

## Corneal Dermoid and Microphthalmia of Sheep and Cattle in Borno State, Nigeria

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**Abstract:** Clinical case records of animals presented to the State Veterinary Hospital and the University of Maiduguri Veterinary Teaching Hospital (Unimaid VTH) Nigeria, between May 2004 to May, 2007 were studied for cases of dermoid and/or microphthalmia. Four (0.32%) cases of corneal dermoid and microphthalmia were found at the State Veterinary Hospital. Three of the cases were ovine species and one was bovine. No case of either corneal dermoid or microphthalmia was found in the Unimaid VTH during the period of study. The treatment procedures for the cases recorded are discussed and the need for further studies to determine the prevalence, specie and breed distribution is emphasized.

**Key words:** Corneal dermoid, microphthalmia, sheep, cattle, borno state

### INTRODUCTION

Dermoids are islands of skin that are histologically normal but displaced to an abnormal location, usually the lateral canthus or limbus, third eyelid, medial canthus and eyelid and were described as a heritable autosomal recessive and polygenic trait in Hereford Cattle (Deas, 1959; Hickman and Walker, 1980; Gelatt, 1991; Sarma and Sama, 1989; Ismail, 1994; Slatter, 2001; Barkyoumb and Leipold, 1984; Rezaei *et al.*, 2007). Corneal dermoid is a congenital choriostoma characterized by the presence of heterotrophic cutaneous tissue in an inappropriate place. They are present at birth, although they may not be clinically recognized until the animal is several weeks old (Gelatt, 1991). The cause of congenital corneal opacities may be arrested development during embryogenesis and intrauterine infection (Barnett, 1990).

Epiphora is observed when the hair is long and soft and when the hair is short and stiff, there may be considerable irritation (Gelatt, 1991). Corneal dermoid in horses are usually flat with a rough surface and the hairs usually short, stiff with considerable irritation when the individual blinks (Barkyoumb and Leipold, 1984).

Corneal dermoids are reported to occur most commonly in the dog than in other species, particularly in St. Bernard and Dalmatian breeds (Mansilla *et al.*, 2000; Slatter, 2001). Corneal dermoids also occur in Cats (Roberts and Lipton, 1975; Gelatt, 1991). Corneal dermoids

have also been reported in Horses (Barkyoumb and Leipold, 1984), Camels (Moore *et al.*, 1999) and river buffalo (Rezaei *et al.*, 2007). Pawde *et al.* (2005) reported the incidence rate of corneal dermoids in domestic animals to be 3.4% in Uttara Pradesh, India. Gyang (1986) suggested that corneal dermoids are seen only in cattle in Nigeria. Ebbo *et al.* (2003) and Akpavie *et al.* (2006) similarly reported a case of bilateral corneal dermoid in a calf in Sokoto state, Nigeria.

Treatment of the condition is through surgical excision (Hickman and Walker, 1980). The dermoid is removed from the globe and the affected portion of the eyelid is also removed. If extensive eyelid loss results, repair procedures will be required (Hickman and Walker, 1980; Gelatt, 1991; Moore *et al.*, 1999; Lee *et al.*, 2005).

Microphthalmia is abnormal smallness in all dimensions of one or both eyes that may affect normal vision and described by Gelatt (2007) as a congenital disorder which arises from the failure of expression of a transcription factor, MITF (microphthalmia-associated transcription factor), in the pigmented retina thus preventing it from fully differentiating.

Extensive clinical, statistical and genetic studies suggested genetic and infective factors in the causation of microphthalmia (Nath and Gogi, 1976). Tetens *et al.* (2007) recently characterized the phenotype and mapped the locus responsible for autosomal recessive inherited ovine microphthalmia and found the genetic localization for hereditary ovine microphthalmia.

Cases of microphthalmia in animals have been reported elsewhere (Gellat and McGill, 1973; Lewis *et al.*, 1986; Jackson, 1990; Saunders, 2002; Van der Linde-Sipman *et al.*, 2003; Rezaei *et al.*, 2007). There is however, very little information on cases of congenital ocular abnormalities like corneal dermoid and microphthalmia in Nigeria. This study was therefore aimed at determining the occurrence of both bovine and ovine cases of corneal dermoid and microphthalmia in the University of Maiduguri Veterinary Teaching Hospital (UMVTH) and the State Veterinary Hospital, Maiduguri.

