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Occurrence of ocular and adnexal neoplasms in canines with special reference to pigmented sebaceous gland epithelioma of eyelids#

F. Ansar[1], R. Anoopraj[2*], P. Hamza[2], J. G. Ajith[3], S. Sooryadas[4] and P. Ajith[5]
Department of Veterinary Pathology
College of Veterinary and Animal Sciences, Pookode, Wayanad-673576
Kerala Veterinary and Animal Sciences University
Kerala, India

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Abstract

The eyelid tumours are uncommon in dogs. In the present study, out of 102 ocular and adnexal samples from the dogs examined for a period of 2.5 years, 11 cases (10.78 per cent) were neoplastic in nature. The major location of the neoplasms was eyelids (8/11). One case (0.98 per cent) was diagnosed as pigmented sebaceous gland epithelioma. The tumour mass was present in the palpebral conjunctiva of the lower eyelid near the medial canthus of the left eye in a five-year-old Labrador dog. Grossly, the tumour mass appeared to be a greyish-black, firm, cauliflower-like growth. The mass was resected and submitted for histopathology. Microscopic examination of the mass showed a preponderance of basaloid reserve cells in the tumour tissue. The proliferating reserve cells formed irregular islands or trabeculae separated by thin fibrous connective tissue. They showed minimal to no pleomorphism, scanty amphophilic cytoplasm and oval nuclei. Melanin-containing cells were frequent, while mature sebocytes were infrequent. Mitotic figures were occasional. Pigmented sebaceous gland epithelioma was diagnosed based on gross and histopathological features. Apart from this, neoplasms such as fibrosarcoma, meibomian gland adenocarcinoma, well differentiated squamous cell carcinoma, papilloma and non-pigmented sebaceous gland epithelioma involving eyelids, histiocytoma of third eyelid, periglobular lymphoma and leukemic infiltration of choroid were also recorded. The present research underlines the lower incidence of eyelid tumours in dogs.

Keywords: *Eyelid tumours, pigmented sebaceous gland epithelioma, basal cells*

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1. *MVSc Scholar*
2. *Assistant Professor*
3. *Professor and Head*
4. *Assistant Professor, Department of Veterinary Surgery and Radiology*
5. *Veterinary Surgeon, District Veterinary Centre, Kollam*

** Corresponding author: anoopraj@kvasu.ac.in, Ph. 9495361872*

The incidence of neoplasms is on the rise in companion animals (Sudheesh *et al.,* 2021). However, the reports on the occurrence of eyelid neoplasms among domestic animals are scarce. A variety of neoplasms can occur in the eyelids of the dog and most of them are minimally invasive showing a good response to the excision of the affected area. The eyelid neoplasms reported in dogs included meibomian gland tumours, sebaceous gland neoplasms, histiocytoma, papilloma, melanoma, squamous cell carcinoma and basal cell carcinoma (Dubielzig *et al.,* 2010). Out of the various neoplasms, those affecting meibomian glands are commonly seen constituting 44 - 70 per cent of eyelid neoplasms (Wilcock and Njaa, 2007). The neoplastic lesions involving the sebaceous glands of eyelids, wherein the histological identification of the meibomian gland is uncertain, are classified generally as sebaceous gland tumours. Usually, sebaceous gland tumours of the eyelid appear as irregularly surfaced masses with pink, tan, grey or black colour depending on the degree of melanin pigmentation (Labelle and Labelle, 2013). Pigmented type of epithelioma is more common and adenomas are less likely pigmented when compared to epithelioma (Werner *et al.,* 2017). Clinically, these tumours can cause corneal and conjunctival irritation that may lead to keratoconjunctivitis. With appropriate treatment, the prognosis is excellent. The present study reports the occurrence of ocular and adnexal neoplasms in dogs with special reference to pigmented sebaceous gland epithelioma of the eyelid, describing its pathological features.

Materials and methods

A total of 102 ocular and adnexal samples including 35 biopsy cases submitted to the Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Pookode, Wayanad from canine cases presented to the veterinary hospitals under Kerala Veterinary and Animal Sciences University, Pookode, Kerala Animal Husbandry Department and private pet hospitals, during the period of September 2018 to July 2021, formed the materials of this study. A five-year-old Labrador dog was presented to District Veterinary Centre, Kollam with a history of a mass on the left lower eyelid for three months. On examination, it appeared as a pigmented proliferative growth on the palpebral conjunctiva of the left lower eyelid irritating the eye and preventing the normal closure of the eye. Surgical excision of the tumour mass was advised and the mass was removed, which was collected in 10 per cent formalin. The formalin-fixed biopsy sample was submitted to the Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Pookode, where it was processed following standard histopathological procedures (Suvarna *et al.,* 2018). Routine hematoxylin and eosin staining was done and mounted using DPX mountant. Later the slides were examined under a microscope (Zeiss Axio LED microscope) and the lesions were recorded.

