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## Histopathological study of choristoma and hamartoma in Indian cattle breed

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### Abstract

The present study was conducted on 15 clinical cases of ocular dermoids in Indian cattle breeds, sheltered at Shree Panna Lal Gaushala, Mandore, Jodhpur, Rajasthan and also among those cattle which were presented at veterinary clinical complex (VCC), Department of veterinary surgery and radiology, CVAS, Bikaner, Rajasthan from August 2019 to December 2019. Upon gross and ophthalmic examination 18 different ocular dermoid cases were diagnosed and classified accordingly. All excised tissues were submitted to histopathological studies. The excised biopsy tissues were fixed in 10% formalin immediately after excision. The sections were stained by haematoxylin and eosin (H&E) and examined under light microscope (100x) to study the histopathological features.

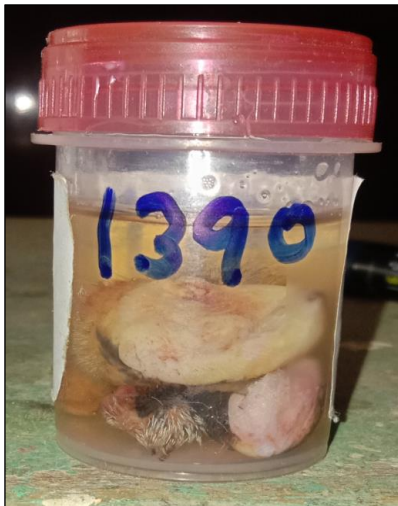
**Keywords:** Dermoid, histopathological study, 10% formalin, hematoxylin and eosin

### Introduction

Ocular dermoid is a congenital growth of skin or skin like appendages that usually arises from limbus, conjunctivae, and/or cornea causing corneal and conjunctival irritation that leads to chronic inflammation, Lacrimation and visual defects. (Barkyoumb and Leipold, 1984; Gelatt, 1981) [4, 6]. It may occur sporadically in numerous cattle breeds and can be unilateral or bilateral (William and Gellat, 1981; Barkyoumb and Leipold, 1984) [12, 4]. Ocular dermoids are choristomatous defects characterised by the overgrowth of normal benign tissue that arise from the ocular region congenitally (Sheilds *et al.*, 1986) [11]. Dermoids are usually normal tissue in an abnormal location; termed as Choristoma when located on the cornea and/or conjunctiva and hamartoma when located on the palpebral skin. During embryonic development Choristoma and hamartoma may develop afterward from same abnormal event and these two terms differentiate by lesions location (Balland *et al.*, 2015) [3]. Ocular dermoid are histopathologically characterised by presence of keratinised squamous epithelium with deposition of melanin and kerato-hyaline granules and also by presence of hair follicles, sebaceous and sweat glands associated with lymphocytic infiltration in dermal layer of tissue section (Hatate *et al.*, 2018) [7]. As ocular dermoids are skin or skin like appendages and made up of different skin layers, to know the elements and their structures which are included in ocular dermoids histopathological studies were done hence present study undertaken on Indian cattle to study histopathology of surgically excised ocular dermoid sample.

### Materials and Methods

The present study entitled "A clinical study on diagnosis and surgical management of ocular dermoids in cattle" was done from August, 2019 to December, 2019, on 15 clinical cases of ocular dermoids in cattle sheltered at Shree Pannalal Gaushala, Mandore, Jodhpur, Rajasthan and also among those cattle presented in veterinary clinical complex (VCC) Department of Veterinary Surgery and Radiology, CVAS, RAJUVAS, Bikaner, Rajasthan. Ocular dermoids of 18 eyes of 15 clinical cases were diagnosed and classified. All the cattle included in the study were evaluated by anamnesis, gross and ophthalmic examination. Most of the animals had unclear history because animal from gaushala rescued from street and animals presented at VCC, Bikaner also with incomplete breeding history. Different types of dermoids (corneoscleral, corneconjunctival, sclera-cornea-conjunctival, third eyelid & conjunctival, lower or upper eyelid & conjunctival and scleral) which are excised by surgical procedure included in histopathological studies. Fixing of surgically excised dermoid masses were done in 10% formalin immediately after excision (Fig. 1a and 1b).