## MATERIALS AND METHODS

A three years (May 2004-May 2007) prospective study of clinical cases of dermoid and microphthalmia was also conducted at the University of Maiduguri Veterinary Teaching Hospital (Unimaid VTH) and the State Veterinary Hospital, Maiduguri, Nigeria.

The species, breed, sex, age, type of birth and other relevant data were recorded. Clinically identified cases of dermoid were prepared for superficial keratectomy under general anesthesia. Pre-anesthetic medication using 2% solution of xylazine HCL at dose rates of 0.1 and 0.04 mg kg<sup>-1</sup> body weight for the lambs and calves, respectively was followed by induction and maintenance of general anesthesia using thiopentone sodium (10 mg kg<sup>-1</sup> body weight). Pictures of the affected eyes were taken before surgery and post-operatively. Tissue sections were collected for histological examination following superficial keratectomy. The tissue sections were processed for histological examination. Photomicrographs of the histologic sections were taken using an Olympus® digital camera (4 mega pixels).

## RESULTS AND DISCUSSION

Four (0.32%) cases of corneal dermoid and microphthalmia were found out of a total of 1253 cases handled during the study period between May 2004 and May 2007 in the State Veterinary Hospital, Maiduguri. Three of the cases were Ovine species (one of the cases been twins) and one was Bovine. The sex and breed of the cases are shown in Table 1. Neither condition was observed in goats, dogs and cats brought for treatment.

Meanwhile, no case of either corneal dermoid or microphthalmia was found in the University of Maiduguri Veterinary Teaching Hospital during the period of study (Fig. 1-7).

Dermoids are a consequence of abnormal differentiation of tissues of the ocular surface (Roberts and Lipton, 1975; Gellat, 1991; Moore *et al.*, 1999; Gellat, 2007). Roberts and Lipton (1975) suggested that dermoids should be removed surgically if they cause irritation and interfere with vision. The lesion should be carefully dissected from the underlying cornea to avoid penetrating the anterior chamber of the eye. Roberts and Lipton (1975) similarly reported the frequent replacement of the bed of dermoid with a dense corneal scar after surgery. Similar observations were made in all the cases where the keratectomy procedure was performed in this study.

None of the animals studied presented with any other apparent deformity other than the corneal dermoid and microphthalmia. This contrasts with the findings of Yeruham *et al.* (2002), where Hydrocephalus externus were observed as additional congenital malformation in a stillborn twin calf.

Dermoids were also occasionally associated with other congenital eye defects like corneal opacity which have been described in Holsteins as recessive condition (Deas, 1959; Rezaei *et al.*, 2007). The corneal opacity observed in all the lambs and calf in this study agrees with the findings of Yeruham *et al.* (2002), where corneal opacity was observed in the calves they studied.

Congenital microphthalmia which may be unilateral or bilateral have also been reported in ovine species and usually occur with other ocular defects (Jones and Hunt, 1983; Jackson, 1990; Van der Linde-Sipman *et al.*, 2003; Rezaei *et al.*, 2007). The microphthalmia reported in this study were also associated with an apparent complete bilateral blindness with cloudy cornea. There is no known treatment for microphthalmia and surgery of dermoids and cataracts has limited value when central vision is poorly developed (Roberts and Lipton, 1975). The aesthetic benefits of superficial keratectomy procedure, is usually the motivation for surgery. Further studies may be necessary to determine the prevalence, etiology and the specie or breed distribution of corneal dermoid and microphthalmia in Borno state, Nigeria.

Table 1: Distribution of bovine and ovine corneal dermoid and microphthalmia and their management in the state veterinary hospital, maiduguri (May 2004-May 2007).

Species	Breed	Sex	Age (days)	Type of condition	Management
Ovine	Balami (Twins)	Male/female	3	Bilateral microphthalmia	Culling
Ovine	Yankasa	Female	5	Corneal dermoid	Keratectomy/culling
Ovine	Balami/uda cross	Male	5	Corneal dermoid and Microphthalmia	Keratectomy/culling
Bovine	Rahaji/gudali cross	Male	14	Corneal dermoid/keratocystoma	Keratectomy/culling



Fig. 1: Corneal dermoid and microphthalmia on the left eye of a 5 days old Balami/Uda cross lamb. Note the long soft hair (D) and corneal opacity (O)

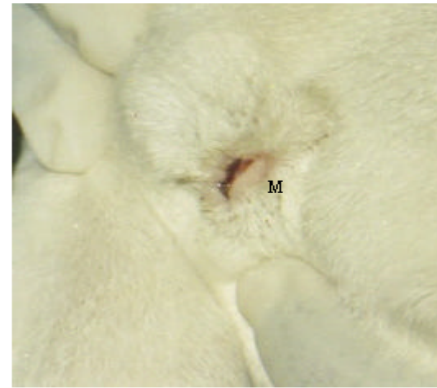


Fig. 4: Microphthalmia on the right eye of a 3 days old Balami lamb (M).



