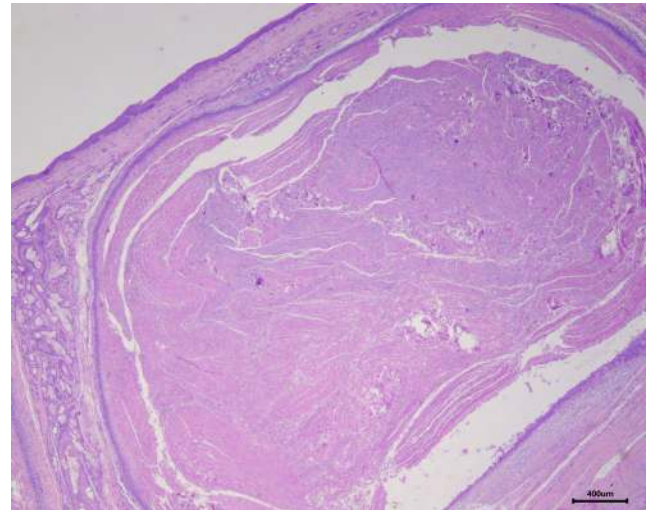


Figure 2. Warty dyskeratoma with sebaceous glands associated, dog. Demonstration of a cystic structure delimited by stratified epithelium, with numerous sebaceous and follicular structures around it, gathering more adnexal appendages at left. Objective lens of 2x. Haematoxylin and Eosin stain. 400 µm bar.

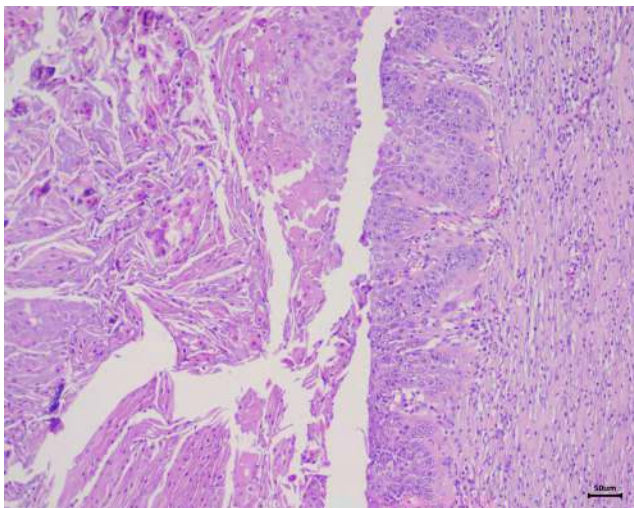


Figure 3. Warty dyskeratoma, focusing in the difference between the lumen and basal layer, dog. At right, evidence of the base of the cystic structure with visualization of epithelial projections resembling intestinal villi toward the dermis, revealing adjacent inflammation. At left, the lumen is filled by keratin. Objective lens of 10x. Haematoxylin and Eosin stain. 50 µm bar.

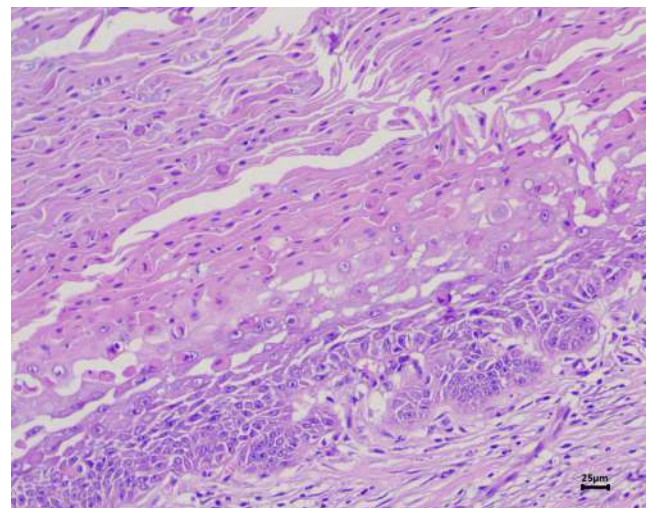


Figure 4. Warty dyskeratoma, showing characteristic stratification, dog. Recognition of luminal parakeratosis, as well as acantholytic cells. Absence of malignancy signs. Objective lens of 20x. Haematoxylin and Eosin stain. 25 µm bar.

Discussion

Warty dyskeratoma is a rare condition, with scarce reports in veterinary medicine, besides the few ones in human medicine (4,8). Therefore, there is no correlation of these lesions with any breed, age, or sex in dogs, with a previous report describing the circumstance in a Yorkshire Terrier and a Basset Hound (8, 9). In our case, it regarded a dog, female, Shih Tzu, 12 years old, with a solitary neof ormation in the left axillary region.

In humans, those tumoral processes usually occur in the head and neck regions, as papules or nodules, besides the evidence that they can occur at the oral mucosa. (10, 12). Curiously, the follicular tumors in dogs show an important prevalence in the head and neck regions, developing in these same locations described in the human warty dyskeratoma (10, 14); however, it should be emphasized that in this present report the lesion occurred in the axillary region.

