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Bovine bilateral mesenchymal hamartomas on the upper eyelid: A case report

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Abstract: A 2-day-old calf was presented with a bilateral mass in the medial canthus of the upper eyelid. The masses were removed surgically. The morphological diagnosis was a bilateral hamartoma characterised by an abnormal mixture of tissue indigenous to that area including blood vessels, striated muscle bundles, adipose tissue, isolated cartilage and nerve bundles. No recurrence developed in the 6 months following the surgical removal. Overall, although this congenital defect is relatively rare, it should be differentiated from eyelid tumours such as haemangiomas, squamous cell carcinomas, Meibomian gland tumours, dermoid cysts and teratomas in cattle.

Keywords: calf; congenital malformation; ocular

A hamartoma is an overgrowth or excessive formation of the mature tissue mass resulting from the faulty development in any organ or system (Maxie and Jubb 2015). It was also originally described, many decades ago by Eugen Albrecht (Albrecht 1903), as a "tumour like malformation" in which only the abnormal mixing of the normal components of an organ occur. Hamartomas are commonly present at birth; however, in some cases, they might need some time to be noticed after birth (Maxie and Jubb 2015).

As hamartomas often mimic other neoplasms and have similarities with choristomas, it is important to know the pathological and clinical features of the hamartoma. They cannot be classified as a neoplasm due to self-limited growth and they retain their size with no further growth. Unlike choristomas, the components of the hamartoma are in normal localisation (Leiter Herran et al. 2017).

In veterinary medical literature, hamartoma cases are well documented in animals in many different locations on their bodies (Ladds 1983; Tyler et al. 1995; Dubielzig 2002; Kafarnik et al. 2010; Storms et al. 2014; Leiter Herran et al. 2017; Martin et al. 2020; Morais et al. 2020). Amongst the bovine hamartomas, gingival vascular hamartomas and bovine cutaneous angiomatosis are well-known examples (Maxie and Jubb 2015).

The present report describes the morphological findings of bilateral upper eyelid mesenchymal hamartomas in a 2-day-old calf.

Case description

A 2-day-old Simmental male calf was referred to the Veterinary Hospital of the Veterinary Medical School of Firat University on February 12, 2020. The owner stated the presence of the mases after birth and signed an informed consent form prior to any intervention (Protocol No. 200379).

On presentation, the temperature and heart rate of the calf were in the normal ranges. Grossly, the superior-medial canthus of the upper eyelids

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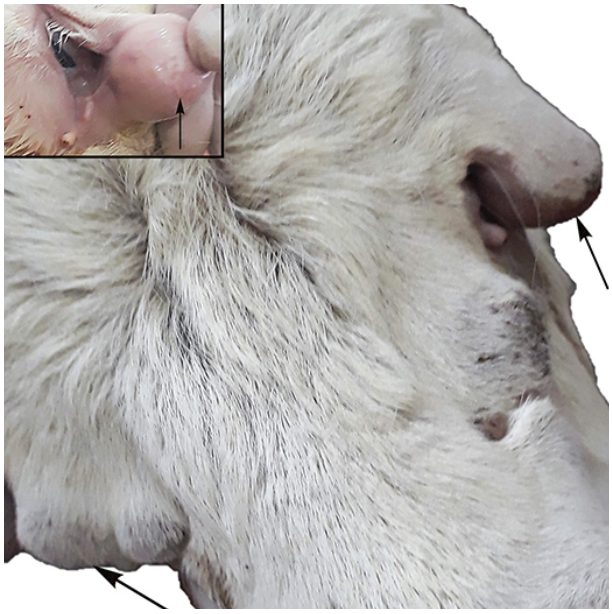

Figure 1. Bilateral hamartomas (arrows), well circumscribed with a smooth surface and grey-white in colour (inset)

were thickened by masses (Figure 1). On the dorsal surface, the mass was poorly delineated and had a mild dome-shape and blended with the palpebral tissue. On eversion of the upper lid, the mass was well circumscribed with a smooth surface having a coin like appearance with a grey-white in colour (Figure 1-inset).