**Fig 1a:** Fixing of surgically excised dermoid masses were done in 10% formalin immediately after excision



**Fig 1b:** Fixing of surgically excised dermoid masses were done in 10% formalin immediately after excision

**Clinical examination**

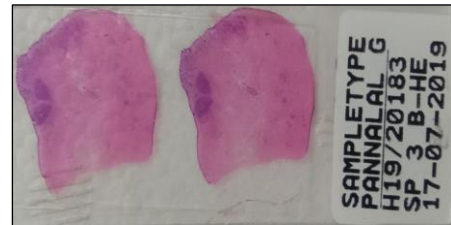
Gross examinations of eye and periocular regions were done to record ocular discharge, epiphora, redness, swelling, pain, Blepharitis, chemosis, ectropion, entropion and presence of any foreign body, if any. Ophthalmic examinations were performed by doing various tests.

**Tissue processing and preparation of slide**

The tissues were processed in ascending grades of alcohol, cleared and embedded in paraffin. Section of 3 to 5mm thickness was cut and mounted on a slide (Fig. 2a and 2b). The sections were stained by haematoxylin and eosin (H&E) and examined under light microscope (100x) to study the histopathological features described by Luna (1968) [9].



**Fig 2a:** Section of 3 to 5mm thickness was cut and mounted on a slide



**Fig 2b:** Section of 3 to 5mm thickness was cut and mounted on a slide

**Results**

Histopathological study of excised tissue was done after fixing with 10% formalin to each sample. Dermoid cysts were lined by keratinizing stratified squamous epithelium. Many elements of normal skin were histologically described within the submitted dermoid tissue including dermal appendages, apocrine glands, salivary glands and collagen.

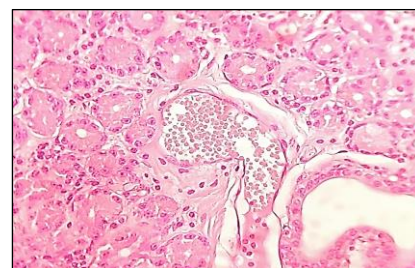
Variation within and among the various ocular dermoids observed histologically and ultrastructurally included degree of epidermal keratinization and pigmentation, epidermal thickness, number of epidermal adnexa. General description of examined tissue included keratinized/non-keratinized stratified squamous epithelium, haired tissue and fibrous connective tissue (Fig. 3-12).

Histopathological finding of case no.2 of corneoconjunctival dermoid of right eye showed presence of several adnexal glands along with mucous glands. Case no.3 of lower eyelid and conjunctival dermoid, showed presence of fibro-collagenous tissue along with dermoid cyst. Case no.4 of corneoconjunctival dermoid showed presence of stratified squamous epithelium along with dermal appendages which were ectodermal elements.

Histopathological findings of case no.6 of third eyelid and conjunctival dermoid of left eye showed stratified squamous epithelium along with chronic inflammation, peri-glandular fibrosis and haemorrhage. Whereas, findings of right eye of case no.6 (sclero-cornea conjunctival dermoids) showed presence of melanin pigment along with dermoid cyst.

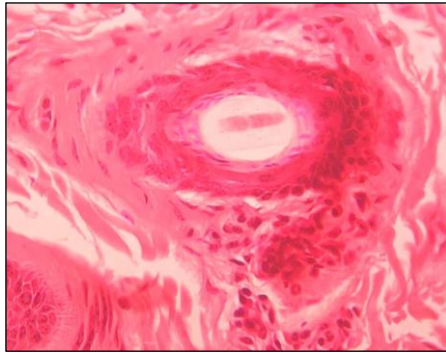
Histopathological findings of case no.8 of conjunctival third eyelid dermoid of left eye showed mild lymphocytic infiltration and dermoid cyst whereas; right eye of case no. 8 (conjunctival dermoids) showed presence of adnexal glands along with mucous glands.

Presence of adnexal glands and dermal appendages was observed in case no. 10 of lower eyelid and corneoscleral dermoid of right eye. Case no. 11 of conjunctival dermoid of left eye showed focal granulation tissue, peri-glandular fibrosis along with presence of salivary glands. Presence of keratinized stratified squamous epithelium along with dermoid tissue was observed in case no. 12 of corneoscleral dermoid.

