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## CASE REPORT

### Meibomian Epithelioma of the Lower Eyelid in a Thoroughbred Horse

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#### ABSTRACT

A 9-year old, castrated male, thoroughbred horse presented for a left lower eyelid mass with ocular signs of mucopurulent discharge, conjunctival hyperemia and ocular discomfort. On physical examination, there was no other abnormality. Surgically, the mass arising from the inner surface of left lower eyelid was excised and examined histopathologically. Microscopically, the eyelid mass exhibited neoplastic basaloid cells forming irregular cell masses of variable size separated by thin fibrous tissues. The basaloid cells showed mildly pleomorphic and undifferentiated appearances with prominent oval nuclei and scant cytoplasm. Poorly differentiated meibocytes were observed occasionally in the periphery regions of the cell masses suggesting the mass of lower eyelid originated from meibomian glands. Based on histopathological observation, the present case was diagnosed as an equine meibomian epithelioma in the lower eyelid. To the author's knowledge, the present case is the first report of equine meibomian epithelioma in veterinary literatures.

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#### INTRODUCTION

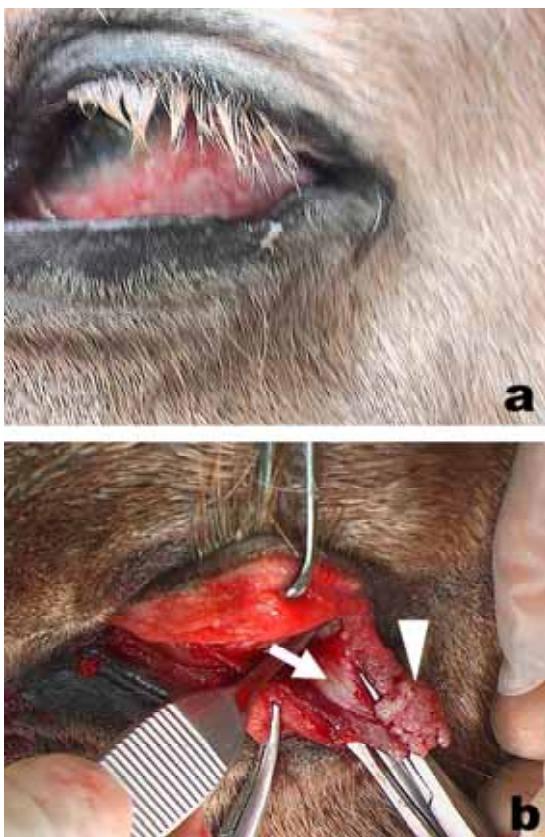
The majority of tumors occurring in horses are cutaneous tumors capturing 50% of all neoplasms of horses. Among them, sarcoids and squamous cell carcinomas were revealed to be the most common equine cutaneous tumors. Previous studies also indicated that melanomas, papillomas, fibromas, and lipomas are one of the major cutaneous neoplasms occurring frequently in horses (Valentine, 2006). Squamous cell carcinomas and sarcoids are known to be the representative and most prominent tumors affecting the ocular region in horses (Bellhorn, 1996). Other neoplasms such as hemangioma, lymphangioma, lymphangiosarcoma, papilloma, solid carcinoma, sebaceous adenocarcinoma and basal cell tumor were also reported to occur in the ocular regions of horses (Mathes *et al.*, 2011).

There are various epithelial origins arising from meibomian glands, lacrimal glands, nictitans glands and cutaneous epithelium in the eyelid including the third eyelid of horses (Bellhorn, 1996). Therefore, several cases

reported various ocular neoplasms including squamous cell carcinomas, a lacrimal gland adenocarcinoma and a basal cell carcinoma in the region of horses (Mathes *et al.*, 2011). In horses, most ocular neoplasms were identified in the third eyelid (nictitating membrane), which was thought to be associated with its anatomical structure including various origins of conjunctiva, cartilage, various glands and vascular tissues. However, to date, there was no reported case of tumors originating from meibomian glands located in the upper and lower eyelid in horses. This case report describes an extremely rare case of primary equine meibomian epithelioma diagnosed histopathologically for the first time.