Fig. 2: The left eye of a 5 days old Balami/Uda cross lamb following superficial keratectomy. Note the corneal opacity (O)

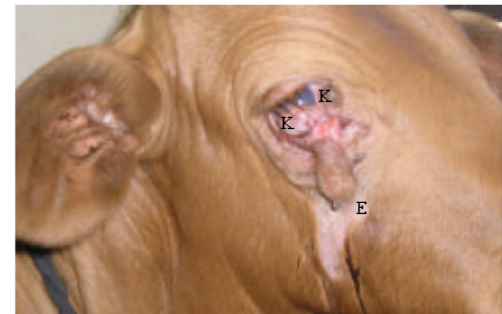


Fig. 5: Corneal dermoid and neoplasia on the right eye of a fourteen days old calf. Note the epiphora (E) and the Keratocystoma (K)

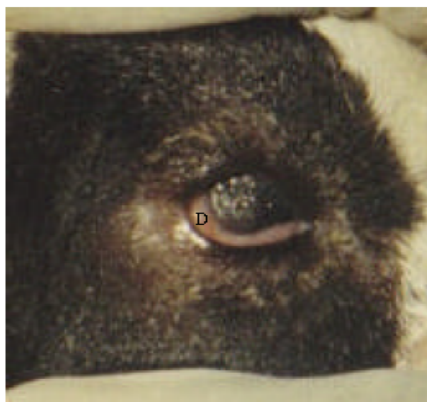


Fig. 3: Corneal dermoid and microphthalmia on the right eye of a 5 days old Yankasa lamb. Note the short hair causing irritation (D)

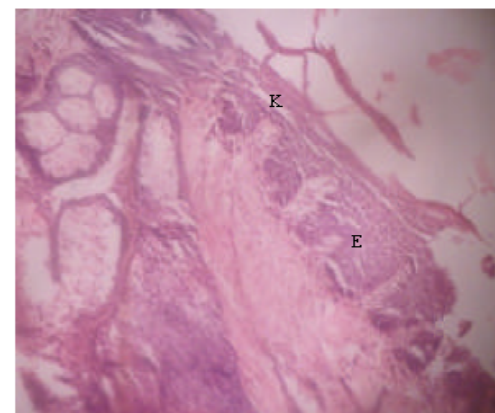


Fig. 6: Photomicrograph of a section of keratocystoma in the eye of a fourteen days old calf. Note the proliferating variably sized and shaped lesions filled with keratin material (K) and epithelium (E) H and E X 50

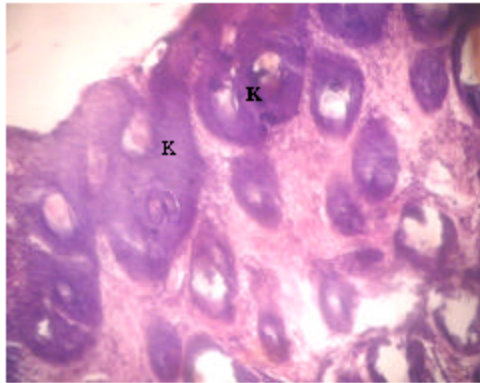


Fig. 7: Photomicrograph of a section of keratocystoma in the right eye of a fourteen days old calf. Note the keratinization of solid squamous cell islands with defined margins (K). H and E X 200