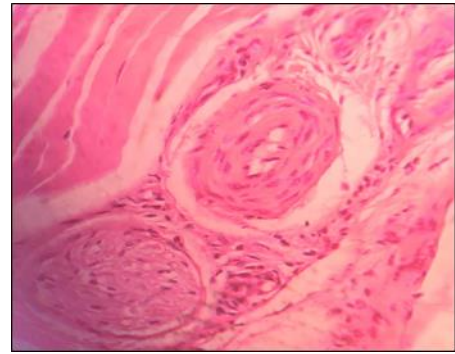


**Fig 3:** Histopathological findings of corneo-conjunctival dermoid of right eye H & E, 100X, (case no. 2) showing presence of several adnexal glands

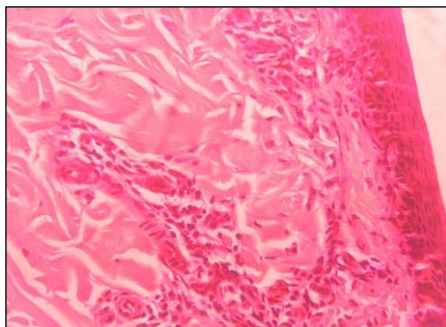




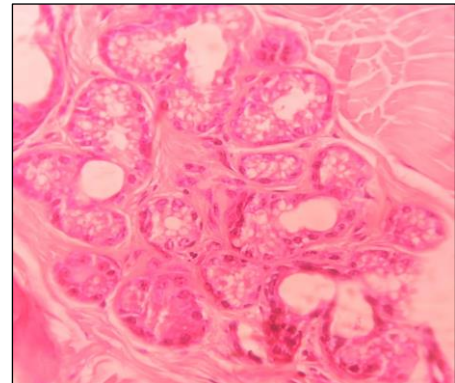
**Fig 4:** Histopathological findings of upper eyelid and lower conjunctival dermoid of left eye H & E, 100X, (Case no. 3) showing presence of fibro-collagenous tissue along with dermoid cyst



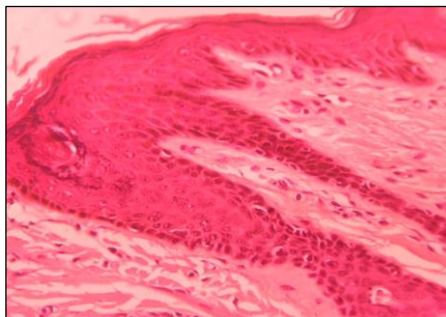
**Fig 8:** Histopathological findings of conjunctivo-third eyelid dermoid of left eye H & E, 100 X, (case no. 8) showing mild lymphocytic infiltration



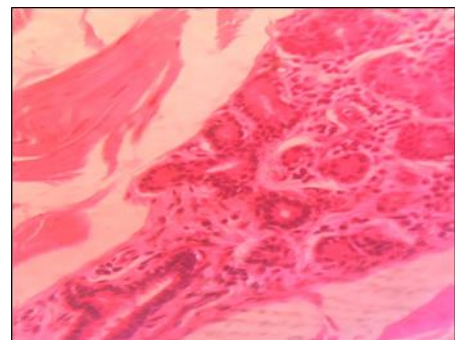
**Fig 5:** Histopathological findings of case no. 4 of corneo-conjunctival dermoid of left eye H & E, 100 X, (case no. 4) showing presence of stratified squamous epithelium along with dermal appendages which are ectodermal elements



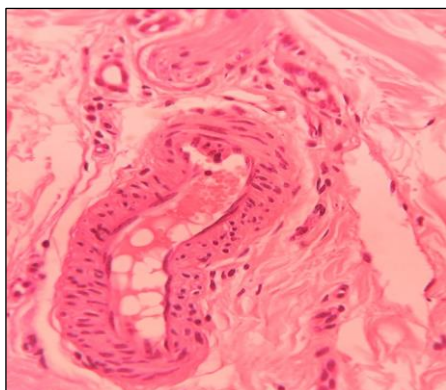
**Fig 9:** Histopathological findings of conjunctival dermoid of right eye H & E, 100 X, (case no. 8) showing presence of several adnexal glands



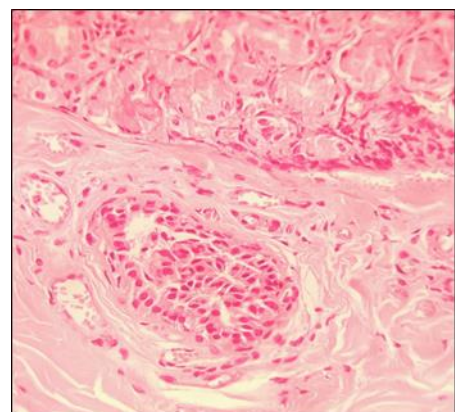
**Fig 6:** Histopathological findings of third eyelid & conjunctival dermoid of left eye H & E, 100X, (Case no. 6) Showing stratified squamous epithelium along with chronic inflammation



