

**Case Report**

**ASYMMETRICAL OCULAR DERMOID IN NATIVE KOREAN CATTLE**

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**ABSTRACT**

This paper describes two cases of ocular dermoids in native Korean cattle based on gross and histopathologic findings. In Case 1, the choristoma on the left side was characterized by hair growth in the cornea conjunctiva, while the choristoma on the right side was only located in the nictitans. The choristoma in Case 2 was located in the left cornea conjunctiva. The choristomas were surgically excised from the ocular area. Histopathologically, hair shafts, hair bulbs, and sebaceous and sweat glands were observed in the epidermis and dermis of the choristoma. Based on the anatomical location and histopathological features of the masses with hair, each choristoma in Case 1 was diagnosed as a bilateral, corneoconjunctival and conjunctival dermoid, and the one in Case 2 was diagnosed as a unilateral, corneoconjunctival dermoid. The bilateral coexistence of two different types of ocular dermoids in one individual has not been previously reported.

(148 words limit)

**Key words:** Ocular dermoid, choristoma, native Korean cattle.

**INTRODUCTION**

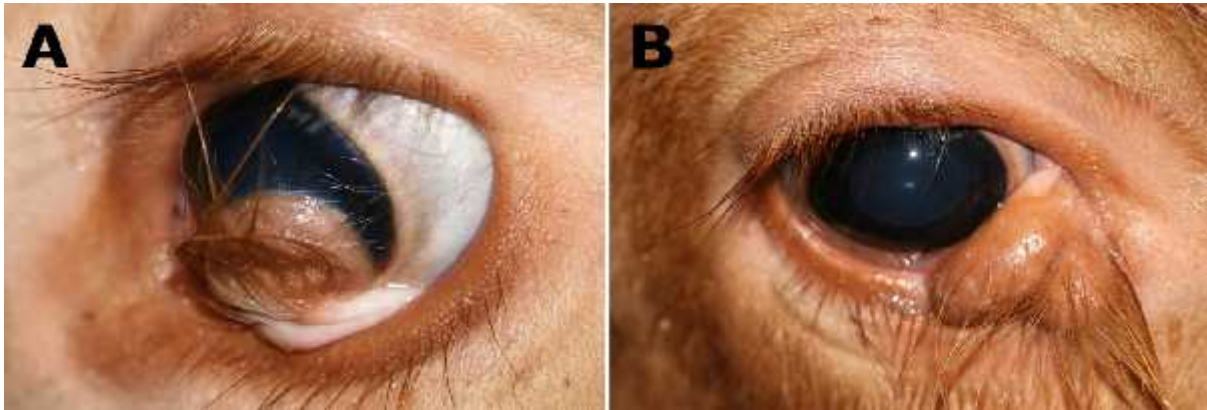
Choristomas are benign, congenital lesions that consist of an over growth of normal tissue in an abnormal location (Oakman *et al.* 1993). Dermoids are choristomatous abnormalities that often arise in the ocular region (Shields *et al.* 1986). Dermoids are generally located in the cornea, conjunctiva, nictitans, and eyelids (Lawson 1975) and they usually occur unilaterally. Bilateral ocular dermoids have been found in animals (Feist and Trefz 2011; Gelmetti *et al.* 2010; Yeruham *et al.* 2002) and humans (Magli *et al.* 1999). However, ocular dermoids are not common in cattle with their prevalence estimated at 0.002% (Yeruham *et al.* 2002). This paper presents two unusual cases of ocular dermoids in native Korean cattle.

**Case Report:** Case 1: A 2-year-old native Korean cattle presented with an abnormal appearance in both eyes. However, the ocular findings were different for each of the eyes. On the left side, a large mass was attached to the inferomedial cornea and conjunctiva with moderate hairs arising from the surface (Fig. 1A). The fleshy mass on the right side was limited to the nictitans (Fig. 1B). The cattle exhibited moderate, watery discharge in both eyes. No other ocular abnormalities were detected in either eye. The clinical diagnosis was bilateral corneoconjunctival and nictitans dermoids. The corneoconjunctival dermoid extended beyond the inferomedial limbus and then merged with the hairless tissue within the inferomedial bulbar conjunctiva of the left eye (Fig. 1A). The nictitans