**History, clinical examination and gross findings:** A 9-year-old, castrated male, thoroughbred horse was presented to a certain local large animal hospital with the left ocular signs of ocular mucopurulent discharge, conjunctival hyperemia and ocular discomfort. On physical examination, the horse appeared to be in normal range of pulse, body temperature and respiration rate. On close examination of affected left eye, a mass arising from inner surface of the lower eyelid was seen (Fig. 1a). The

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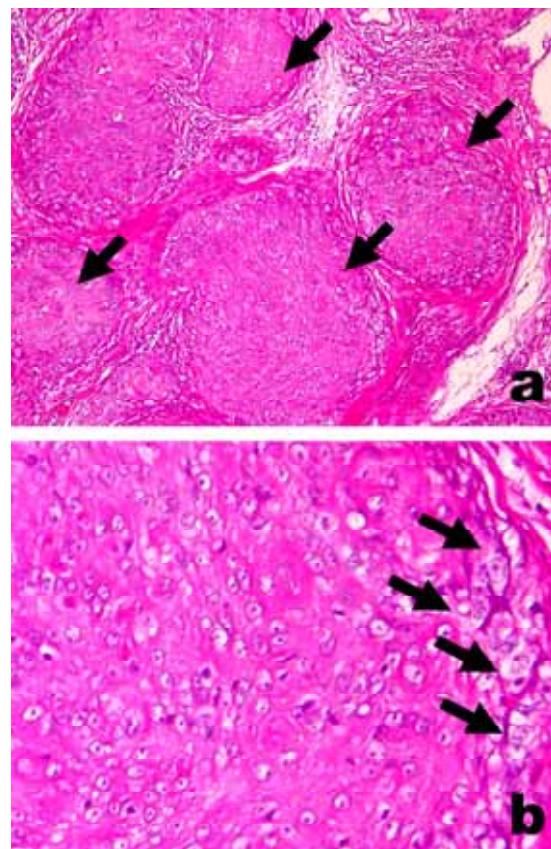


**Fig. 1:** The affected left eye of a 9-year old, thoroughbred horse. (a) There is a white-pinkish neoplasm spreading to the hyperemic conjunctiva and cornea. The neoplasm shows multi-nodular shapes with an indistinct boundary. (b) Surgically separated and excised mass. The ocular mass exhibiting multi-lobular appearances (arrow head) originated from inner surface of lower eyelid. The easily separated mass from the cornea shows a smooth and intact contact surface indicating the mass is well-encapsulated without invasions to the adjacent tissues (arrow).

white-pinkish mass had multi-nodular and lobular appearance. The ocular mass also exhibited irregular margin and adhesions to a certain part of cornea (Fig. 1).

**Treatment:** For surgery, the horse was fasted for a day and general anesthesia was induced by intravenous injection of Xylazine hydrochloride (1.1mg/kg), guaiphenesin (60mg/kg) and Ketamine hydrochloride (1.7mg/kg). The mass of lower eyelid was easily separated from the cornea without excision as well as encapsulated (Fig. 1b), which means that the mass did not invade the cornea but induced chronic inflammations causing adhesive lesions. The surgically excised mass was referred to College of Veterinary Medicine, Kyungpook National University and Animal, Plant and Fisheries Quarantine and Inspection Agency, Ministry for Food, Agriculture, Forestry and Fisheries for a definite diagnosis. For histopathological examination, the mass tissue was immediately fixed in 10% neutral buffered formalin, processed routinely and embedded in paraffin wax. The neoplastic tissue embedded in paraffin block was sectioned at thickness of 5  $\mu\text{m}$ . The sectioned slides were stained with hematoxylin and eosin.

**Diagnosis:** Microscopically, the resected mass of eyelid was composed of neoplastic basaloid cells forming irregular



**Fig. 2:** Representative photomicrographs of the meibomian epithelioma at the left eyelid. (a) The eyelid mass consisted of masses (arrows) of neoplastic basaloid cells which are separated by thin fibrous connective tissues. Numerous inflammatory cells infiltrate the fibrous connective tissues surrounding cellular solid masses and newly formed blood vessels. H&E stain.  $\times 100$ . (b) The neoplastic basaloid cells characterized by prominent nuclei and scant cytoplasm are undifferentiated and mildly pleiomorphic. Occasionally, poorly differentiated meibocytes were observed in the periphery of the cell masses (arrows). H&E stain.  $\times 400$ .

cell masses of variable size (Fig. 2a). The masses were separated by thin fibrous connective tissues. Numerous inflammatory cells including neutrophils, eosinophils, lymphocytes, plasma cells and macrophages infiltrated the fibrous connective tissues surrounding cellular solid masses and newly formed blood vessels. The majority of the basaloid cells was mildly pleiomorphic and undifferentiated, which shows prominent oval nuclei and scant cytoplasm (Fig. 2b). The nuclei of the neoplastic cells were characterized by condensed chromatin, large clear vesicles and one-two prominent nucleoli. The cell boundaries were indistinctive and three mitotic figures per high power of view were frequently observed. Poorly differentiated meibocytes were also observed occasionally in the periphery regions of the cell masses. Based on gross and microscopic findings, the present case was diagnosed as equine meibomian epithelioma.