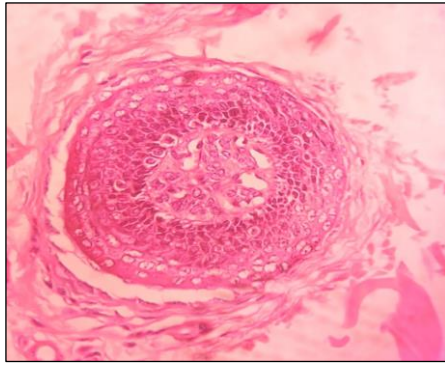
**Fig 10:** Histopathological findings of case no. 10 of lower eyelid & corneoscleral dermoid of right eye H & E, 100 X, (case no. 10) showing presence of adnexal glands and dermal appendages



**Fig 7:** Histopathological findings of sclero-corneoconjunctival dermoid of right eye H & E, 100 X, (case no. 6) showing presence of melanin pigments along with dermoid cyst



**Fig 11:** Histopathological findings of conjunctival dermoid H & E, 100X, (Case no. 11) showing focal granulation tissue, peri-glandular fibrosis along with presence of salivary glands



**Fig 12:** Histopathological findings of corneoscleral dermoid H & E, 100 X, (case no. 12) showing presence of keratinized stratified squamous epithelium

### Discussion

In present study, histopathology of excised tissues resembled normal skin lined with keratinized/non-keratinized stratified squamous epithelium and haphazardly arranged hair follicles. Excised tissues were made up of ectodermal and mesenchymal elements. This was in accordance with Badanes and Ledbetter (2019) [2], Hillyer *et al.* (2003) [8] and Aher *et al.* (2018) [1] had reported presence of some adnexal structures superficially. Similar histopathological findings were observed in present study in case no. 2 of corneoconjunctival dermoid.

Sarangom *et al.* (2016) [10] had reported presence of stratified squamous keratinized epithelium above a thick collagenous stroma with hair follicles and bulbs in addition to apocrine gland. Further, Balland *et al.* (2015) [3] had reported presence of multiple pilo-adnexal units, embedded in a fibrous connective tissue and deep adipose lobules of excised tissue. Similarly, in present study case no. 3 of lower eyelid and conjunctival dermoid was consisted of mesenchymal element (fibro-collagenous tissue, hair follicles and bulbs) along with dermoid cyst.

Barkyoub and Leipold (1984) [4] and Badanes and Ledbetter (2019) [2] had reported keratinized/non-keratinized squamous epithelium with normal dermis and epidermis along with haired skin in examined tissue, subacute sub-epidermal, conjunctival and corneal inflammation in all dermoids. Similarly, in present study histopathology of case no.6 of third eyelid and conjunctival dermoid consisted of stratified squamous epithelium along with chronic inflammation, periglandular fibrosis and haemorrhage. Haemorrhage might be due to any ocular injury.

In present study, in case no. 6 of sclera cornea-conjunctiva dermoid presence of melanin pigments along with dermoid cyst lined with stratified squamous epithelium was observed. This was in accordance with findings of Erdikmen *et al.* (2013) [5] and Hatate *et al.* (2018) [7].

Hatate *et al.* (2018) [7] found hair follicles and the sebaceous and sweat glands associated with lymphocytic infiltration in dermal layer. Similarly, in present study mild lymphocytic infiltration and dermoid cyst were observed in case no.8 of conjunctival third eyelid dermoid.

Presence of adnexal glands and ectodermal elements like dermal appendages were observed in case no. 10 of corneo scleral and lower eyelid dermoid. This was in accordance with Aher *et al.* (2018) [1] and Badanes and Ledbetter (2019) [2].

Yeruham *et al.* (2002) [13] had found that ocular dermoids contained keratinized squamous epithelium cells, hair follicles and sweat glands. Similarly, in present study dermoid cyst

was lined by keratinized stratified squamous epithelium in case no. 12 of corneoscleral dermoid.

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