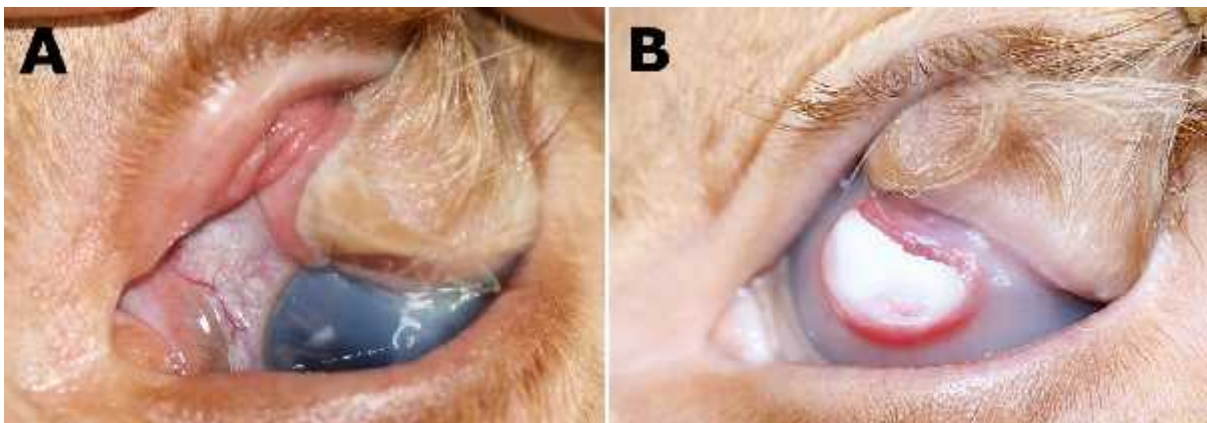
dermoid in the right eye was located only within the third eyelid area and did not extend to any conjunctival or corneal areas (Fig. 1B).

Case 2: A 3-month-old native Korean calf presented with an abnormal appearance in the left eye. A large mass was attached to the superotemporal cornea and conjunctiva with a large number of hairs arising from the surface (Fig. 2A). This case exhibited chronic epiphora and displacement of the globe. Corneal opacity and superficial corneal rupture occurred in the central cornea of the left eye two weeks after our first observation (Fig. 2B). No ocular abnormalities were detected in the right eye. The clinical diagnosis was a unilateral corneoconjunctival dermoid. The corneoconjunctival dermoid extended beyond the superotemporal limbus and into the superotemporal bulbar conjunctiva of the left eye. This mass showed typical macroscopic characteristics including tissue with a large amount of hair between the corneal and conjunctival areas (Fig. 2A). All of the tissue excised by surgery was submitted for histopathologic examination.

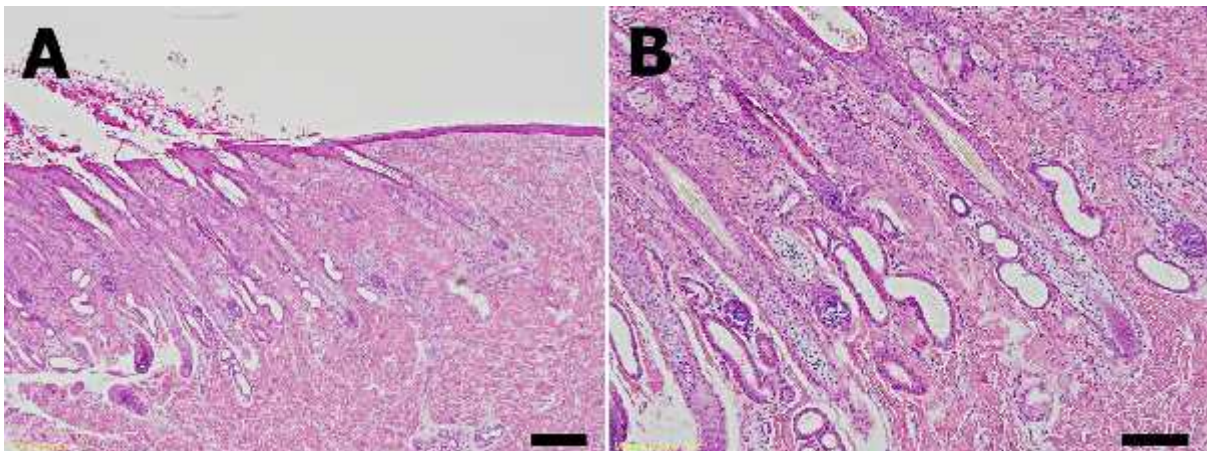
The corneal lesion exhibited a moderately well delineated, but non-encapsulated, raised mass. The mass was comprised of stratified squamous keratinized epithelium overlying a thick collagenous stroma, which merged with conjunctival tissue that contained submucosal, glandular tissue (Fig. 3A). The corneoconjunctival mass contained well-developed hair follicles as well as apocrine and sebaceous glands (Fig. 3B).