The masses were removed surgically. For the anaesthesia, 0.2 mg/kg dose of xylazine hydrochloride (Rompun; Bayer, Leverkusen, Germany; 23.32 mg/ml) and ketamine hydrochloride (Ketasol 10%; Interhas, Ankara, Turkey; 100 mg/ml) were administered intramuscularly. Ten minutes later, elliptic incisions were made on the base of the masses originating from the right and left eyelids. After the separation in the subcutaneous tissues, the masses were completely removed. After the operation, the line was cleaned with a 0.1% iodine solution, the tissues under the skin were sutured separately with an absorbable suture material (Vicryl, USP 2/0). The operation line was closed by stitching with a non-absorbable suture material (silk thread, USP 0).

Postoperatively, an 8.75 mg/kg dose of amoxicillin-clavulanic acid (Synulox; Pfizer, New York, USA; 175 mg/ml) was administered intramuscularly for 5 days. The operation lines were cleaned with an antiseptic solution (0.1% Lugol solution) for 1 week.

The masses were measured as being 2.0 cm in diameter causing epiphora in both eyes. There were no eyelashes around the masses (Figure 1).

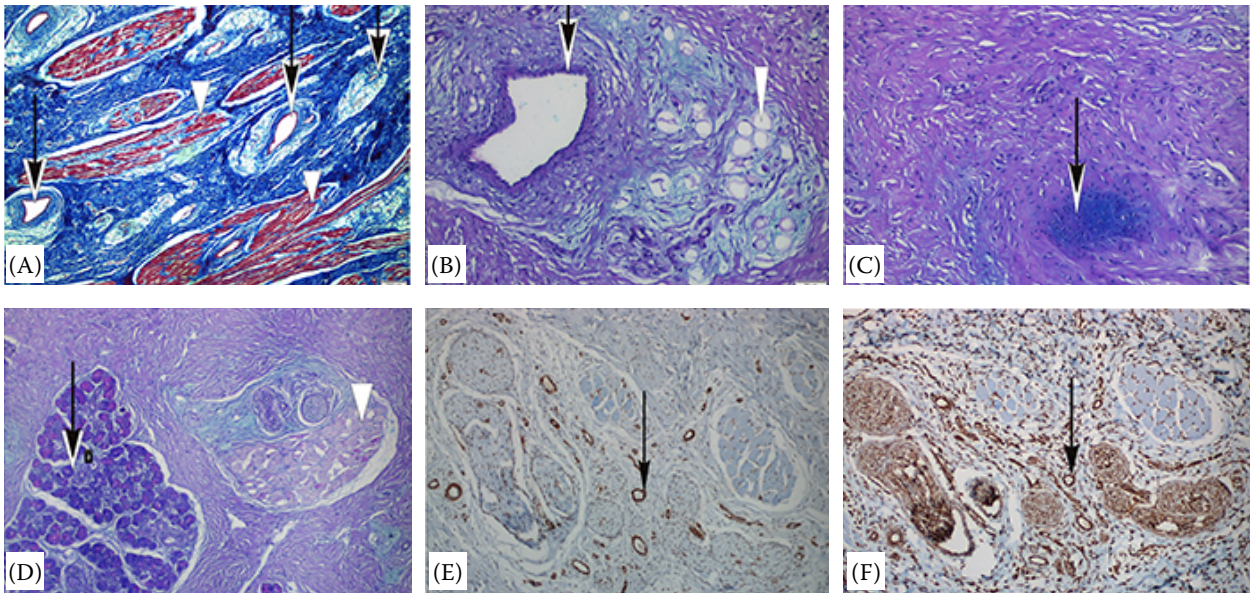

Figure 2. (A) A mass composing of a large amount of collagen bundles (blue), scattered islands of skeletal muscle bundles (arrows) and vascular structures (arrow head). (B) Masson trichrome. Vascular structure (arrow) and perivascular fibroadipose tissue (arrowhead); periodic acid schiff-alcian blue stain (PAS-AB). (C) An island of hyaline cartilage (arrow) embedded in collagen; PAS-AB. (D) The lacrimal gland and striated muscle bundles embedded in the connective tissue; PAS-AB. (E) Positive immunoreaction to the smooth muscle actin in the wall of the arterioles in the dermis; smooth muscle actin (SMA). (F) Positive immunoreactivity to the vimentin in the mesenchymal cells

