

EQUINE PRACTICE — OPHTHALMOLOGY

Orbital tumors are rare in the equine species. Nothing concerning orbital tumors in donkeys was presented in the available literature. In this study orbital tumors in two donkeys were presented. The first case involved retrobulbar fibrosarcoma which invaded the optic nerve and caused severe exophthalmos. The second case, orbital osteoclastoma, was the first of this kind of bone tumor recorded for the equine orbit. The mass in the second case was excised through a new approach, transtemporal orbitotomy, which proved to be a safe, noninvasive technique.

Orbital Tumors in Two Donkeys

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Case 1

CASE HISTORY

A 12-year-old male donkey was presented with a history of longstanding unilateral exophthalmos and mucopurulent ocular discharge of the left eye (OS).

Ophthalmic examination revealed that the left eye was extensively exophthalmic and the globe could not be retrobulbed into orbit (Fig. 1). The cornea (OS) was shrunken with diffuse yellowish-white homogenous infiltrates (corneal abscess) and a dark brown dead corneal tissue (corneal sequestrum) at the limbus. The bulbar conjunctiva, scleral, and extraocular muscles were extremely inflamed and highly congested. There was extensive palpebral edema. The right eye (OD) was normal on ophthalmic examination, but no consensual pupillary light reflexes could be detected. Based upon the clinical examination, there was no hope to continue visual function or even to save the eye (OS).

SURGERY

The left globe and orbital content were exenterated by using transpalpebral approach. The up-

per and lower eyelids were coappetated together as much as possible by single interrupted suture. Skin incision was made 1 cm apart from the upper and lower eyelid margins around the palpebral fissure. Dissection was continued around the globe by scissors. The optic nerve and its blood vessels were clamped, ligated, and excised. A diffuse retrobulbar mass at the base of the orbit was completely excised. The skin was sutured by using simple interrupted nonabsorbable No. 2 sutures.

The optic nerve was highly thickened and measured 3 cm in diameter. The enucleated globe was fixed in Bouin's solution and parasagittal sections of the globe, as well as sections of the retrobulbar mass, were submitted for histopathological examination. Recovery was uneventful and healing was primary.

Histopathology of the retrobulbar mass showed a wavy pattern of fibroblasts with pleomorphism, hyperchromatosis, and activity of nuclear division (round and spindle cells). Macrophage, neutrophils and few lymphocytes were distributed. A focus of pus cells (dead neutrophils) was also found. The thickness of the optic nerve was caused by the presence of multiple neoplastic foci represented by wavy aggregations with nuclear activity and

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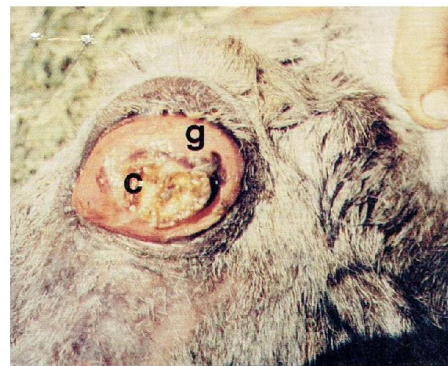


FIG. 1 — Clinical photograph of the left eye of a donkey with extremely severe exophthalmia (Case 1) showing a highly congested globe (g) and the shrunken cornea (c).

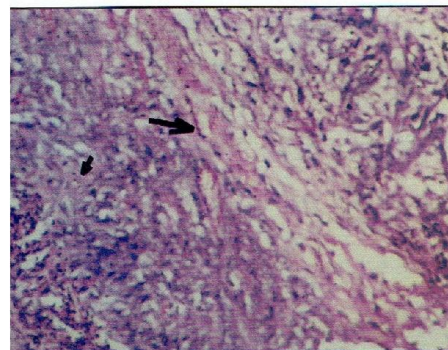


FIG. 2 — Photomicrograph of the optic nerve (long arrow) showing fibrosarcoma, hypercellularity with hyperchromatic and vesicular nuclei with heavy infiltration of leukocytes (short arrow) (H&E \times 150).