**Figure 1.** (A) The corneoconjunctival dermoid extended beyond the inferomedial limbus, and then merged with the hairless tissue within the inferomedial bulbar conjunctiva of the left eye. (B) The nictitans dermoid of the right eye was located only within the third eyelid area and did not extend to any conjunctival or corneal areas.



**Figure 2.** (A) The corneoconjunctival dermoid was attached to the superotemporal cornea and the conjunctiva with a large number of hairs arising from the surface. (B) Corneal opacity and rupture were present in the central cornea of the left eye.



**Figure 3.** (A) The ocular dermoid exhibited a stratified squamous keratinized epithelium overlying a thick collagenous stroma, which merged with the submucosal glandular tissue. H&E staining; bar=200  $\mu$ m. (B) Each choristomas contained numerous, large, well-developed hair follicles and other adnexal structures (apocrine and sebaceous glands). H&E staining; bar=100  $\mu$ m.

## DISCUSSION

The exact developmental mechanisms related to the pathogenesis of ocular dermoids have not yet been clarified (Barkyoumb and Leipold 1984). Metaplasia of the mesenchyme of the mostly neural ectoderm, resulting in abnormal differentiation of the surface ectoderm, has been proposed as the most likely mechanism (Cook 1999). The resulting dermoid consists of ectodermal constituents (keratinized epithelium, hairs, and sebaceous and apocrine glands) and mesenchymal constituents (fibrous tissue and fat) in different proportions (Golubovi *et al.* 1995).

Ocular dermoids in cattle are relatively rare, with an estimated prevalence of 0.002% (Yeruham *et al.* 2002). Ocular dermoids have been documented worldwide in many breeds of cattle with a similarly low prevalence in all of the breeds except for the Hereford (Barkyoumb and Leipold 1984; Castro *et al.* 2006). The apparent predisposition in Herefords is primarily based on a survey of 74 affected Hereford and Hereford-cross calves from one region in the USA (Barkyoumb and Leipold 1984). The sites of the dermoids in that study were reported in decreasing order of incidence as the limbus, third eyelid, canthus, eyelid, and conjunctiva (Barkyoumb and Leipold 1984). There are only a few reports of bilateral ocular dermoids in calves and each of the cases have been described as occurring in single or low numbers of animals (Ismail 1993; Yeruham *et al.* 2002). Of those bilateral cases, inferonasal corneoconjunctival dermoids were most frequently reported, followed by nasal canthal dermoids (Ismail 1993; Yeruham *et al.* 2002).

According to Barkyoumb's nomenclature (Barkyoumb and Leipold 1984), the left eye in our Case 1 was determined to contain a corneoconjunctival dermoid. The dermoid in the right eye in our Case 1 can be classified as a nictitans dermoid with a normal appearance of the other areas of the eye. In general, bilateral ocular dermoids are symmetrical. However, the dermoids in our study were not. Only one case of asymmetrical ocular dermoids in humans has been reported (Sharma *et al.* 2008). In addition, the corneoconjunctival dermoids in our Case 1 had different characteristics since the mass on the corneal area had hair and the mass on the conjunctival area was hairless. These results indicate that the onset of these masses might have occurred via different developmental mechanisms.

The results of our study showed unusual bilateral ocular dermoids, characterized by a corneoconjunctival dermoid in the left eye and a nictitans dermoid in the right eye. To our knowledge, the synchronous occurrence of two completely different types of ocular dermoids in one cow has not been previously reported.

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