

Ocular Dermoids in Cattle: A Case Report and Review

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Abstract

A two-week-old calf was presented because of severe ocular irritation; examination revealed a large conjunctival dermoid. A conjunctivectomy was curative, as evidenced by no recurrence with a four-month follow up. A review was compiled from the literature and the Veterinary Medical Database.^a Dermoids have been reported in 22 breeds of cattle, with the Hereford being over-represented. Average age at presentation is 6.1 months. Calves usually show signs of severe ocular irritation, which is caused by hair on the surface of the dermoid. Dermoids may occur on the cornea, limbus or conjunctiva. Surgical excision via keratectomy or conjunctivectomy after sedation with xylazine and local anesthesia is curative in most cases.

Résumé

Un veau de deux semaines a été admis en raison d'une irritation oculaire sévère. L'examen a révélé un gros kyste dermoïde conjonctival. Une conjunctivectomie a guéri le problème car il n'y a pas eu de récurrence lors des quatre mois suivants. Une revue de cas a été faite à l'aide du *Veterinary Medical Database*. Des kystes dermoïdes ont été rapportés dans 22 races de bovin et plus particulièrement chez les bovins Hereford. L'âge moyen à l'admission était de 6.1 mois. Les veaux avaient des signes d'irritation oculaire sévère causée par la présence de poil sur la surface du kyste. Les kystes dermoïdes peuvent se retrouver au niveau de la cornée, du limbe ou de la conjonctive. L'excision chirurgicale à l'aide de la kératectomie ou de la conjunctivectomie, après sédation à la xylazine et anesthésie locale, permet la guérison dans la plupart des cas.

Introduction

A dermoid is a focal area of skin-like differentiation of the cornea or conjunctiva.^{27,28} Dermoids have also

been referred to as choristomas, though they are not cancerous.²⁸ Canthal and palpebral dermoids may be called hamartomas.³ Dermoids may affect any part of the ocular adnexa or the cornea. There can be tremendous variation in size of dermoids and they may be unilateral, bilateral, singular or multiple. Dermoids tend to be diagnosed in very young animals because of the irritation caused by the hairs that grow from this congenital tissue. The only effective treatment is complete surgical excision. The following is a case report and review of the literature on the development, clinical appearance and treatment of dermoids in cattle.

History

A two-week-old intact male Brahman-cross calf was presented for ophthalmologic evaluation of the left eye (OS). A mass had been present OS since birth, and appeared to have increased in size. The owner was concerned because of the size of the mass and the marked epiphora and blepharospasm. No treatment had been initiated. The calf appeared healthy otherwise and was nursing well.

Clinical Findings

Ophthalmologic examination revealed a 3 cm x 1 cm x 1 cm mass on the palpebral conjunctiva of the lower eyelid OS. The mass was grayish in color and had many coarse hairs on the surface (Figure 1). Severe blepharospasm and epiphora were present. Fluorescein stain did not reveal corneal ulceration, and the cornea appeared normal. The physical examination was within normal limits. No other congenital defects were observed.

Surgical and Therapeutic Management

A clinical diagnosis of ocular dermoid was made based on physical examination findings. Other differ-

the University of Tennessee College of Veterinary Medicine (Figure 2).

Discussion

The characteristic appearance of a dermoid is a mass of skin-like tissue that has very coarse hairs emanating from the surface. Dermoids may occur on the conjunctiva, cornea, limbus, eyelids or third eyelid. They may have a pendulous appearance or be flat. Limbal dermoids that involve both cornea and adjacent conjunctiva occur much more commonly than pure corneal dermoids. Dermoids can either be very small lesions or be large enough to inhibit eyelid closure. Large and fleshy dermoids can resemble an additional eyelid.⁸ Very rarely, there is marked malformation of the globe and blindness.³ Dermoids are classified either as cystic or solid, based on the number and size of intraepithelial keratinaceous cysts that are common to most dermoids.²⁹ A cyst may contain hair as a tightly coiled mass within the dermoid. The cyst forms when the epithelial elements have invaginated and line the interior, and desquamated cells, keratin, debris and sebaceous secretions gradually accumulate over time.^{13,19}

Bilateral dermoids appear to be more common than unilateral dermoids in cattle.^{1,3,6} Dermoids in all other species are more likely to be unilateral. Additionally, they may occur either singularly or in multiple areas on the same eye.^{3,8,9,12,22} Dermoids most commonly involve the limbus, but are also seen frequently in the ventral and medial conjunctiva.^{3,8,30} The largest study



Figure 1. A dermoid measuring 3 cm x 1 cm x 1 cm is exteriorized from the ventral conjunctiva of the left eye of a two-week-old male Brahman-cross calf. This single, unilateral, solid appearing mass had been present OS since birth, and it appeared to have increased in size. The dermoid is grayish in color due to pigmentation and has hair emanating from the surface.

ential diagnoses included anatomic abnormalities (either congenital or secondary to a traumatic insult), an inflammatory lesion and neoplasia. Because dermoids cause severe ocular irritation, surgery was indicated. A conjunctivectomy was planned to remove the dermoid.