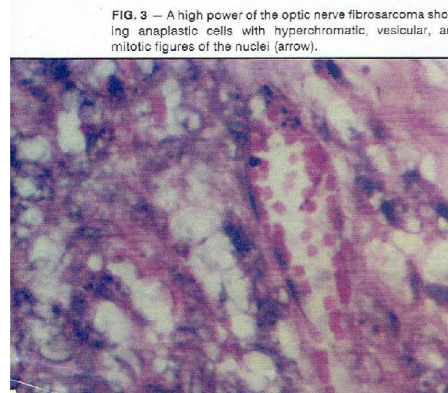


FIG. 3 — A high power of the optic nerve fibrosarcoma showing anaplastic cells with hyperchromatic, vesicular, and mitotic figures of the nuclei (arrow).



FIG. 4 — Abnormal swelling (giant cell tumor) in the left supraorbital fossa (arrow) and mild ptosis in 8-year-old male donkey (Case 2).

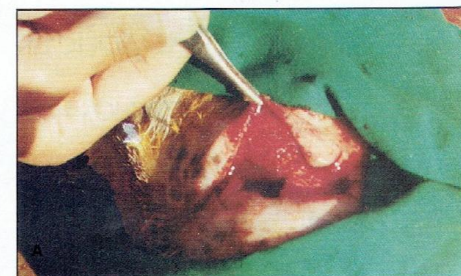


FIG. 5 — A) Transtemporal orbitotomy in a donkey and the B) excised well identified encapsulated mass.

FIG. 6 — Giant cell tumor of bone with multiple focal areas of destructed bone and leukocytic infiltration (arrow) (H&E \times 150).

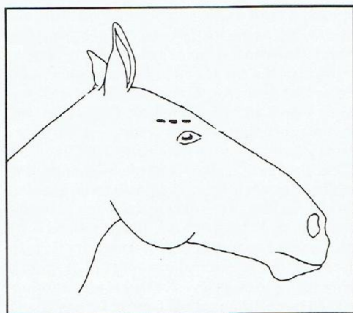


FIG. 7 — Scheme of transtemporal orbitotomy approach. Linear incision made parallel to the supraorbital process and in the middle of the temporal fossa.

heavy infiltration of macrophage and neutrophils (Figs. 2 & 3). The corneal anterior epithelium showed hyperplasia, acanthosis and hydropic degeneration. Corneal stroma was highly infiltrated with neutrophils and newly formed capillaries. The choroidal blood vessels were congested and the extraocular muscles showed hyaline degeneration with a high infiltration of neutrophils. Histopathological diagnosis was orbital fibrosarcoma which invaded the optic nerve.

Case 2

CASE HISTORY/CLINICAL EXAMINATION

An 8-year-old male donkey was presented with abnormal swelling in the left supraorbital fossa (Fig. 4). The swelling was painless, hard in consistency and palpated subcutaneously.

Ophthalmic examination of the left eye revealed a mild exophthalmos, ptosis, and mild narrowing of the palpebral fissure with positive, direct, and consensual pupillary light reflexes. Corneal, menace, and dazzle reflexes were normal. The globe was retropulsive caudally and fundus examination showed no indentation. Palpation of the orbital rim revealed a firm swelling at the angle between the supraorbital process of the frontal bone and the zygomatic process of the temporal bone just above the level of the lateral canthus.