Results and discussion

Out of the 102 ocular and adnexal samples studied, 11 cases (10.78 per cent) were diagnosed as neoplasms. One case (1/102, 0.98 per cent) was diagnosed as pigmented sebaceous gland epithelioma. Although sebaceous gland tumours such as sebaceous gland adenoma and adenocarcinoma are the most common eyelid tumour in dogs, sebaceous gland epithelioma is rarely reported (Komnenou *et al.,* 2019). In contrast, Duque *et al.* (2019) recorded a 20 per cent incidence of sebaceous gland epithelioma in a retrospective study involving 250 eye-related neoplasms for a period of 2005 to 2017. In this study, besides pigmented sebaceous gland epithelioma, neoplasms such as fibrosarcoma (0.98 per cent), meibomian gland adenocarcinoma (1.96 per cent), well differentiated squamous cell carcinoma (0.98 per cent), papilloma (0.98 per cent), non-pigmented sebaceous gland epithelioma (1.96 per cent), histiocytoma of third eyelid (0.98 per cent), periglobular lymphoma (0.98 per cent) and leukemic infiltration of choroid (0.98 per cent) were identified based on the histopathological characteristics.

Histologically, fibrosarcoma appeared as small whorls and fascicles of pleomorphic neoplastic cells with round to fusiform nucleus. Findings in Meibomian gland adenocarcinoma included multiple foci of sebocytic differentiation of reserve cells with marked anisocytosis,

anisokaryosis and pleomorphic nucleus as well as pagetoid invasion of the epithelium by neoplastic sebocytes. The well differentiated squamous cell carcinoma diagnosed in this study showed marked keratin pearl formation, frequent multinucleated giant cells, mitotic figures and presence of cell nests. Microscopically, papilloma was characterised by fibrovascular core, koilocytes, marked epithelial cell hyperplasia and prominent kerotohyalin granules. In cases of non-pigmented sebaceous epithelioma, sheets of proliferating reserve cells with scanty eosinophilic to amphophilic cytoplasm and nucleus with stippled chromatin were recorded. Histiocytoma was characterised by sheets of round neoplastic cells with moderate to abundant cytoplasm and round to reniform nucleus. In periglobular lymphoma, tumour mass comprised of large round cells with scanty cytoplasm and large vesicular to hyperchromatic nuclei with one to two prominent nucleoli. Microscopic observations recorded in leukemic infiltration of choroid included diffuse lymphoblastic infiltration replacing the stroma and marked reduction of melanin pigments in choroid.

The location of eight out of eleven neoplasms identified was eyelids. They appeared as either irregular, cauliflower like growth (sebaceous gland tumours and meibomian gland adenocarcinoma) or capsulated and lobulated mass with smooth surface (fibrosarcoma).

Grossly, pigmented sebaceous gland epithelioma appeared as a greyish-black coloured proliferative irregularly surfaced cauliflower-like growth of about 5mm x 3mm in size on the palpebral conjunctiva of the left lower eyelid (Fig. 1). Saberi *et al.* (2012) reported that the sebaceous gland epithelioma appeared as an enlarged non-pigmented irregular mass in the left upper lid and palpebral conjunctiva in a Doberman. The tumour involved the meibomian gland. It is difficult to differentiate different types of sebaceous/ meibomian gland tumours of the eyelid based on gross appearance. Clinically, they appeared as tan, pink, grey or black coloured firm masses with irregularly textured surfaces (Labelle and Labelle, 2013).

Fig. 1. Pigmented proliferative growth on the palpebral conjunctiva of the left lower eyelid

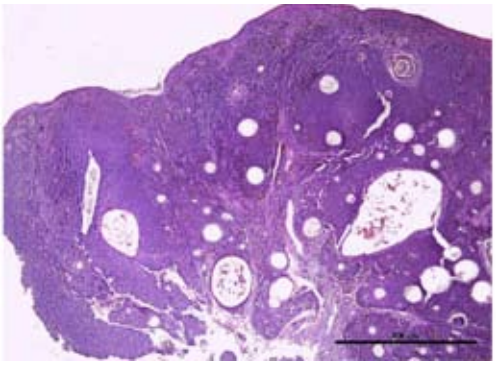

Fig. 2. Solid, pseudolobulated tumour mass with thin fibrous connective tissue stroma separating the lobules (H&E, x40).