The calf was placed in right lateral recumbency and physically restrained. Two ml of 2% lidocaine were injected into the conjunctiva under the mass using a 25-gauge needle, and lidocaine was splashed on the conjunctival surfaces. The mass was then grasped with rat-toothed forceps, and a Halsted mosquito forcep was placed at the base of the mass at its junction with the palpebral conjunctiva for approximately two minutes. The mass was then excised using curved Metzenbaum scissors. The mass was placed in 10% formalin for histopathology. The forceps were removed and hemostasis was completed by direct pressure with 4 x 4 gauze for a few minutes, taking care to avoid abrading the cornea. Neomycin- bacitracin- polymyxin B ophthalmic ointment^b was then applied to the eye. The calf recovered uneventfully from the procedure.

Post-operative topical antibiotic therapy was recommended, but the owner was unable to catch the calf again. Rechecks done on days eight and 16, and follow-up by phone four months later, revealed that the wound healed without complications and the eye and adnexa appeared normal. No signs of scarring or regrowth were ever noticed. Diagnosis of a solid conjunctival dermoid was confirmed histopathologically by a pathologist at

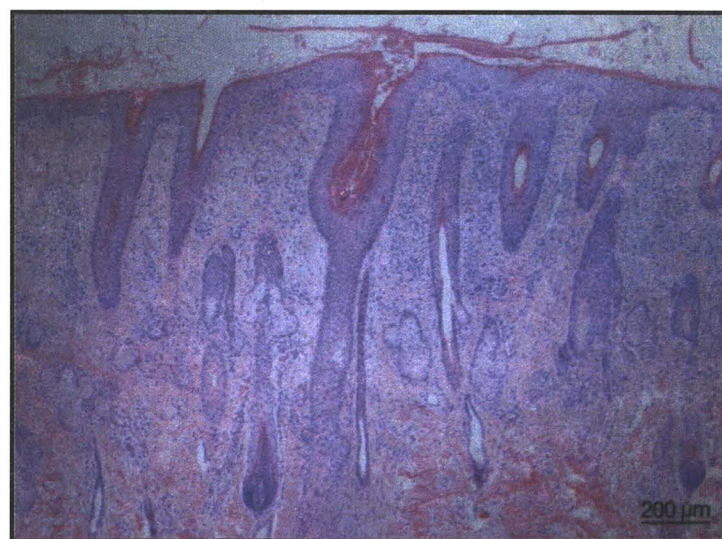


Figure 2. Histologic specimen from Figure 1. The external surface of this solid dermoid is covered with keratinized squamous epithelium. Normal hair follicles and associated glands are present in the dermis. (H&E, 4x magnification)

evaluating dermoids in Herefords found that the most commonly affected sites in decreasing order of frequency were the limbus, third eyelid, canthus, eyelid and conjunctiva.³ When dermoids affect the limbus, they most commonly occur ventrolaterally. Conjunctival dermoids most commonly affect the medial canthus. Central corneal dermoids and anterior segmental dermoids with complete corneal replacement and severe dysplasia of internal ocular structures have also been seen.³ Some dermoids appear to increase in size with time, as the one described in this case report.² The amount of pigmentation in dermoids varies with the degree of surrounding skin pigmentation.⁹

Evaluation of the literature and information obtained via the Veterinary Medical Data Base (VMDB) showed that dermoids occur in many breeds of cattle worldwide (Table 1).^{a,1-4,7-9,11,12,17,18,20,25,26,30} Of the reported cases, the Hereford breed appears to be the most commonly affected.^{a,1-4,7-9,11,12,17,18,20,25,26,30} A large study evaluating dermoids in Hereford cattle did not find any association with hematologic abnormalities, infectious

or environmental factors leading to dermoid development. Evidence indicated that both an autosomal recessive and polygenic inheritance were possible.³ One study showed increased risk of corneal dermoids in the Shorthorn breed compared to other breeds, although the number of cases was very small.²⁰ In most cases dermoids are a sporadic occurrence.¹⁰ Studies evaluating congenital defects in cattle have reported the incidence of ocular dermoids ranges between 0.002% and 0.005%.^{11,30}