## REFERENCES

- Akpavie, S.O., M.S. Abubakar, T.J. Anga and A.A. Umar, 2006. Observations on Organ Pathology of Ruminants at Sokoto, Nigeria. In: Proceedings of the 43rd conference of the Nigerian Veterinary Medical Association, Gidan Matasa, Niger State, pp: 26-32.
- Barkyoumb, S.D. and H.W. Leipold, 1984. Nature and cause of Bilateral ocular dermoids in Hereford cattle. *Vet. Pathol.*, 21: 316-324.
- Barnett, K.C., 1990. A Color Atlas of Veterinary Ophthalmology. Wolfe Publishers Ltd, pp: 12.
- Deas D.W., 1959. A note hereditary opacity of the cornea in British Friesian Cattle. *Vet. Rec.*, 71: 619-620.
- Ebbo, A.A., B.M. Agai, U. Adamu, A.I. Daneji and H.S. Garba, 2003. Retrospective Analysis of cases presented to the Veterinary Teaching Hospital, Usmanu Danfodiyo University Sokoto (1993-2002). *Nig. Vet. J.*, 24: 133-136.
- Gelatt, K.N. and L.D. McGill, 1973. Clinical characteristics of microphthalmia with colobomas of the Australian shepherd dog. *J. Am. Vet. Med. Assoc.*, 162 (5): 393-396.
- Gelatt, K.N., 1991. Veterinary Ophthalmology. 2nd Edition. Lea and Febiger. Philadelphia, USA, pp: 301-310.
- Gellat, K.N., 2007. Treatment of Orbital Diseases in Small Animals. Proceedings of the 27th WWSA.
- Gyang, C.E.O., 1986. Introduction to Large Animal Surgery. ABU Press, pp: 416.
- Hickman, J. and R.G. Walker, 1980. An atlas of Veterinary Surgery, 2nd Edn, pp: 130.
- Ismail, S.F., 1994. Ocular dermoids in some farm animals. *Assiut Vet. Med. J.*, 30: 212-220.
- Jackson, E.K.M., 1990. Microphthalmia in Sheep. *Vet. Rec.*, pp: 126: 650.
- Jones, T.C. and R.D. Hunt, 1983. Veterinary Pathology. Lea and Febiger. Philadelphia, USA, pp: 1692.
- Lee, J., M.J. Kim, I.H. Kim, Y.I. Kim and M.C. Kim, 2005. Surgical Correction of Corneal Dermoid in a Dog. *J. Vet. Sci.*, 6: 369-370.
- Lewis, D.G., D.F. Kelly and J. Sansom, 1986. Congenital microphthalmia and other developmental ocular anomalies in the Doberman. *J. Small Anim. Prac.*, 27: 559-566.
- Mansilla, M., C. Veuthey and Vasconcellos, 2000. A cystic teratoma dermoide of the cornea-conjunctiva in a german shepherd dog (*Canis familiaris*): A clinical case. *Rev. Chil. Anat.*, 18: 273-277.
- Moore, C.P., J.B. Shaner, R.M. Halenda, C.S. Rosenfeld and W.K. Suedmeyer, 1999. Congenital ocular anomalies and ventricular septal defect in a dromedary camel (*Camelus dromedarius*). *J. Zoo Wildlife Med.*, 30: 423-430.
- Nath, K., R. Gogi, 1976. The orbit. *Indian J. Ophthalmol.*, 24: 1-14.
- Pawde, P.K., A.M. Kirjavdekar, P., Aithal, H.P. Amarpal and M. Hooque, 2005. Survey of eye disorders in domestic animals. *Ind. J. Anim. Sci.*, 75 (1): 33-34.
- Rezaei, F.S., A.A. Farshid and S. Saifzadeh, 2007. Congenital Ocular Dermoid Cyst in a River Buffalo (*Bubalus bubalis*). *Calf. J. Vet. Med. A.*, 54: 51-54.
- Roberts, S.R. and D.E. Lipton, 1975. The Eye. In: Feline medicine and Surgery. In: Catcott, E.J. (Ed). 2nd Edn. American Veterinary Publications Inc. U.S.A., pp: 485-518.
- Sarma, B. and K.K. Sarma, 1989. A case of corneal dermoid in a calf.
- Saunders, L., 2002. Pathology of the eye of domestic animals. Paul Parey, Berlin, 1968. *Revue. Med. Vet.*, 153: 91-92.
- Slatter, D., 2001. Fundamentals of Veterinary Ophthalmology. 3rd Edn. Saunders Publishing Co. Philadelphia, pp: 208.
- Tetens, J., M. Ganter, G. Müller and C. Drögemüller, 2007. Four Linkage Mapping of Ovine Microphthalmia to Chromosome 23, the Sheep Orthologue of Human Chromosome 18. *Invest. Ophthalmol. Visual Sci.*, 48: 3506-3515.
- Van der Linde-Sipman, J.S., T.S. van den Ingh, P. Vellema, 2003. Morphology and morphogenesis of hereditary microphthalmia in Texel sheep. *J. Comparat. Pathol.*, 128: 269-275.
- Yeruham, I., S. Perl and M. Liberboim, 2002. Ocular Dermoid in Dairy Cattle- a 12 years survey. *Rev. Vet. Med.*, 153: 91-92.