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Microscopically, the external and palpebral surfaces of the mass were covered by haired skin. The margins were distinct from the normal palpebral tissue by having a less condensed collagen tissue. The skin of the external surface had hyperplastic epithelium in the both of the samples, whereas the internal surface had atrophic haired skin. There were sebaceous glands in the epidermis. Most of the masses were composed of numerous thick-walled vascular spaces in varying shape and size, with haphazardly distributed striated muscle bundles of collagen-rich connective tissue, some adipose tissue and fully developed nerve bundles in the dermis (Figure 2A). All these structures were embedded in loose collagenous connective tissue. There were also loose fibrous tissue and adipocytes in the perivascular stroma (Figure 2B). The disorganised vascular spaces were lined by slightly plump endothelial cells with no atypia, and had no muscular layer. The nerve bundles were closely packed in a tortuous arrangement. Some vessels were hardly noticeable, while others were 1 mm in diameter. Most of the middle and large vascular spaces had no muscular layer, however, the small vessels always had a muscular layer (Figure 2D).

DISCUSSION AND CONCLUSION

Bovine hamartoma cases have been documented in the gingiva (Maxie and Jubb 2015; Martin et al. 2020), testis (Tyler et al. 1995) and liver (Ladds 1983), however, there have been no reported eyelid hamartomas in cattle. Hamartomas have been reported as a being subcutaneous, subconjunctival or orbital masses, and histologically consist of fully differentiated collagen rich connective tissue interspersed with variable amounts of adipose, vascular, muscle and nerve tissue (Dubielzig 2002). Based on earlier retrospective reports in dogs, hamartomas are the most common in the lateral canthus (12/22 dogs) and the least common in the medial canthus (1/22 dogs). No bilateral-symmetric involvement was present in the twenty-two total canine cases. Two of the twenty-two hamartomas contained cartilaginous tissue (Storms et al. 2014). However, the dorsomedial and bilateral involvement takes an unusual presentation of a mesenchymal hamartoma in the present case of the calf.

In the present report, both of the masses had an abnormal mixture of tissue indigenous to that area including blood vessels, striated muscle bundles, adipose tissue, isolated cartilage and nerve bundles. The only histological difference between the left and right masses was the presence of the hyaline cartilage in the right mass.

Despite that the mechanism of a hamartoma formation have been uncovered, two theories are reasonable:

1. Local over-influence or insufficient growth inhibitors (Krymskaya 2003).
2. Chromosomal abnormalities (Leiter Herran et al. 2017). The responsible gene for the hamartoma occurrence is located on chromosome 26 in dogs and cattle, on chromosome 2 in cats, and on chromosome 14 in pigs (Leiter Herran et al. 2017).

The present report differs from the previous described cases of hamartomas, because of the bilateral-symmetrical anatomical localisation on the eyelids. Similar to the present report, a cartilaginous differentiation was noted in a canine mesenchymal periocular hamartoma (Kafarnik et al. 2010).

Overall, although this congenital defect is relatively rare, it should be differentiated from tumours such as haemangiomas, squamous cell carcinomas, Meibomian gland tumours, dermoid cysts and teratomas in cattle. A choristoma is also a tumour-like mass composed of normal cells in an abnormal location. A dermoid cyst is also evaluated within the concept of a choristoma. Teratomas are germ cell congenital tumours. Solid and cystic areas with sebaceous material and hair are mostly observed in the tumour. A wide variety of tissues such as neural tissue, adipose tissue, bone, tooth and respiratory epithelium are present in teratomas (Kafarnik et al. 2010).

It may be difficult to differentiate between vascular hamartomas and haemangiomas. Haemangiomas develop as unencapsulated solitary nodules with distinct borders and are often located deep in the dermis. They consist of closely spaced vascular spaces lined with a relatively normal looking endothelium. Small hamartomas are sharply separated from the surrounding tissue, but as the mass expands, it can replace the original tissue where it is found (Maxie and Jubb 2015).

Conflict of interest

The authors declare no conflict of interest.

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