## DISCUSSION

Meibomian gland tumor is not only one of the most common canine tumors such as basal cell tumor, mammary gland tumor, mast cell tumor, melanocytic tumor but also the most commonly reported eyelid neoplasm in dogs (Cordy *et al.*, 1990). However, the

meibomian tumor is extremely rare in other large animals such as cattle and horses. To date, only two cases of meibomian tumor of large animals, which were meibomian carcinoma and adenoma, were reported in cattle (Yuksel *et al.*, 2005).

Meibomian gland tumors can be classified histologically into four major groups similarly with sebaceous gland tumors as follows: meibomian adenoma, meibomian ductal adenoma, meibomian epithelioma and meibomian carcinoma (Goldschmidt *et al.*, 2002). Meibomian epithelioma is very similar to sebaceous epithelioma and basal cell epithelioma in most aspects including biological behaviors and histological features. The origins of those tumors are undifferentiated basal cells of the meibomian glands and sebaceous glands and epidermis. Meibomian epithelioma is composed of the undifferentiated basal cells forming irregularly shaped cell masses. The cellular masses of undifferentiated basal cells often contain heavily pigmented melanocytes distributed among the basal cells, which are frequently observed in most benign basal cell tumors. The masses of undifferentiated basal cells are separated by fibrous connective tissues and surrounded by a dense infiltration of inflammatory cells containing lymphocytes and plasma cells (Cordy, 1990). Our present case indicates most identical histological features to the previously reported cases of meibomian epithelioma in the veterinary literature, although the melanin pigmented lesions were not observed. A previous report of meibomian adenoma from a calf also showed a lack of melanin pigmentation which is well consistent with our findings in the present report (Yuksel *et al.*, 2005). In dogs and human beings, the upper eyelid was reported to be more susceptible to neoplastic changes compared with the lower eyelid as the upper eyelid has more abundant meibomian glands (Goldschmidt *et al.*, 1992). However, our present case in a horse and other previous reports in cattle show the meibomian tumors arising from the lower eyelid in large animals.

Meibomian gland tumors are mostly benign except for meibomian carcinoma. Among them, meibomian epithelioma containing low grade of malignancy can be misdiagnosed as meibomian carcinoma because of the undifferentiated cells of the tumor. Therefore, meibomian epithelioma should be differentiated from meibomian carcinoma histopathologically. Meibomian carcinomas consist of irregular lobules composed of poorly differentiated pleomorphic basal cells. The basal cells of meibomian carcinoma are considerably various in size and appearance including pleomorphic nuclei and finely vacuolated cytoplasm whereas meibomian epithelioma exhibits smaller and uniform shapes of basal cells (Cordy, 1990). In the present case, the size and appearance of undifferentiated tumor cells were uniform and fairly small. Moreover, a few poorly differentiated meibocytes which were observed occasionally made us confirm that this tumor of eyelid originated from meibomian glands.

For the treatment of eyelid and periocular tumors in horses, surgical excision, cryotherapy and chemotherapy were known to be generally effective. In case of benign tumor of meibomian gland such as meibomian adenoma, meibomian ductal adenoma and meibomian epithelioma, a complete surgical excision of the ocular tumor mass is

enough for the full recovery (Brooks, 1999). However, meibomian epithelioma can recur by an incomplete surgical excision (Cordy, 1990). The present case also showed recurrence of tumor mass after one month surgical excision, which is believed to be induced by the incomplete surgery. Finally, a veterinary surgeon performed ophthalmectomy because he believed the present case is in a state of malignancy.

Equine eye is more susceptible to diseases than other domestic animals. Moreover, Racing and riding horses depend almost on their vision to accurately recognize the surrounding environment. Therefore, visual abilities are directly associated with the behavior of horses (Brooks, 1999). In several countries including Japan and Republic of Korea, horses with half blindness or blindness are restricted or banned to participate in races. Furthermore, a long interval of time including resting period is required for the complete recovery of the affected eye, which induces the interference in training and decreased racing ability of racehorses (Wada *et al.*, 2010). Therefore, the misdiagnosis and inappropriate treatment for ocular diseases can be linked directly with a critical and enormous loss in the economic values of racehorses.

Since meibomian gland tumor is most commonly reported eyelid neoplasm in dogs, meibomian epithelioma is very common in dogs (Cordy, 1990). To date, however, meibomian epitheliomas have never been reported in large animals including horses. To the author's knowledge, the present case is the first report of equine meibomian epithelioma which is considered as an extremely rare and unique case in veterinary fields, which suggests that meibomian gland tumors can occur rarely in horses. Veterinary clinicians should keep in mind that histopathological diagnosis should be followed by surgery of eyelid tumors in horses and meibomian epitheliomas which are benign can be removed completely with surgical excision like other common disorders of equine eyes which are can be managed with the proper care.

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