While dermoids are a congenital defect, calves may be presented any time from birth until several years of age. The average age at evaluation is 6.1 months.^{a,1,4,6-9,15,17,18,22,24-26,30} Dermoids are often not recognized until they grow sufficiently large to be clearly seen and grow enough hair to cause irritation.⁵ Irritation of ocular structures is the most significant effect of most dermoids, manifested as excessive lacrimation, ocular discharge, conjunctival hyperemia, keratitis and excoriation of the skin secondary to the chronic lacrimation. Dermoids that involve the central cornea may obstruct vision. Other congenital defects occur rarely in conjunction with dermoids. Malformations of the head, hydrocephalus, atresia ani, microphthalmos and cardiac and kidney abnormalities have been reported.^{a,3,4,8,30} Of the 115 cases in which the gender was reported, 75 were male and 40 were female.^{a,1-4,6-9,11,12,17,18,20,25,26,30}

Embryologically, ocular dermoids are a disorder of the surface ectoderm which is normally the progenitor for the corneal epithelial cells, lens, lacrimal apparatus, and epithelial portions of the eyelids and associated adnexa.²⁸ Abnormalities in neural crest development and migration may also be involved in cases with very extensive dermoids involving the interior of the globe.¹⁶ Because of their clinical and histologic appearances and origin, dermoids have been described as skin that was dislocated from its normal position during development.^{5,18,29} Histopathologically, dermoids primarily consist of keratinized stratified squamous epithelium with variable pigmentation overlying a dermis that contains hair follicles, sweat glands and sebaceous glands. Additionally, adipose tissue, fibrous tissue, smooth and skeletal muscle, hyaline cartilage, lacrimal tissue and varying degrees of inflammation may also be seen.^{3,5,14} At the edge of the dermoid, the collagen reorients to blend with the surrounding normal stroma.²⁸ Histologically, most dermoids only involve the superficial layers of the cornea and the conjunctiva. Rarely, a dermoid will involve the entire depth of the cornea.¹⁹ This appears to only occur when the corneal dermoid is very extensive and does not appear to occur with more commonly occurring limbal dermoids. Additional abnormalities including scleralcornea, aphakia (absence of the lens), dysplasia of anterior uvea, scleral ectasia, retinal detachment and dysplasia, persistent hyaloid artery, optic nerve colobomas and microphthalmia have been

Table 1. Number of bovine ocular dermoid cases reported in the literature and the Veterinary Medical Data Base^a stratified by breed.^{1-4,7-9,11,12,17,18,20,25,26,30}

Breed	Total
Aberdeen-Angus	2
Angus	3
Brahman-cross	1
Charolais	1
Chianina	1
Cross	4
Crossbreed Jersey	1
Galloway	1
Guernsey	1
Hauana	2
Hereford*	89
Holstein - Friesian	7
Israeli Holstein	5
Jersey	1
Limousin	2
Longhorn	1
Mixed breed	6
Mixed breed beef	1
Mixed breed dairy	1
Native - Egypt	1
Rathi	2
Shorthorn	1
Unknown	15
Total	149

*The total number of Herefords includes 26 Polled Herefords, 3 Horned Herefords, 41 grade Herefords, 8 Hereford-crosses, and 11 unspecified Herefords.

seen in Herefords. These were only seen in severely affected cattle whose dermoids were referred to as anterior segmental dermoids.³

When a dermoid is causing irritation, the only effective therapy is surgical excision. Sedation and analgesia may be achieved with xylazine (0.01-0.03 mg/kg IV or IM) in very young calves. Larger calves that are more difficult to restrain and calves with a more difficult disposition may need 0.03-0.05 mg/kg IM of xylazine. Topical anesthesia using lidocaine or proparacaine, possibly in conjunction with a Peterson block, is also indicated depending on the location of the dermoid.

If the dermoid affects the cornea, a superficial keratectomy is the treatment of choice. When performing a superficial keratectomy, a Peterson block and topical anesthetic (lidocaine or proparacaine) are indicated in addition to the xylazine. The Peterson block is done using an 18- or 20-gauge, 3-1/2 inch spinal needle. The needle is inserted at the angle formed by the frontal and temporal processes of the zygomatic bone and walked off the anterior border of the coronoid process. When the needle abuts the most dorsal lateral aspect of the sphenoid complex on the medial orbital aspect of the globe, it is pulled back from several millimeters to a centimeter to line up with the orbitotundum. Approximately 5-10 ml of 2% lidocaine is injected in very small calves. If too great a quantity of lidocaine is injected, the globe may become exophthalmic, resulting in corneal exposure and ulceration. The four-point block is an alternative to the Peterson block and is considered to be easier by some, but may be more likely to result in intrathecal injection. Intra-arterial or intrathecal injection of the lidocaine can result in death. Additionally, the globe can be proptosed after the Peterson block or four-point block to increase exposure. The globe can be safely proptosed by applying slow gentle pressure with the thumbs over the dorsal and ventral eyelids.