The warty dyskeratoma microscopy may vary in human medicine, although the common finding between all lesions is the presence of acantholysis and dyskeratosis, which are also found in veterinary medicine (10). The closest differential diagnosis of the warty dyskeratoma is the acantholytic or pseudoglandular squamous cell carcinoma, that shows acantholytic cells. However, it exhibits a great number of apoptotic cells, increase of mitosis and basal lamina invasion, which have not been histological findings in our reported case of warty dyskeratoma (6, 8). Follicular cysts might be a possible differential diagnosis as well, but none of the variants (infundibular, matrical, isthmic or hybrid) show acantholysis and projections of the basal layer to the dermis (8). Considering the characteristic microscopic morphology, an immunohistochemistry is not necessary to conclude the condition (7, 8, 9). Aside from the characteristic acantholysis, dyskeratosis and development of epithelial projections of the basal layer to the dermis, it was drawn attention to the multiple hair follicles affected in the same nodule in this case, and despite the existence of a similar lesion description in human medicine (4), it is the first case report in veterinary medicine with this presentation.

In domestic animals, those neof ormations are listed in the follicular origin tumors sections, unlike the analogous lesions in humans, which are still undefined about its origin by part of the authors, being label as epidermal tumors by some (4, 8). A relevant point that deserves consideration is that in this report, around the cysts, it was observed an increased number of sebaceous units and secondary hair follicles, suggesting a strong morphological association of this neoplasm with a follicular origin. Because this neoplasm has a benign biological behavior, the surgical excision can be considered curative; likewise, it is also indicated in specific veterinary literature (13).

In conclusion, this report is a significant addition to the gross and microscopic description of the warty dyskeratoma which, besides its scarcity of reports in

veterinary medicine in its typical presentation, lacks a publication containing multiple hair follicles affected. Moreover, it shows association with sebaceous glands, enhancing the suggestion that they develop from hair follicles, and contributes with data about breed, age, and sex for future surveys.

Conflict of Interest

The authors declare no competing interests.

References

1. Abramovits W, Abdelmalek N. Treatment of warty dyskeratoma with tazarotenic acid. *J Am Acad Dermatol.* 2002;46(2 Suppl Case Reports):S4.
2. Azuma Y, Matsukawa A. Warty dyskeratoma with multiple lesions. *J Dermatol.* 1993;20(6):374-7.
3. Beck A, Huber D, Šćuric V, Benić M, Hohšteter M, Kužir S. A four year retrospective study of the prevalence of canine follicular tumours in Croatia. *Vet Arhiv.* 2016;86(3):453-66.
4. Boyd AS. Tumors of the Epidermis. In: Barnhill RL, Crowson AN, MAgro CM, Piepkorn MW, editors. *Dermatopathology.* 3rd ed. The McGraw-Hill Companies; 2010. p. 556-614.
5. Burg G, Kutzner H, Kempf W, Feit J, Smoller BRS. Epidermis. In: Burg G, Kutzner H, Kempf W, Feit J, Smoller BRS, editors. *Atlas of Dermatopathology.* 1st ed. Oxford: Wiley Blackwell; 2019. p. 1-84.
6. Goldschmidt MH, Goldschmidt KH. Epithelial and Melanocytic Tumors of the Skin. In: Meuten DJ, editor. *Tumors in Domestic Animals.* 5th ed. North Carolina; 2017. p. 88-141.
7. Gross TL. Epidermal Tumors. In: Gross TL, Ihrke PJ, Walder EJ, Affolter VK, editors. *Skin Diseases of the Dog and Cat.* 2nd ed. Oxford: Blackwell Science; 2005. p. 562-603.
8. Gross TL. Follicular Tumors. In: Gross TL, Ihrke PJ, Walder EJ, Affolter VK, editors. *Skin Diseases of the Dog and Cat.* 2nd ed. Oxford: Blackwell Science; 2005. p. 604-40.
9. Hill, JR. Warty dyskeratoma in two dogs. In: *Proceedings of the 3rd AAVD/ACVD Meeting,* Phoenix, USA, 1987. p.40.
10. Kaddu S, Dong H, Mayer G, Kerl H, Cerroni L. Warty dyskeratoma - "Follicular dyskeratoma": Analysis of clinicopathologic features of a distinctive follicular adnexal neoplasm. *J Am Acad Dermatol.* 2002;47(3):423-8.
11. Machado GAC, Fontes TN, Larangeira DF, Estrela-Lima A, Moreira ELT, Ribeiro LS, et al. Incidence of skin tumors in dogs in Salvador, Bahia state, Brazil (2007-2016). *Pesq Vet Bras.* 2018;38(11):2146-9.
12. Raj AT, Awan KH, Patil S, Morgan P, Warnakulasuriya S. Oral Warty Dyskeratoma—A Systematic Review of the Literature. *Diagnostics.* 2022;12(5):1-21.

13. Scott GA. Proliferations - Hamartomas, Hyperplasias, and Neoplasias. In: Barnhill RL, Crowson AN, Magro CM, Piepkorn MW, editors. *Dermatopathology*. 1st ed. McGraw-Hill Medical; 2010. p. 541-979.
14. Wiener DJ. Histologic features of hair follicle neoplasms and cysts in dogs and cats: a diagnostic guide. *J Vet Diagn Invest*. 2021;33(3):479-497.
15. Zhao Q, Zhou H, Geng S. Multiple warty dyskeratoma on the scalp. *An Bras Dermatol*. 2019;94(5):630-631.