Microscopic examination of the tumour mass revealed pseudolobulations with thin fibrous connective tissue stroma partially separating the lobules (Fig. 2). Most of the tumour mass was composed of islands or trabeculae of basal reserve cells, dilated ducts and melanin and scanty sebocytes (Fig. 3). The connective tissue stroma was infiltrated by mononuclear inflammatory cells surrounding masses and around the newly formed blood vessels.

The majority of the basaloid reserve cells showed anisocytosis, and anisokaryosis with moderate pleomorphism. Most of the pleomorphic cells had oval nuclei with stippled chromatin, prominent nucleolus and amphophilic cytoplasm. The reserve cells showed moderate mitotic activity. Sebaceous differentiation of the reserve cells was minimal.

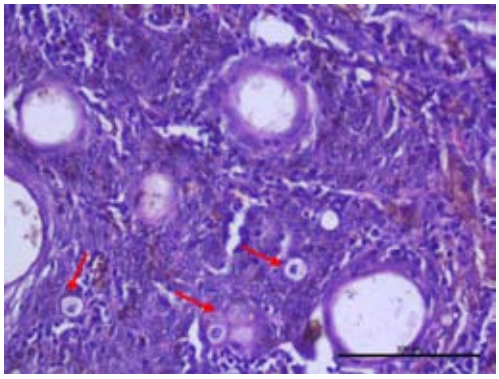

Fig. 3. Islands or trabeculae of basal reserve cells with dilated ducts, melanin and scanty sebocytes (arrows) (H&E, x400).

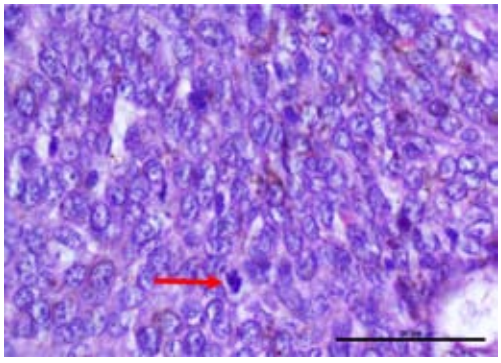

Fig. 4. Baseloid reserve cells with moderate pleomorphism and oval nuclei with prominent nucleolus and amphophilic cytoplasm. Mitotic figure is also seen (arrow) (H&E, x1000).

The immature sebocytes had moderate and the mature had abundant cytoplasm with no mitotic activity in either (Fig. 4). On the basis of histopathological findings, the tumour mass was diagnosed as pigmented sebaceous gland epithelioma. Sebaceous gland epithelioma of the eyelid has the similar histopathological appearance as that of cutaneous sebaceous gland epithelioma. Saberi *et al.* (2012) described the histological features of sebaceous gland epithelioma as solid growth of irregular islands of neoplastic basaloid reserve cells separated by moderate fibrous stroma. They observed a few mature sebocytes and moderate mitotic activity of reserve cells. The histological criterion to differentiate sebaceous gland adenoma and epithelioma is the relative abundance of basaloid reserve cells and differentiated sebocytes. Some researchers suggested a preponderance of basal cells (more than 90%) to diagnose a tumour mass as sebaceous gland epithelioma (Labelle and Labelle, 2013). Although, the development of neoplasm and its related effects can affect the quality of the animals' life (Omkar *et al.,* 2022), in this case, the prognosis for the globe as well as for the life is excellent and the treatment requires complete removal of the mass either by surgical excision or by cryoablation.

Conclusion

Reports of incidence of ocular tumours in India are scarce and this can be due to the less awareness of ocular conditions in the society. This study shows that the incidence of pigmented sebaceous gland epithelioma and other neoplasms of the eyelids in dogs is not common. Although their incidence is scant, the differential diagnosis of eyelid tumours should invariably be performed since the gross appearance of many of the tumours does not vary significantly. Correction of ocular affections needs special expertise in ophthalmology. Even if the pigmented sebaceous gland epithelioma doesn't show malignancy, quick surgical and medical intervention can avoid further complications arising from the presence of the mass that would irritate the cornea.

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Conflict of interest

The authors declare no conflict of interest.

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