A superficial keratectomy is done by making an incision with a fine scalpel blade (a #15 Bard-Parker blade or a 6400 Beaver blade) around the perimeter of the corneal aspect of the dermoid. This incision should extend approximately one-third of the thickness of the corneal stroma. Reports on the normal corneal thickness in cattle vary between 0.75 mm to 2 mm, so one should err on the lesser thickness.^{21,23} After the dermoid has been incised at the periphery, either a scalpel blade or a corneal dissector is used to undermine the dermoid. The benefit of using a corneal dissector is that it maintains the same plane within the corneal lamella, thereby decreasing the possibility of extending the incision more deeply into the corneal stroma than intended. Use of magnification may be helpful during corneal dissection. The conjunctival aspect of the limbal dermoid is then excised using small scissors (Tenotomy scissors would be appropriate). The limbal attachment can then be ex-

cised with the scissors. No suturing is required. If the conjunctival defect is very large, the conjunctival incision may be sutured to the limbus; however, relatively small suture such as 4-0 polyglactin 910 (or smaller) should be used to prevent perforation of the sclera. The feasibility of performing this procedure on the farm versus at a referral hospital is dependent upon the sedative effects on the calf, the size of the dermoid, the facility, available surgical instrumentation and the surgical skills and experience of the veterinarian.

Conjunctival dermoids are excised using scissors after local anesthesia is administered. Using a scalpel blade for excision is not recommended due to the risk of corneal laceration. Generally, topical anesthetic and local infiltration of the base of the dermoid with lidocaine, in addition to xylazine, are adequate. Conjunctival dermoids may be excised freehand with scissors. Alternatively, hemostats may be placed at the base of the dermoid prior to excision with scissors. If the conjunctival defect is less than 2 cm, then the lesion does not need to be sutured. Hemorrhage can be controlled with hemostats before excision, or topical epinephrine, phenylephrine or electrocautery can be used pre- or post-excision to decrease the amount of hemorrhage. Excision of the entire nictitating membrane may be indicated if the dermoid is on the bulbar side or the nictitating membrane is extensively involved.³¹ In these cases, the base of the third eyelid should be infiltrated with lidocaine.

Healing after dermoid removal is mostly by secondary intention. Postoperatively, topical antibiotic ointment, such as triple antibiotic,^b should be used several times daily, if possible, for approximately one week until the lesion has healed. Alternatively, subconjunctival oxytetracycline or procaine penicillin (0.5-1 ml) may be administered. The subconjunctival antibiotics can be injected into the ventral conjunctiva while holding the syringe with a 20-gauge needle vertically, while retropulsing the globe and pulling down the lower eyelid. Generally, scarring is negligible if the entire dermoid has been removed. If some dermal tissue remains, scarring will be more severe.

Conclusions

Dermoids are a relatively rare congenital anomaly in cattle. They have been reported in most breeds of cattle and are generally diagnosed in very young calves. The hair that grows from the dermoid causes severe irritation resulting in epiphora, ocular discharge, blepharospasm and corneal ulceration. Surgical excision by either keratectomy or conjunctivectomy is the treatment of choice. Rarely, dermoids may be associated with other ocular anomalies or anomalies in other organ systems.

Endnotes

- ^a Veterinary Medical Data Base (VMDB) <http://www.vmdb.org/> The VMDB does not make any implicit or implied opinion on the subject of this paper.
- ^b The use of neomycin- bacitracin- polymyxin B ophthalmic ointment is considered to be extra-label. The preharvest withdrawal time recommended by Food Animal Residue Avoidance Databank (www.farad.org) at the time of this writing is zero days in cattle.

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Abstract

A Survey of Bull Breeding Soundness Evaluations in the South East of Scotland

Eppink E.

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This paper presents the preliminary findings of a study of 368 bull Breeding Soundness Evaluations (BSE) performed in the South East of Scotland in 2003-2005. Semen samples were collected by electroejaculation (EEJ) in all cases. 319 bulls, 1 to 12 years old, from 14 breeds and 72 farms, were examined. Of the BSE's carried out, 67% passed the minimum

standards as set in 1993 by the American Society for Theriogenology. The most common reasons for failing were poor morphology (7% of all bulls tested) or a combination of poor morphology and motility (5%). Bulls over 6 years old had a greater than average fail rate (52% vs. 33%).

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