SURGERY

An orbitotomy was performed through the temporal fossa (transtemporal orbitotomy). The area was prepared for aseptic surgery. A linear cutane-

ous incision parallel to the supraorbital process and in the middle of the temporal fossa was made. The skin was bluntly dissected from the subcutaneous tissue. Periorbita and Tenon's capsule were incised. The dorsal aspect of the tumor was exposed and an ovoid mass which was attached to the bone was localized and dissected from the dorsolateral aspect of the bony orbit and the surrounding tissue (dorsal and lateral rectus muscles) until completely excised. The mass was red-gray, measured 5 × 3 × 2 cm and its outline was regular (Fig. 5). The extraocular muscles and the periorbita were coaptated using No. 2 chromic cat gut and the skin was closed with simple interrupted nonabsorbable silk No. 2 sutures.

Recovery was uneventful and the cutaneous sutures were removed 7 days postoperatively. The globe was intact and the clinical examination of the eye and adnexa were normal 7 months postoperatively.

The mass was fixed in Bouin's solution. Histopathological examination revealed the presence of bone tumor giant cells represented by a large number of multinucleated cells with marked similarity of nuclei (Fig. 6). The shape of these cells appeared as oval, ovoid, and spindle with lack of organization. The giant cells usually had less than 10 nuclei. Moderate amounts of eosinophilic cytoplasm were found. Newly formed capillaries with leukocytic infiltration, mainly lymphocytes and macrophages with foci of damaged bone, had been detected. Histopathological diagnosis of the case was giant cell tumor (osteoclastoma).

Discussion

The orbit is the bony cavity formed by the bone of the skull and contains the globe, extraocular muscles, optic nerve, blood vessels, orbital fat, lacrimal gland, and periorbital connective tissue.¹ The orbit in equids is enclosed by frontal, lacrimal, zygomatic, temporal, sphenoid, palatine, and maxillary bones.² The frontal bone and its zygomatic process make the dorsal rim of the orbit which continues caudally with the temporal fossa.³

Orbital neoplasia may be primary or secondary. Primary orbital neoplasia may include any of the mesenchymal, neural, vascular, or epithelial tissues that compose the rather complex contents of the normal orbit. Secondary tumors might arise from direct extension by adjacent tissue or from hematogenous or lymphatic metastases.⁴

Nothing concerning orbital tumors in donkeys is mentioned in the available literature. Meanwhile,

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orbital tumors in horses are uncommon. In a survey of 68 horses with ocular neoplasia, only three had orbital neoplasia.⁵

The reported orbital tumors in the horse include adenocarcinoma, lipoma, hemangiosarcoma and lymphosarcoma melanoma, multilobular osteoma, granulotic unclassified carcinoma, and neuroepithelial tumor of the optic nerve.⁵⁻¹⁴

Tumors with an apparent site of origin which is orbital bone are extremely rare in human patients and animals.^{10,15} Osteoma, osteosarcoma and chondrosarcoma had been reported as bony orbital tumors in dogs.¹⁶ Orbital multilobular osteomas (chondroma rodens) had been reported in a horse.¹⁵ Giant cell tumor of bone (osteoclastoma) is extremely rare in animals and considered one of the destructive bone tumors in humans.¹⁷ Of 403 primary bone tumors in dogs only one giant cell tumor could be identified.¹⁸ The neoplastic cells of giant cell tumor arise from the primitive stromal elements of the bone marrow and have the same enzyme histochemical behavior as osteoclast so it is called osteoclastoma.¹⁷ Giant cell tumor is described as a generally benign, but locally aggressive primary and often recurrent neoplasm so complete excision is recommended in such cases.¹⁹

Orbital neoplasia should be differentiated from the other causes of exophthalmia, which may be orbital cellulitis, abscesses, cysts, granuloma, or pseudotumor (idiopathic inflammation of the orbital contents). In equids extrinsic muscle degeneration might also lead to exophthalmia.²⁰

Upon the clinical examination of the first case differential diagnosis included traumatic proptosis, panophthalmitis, and orbital mass. Traumatic proptosis (anterior displacement of the globe) was excluded as it is uncommon in equids because of the deep orbital socket and complete bony orbital rim. Neither was there any history of trauma. Therefore the diagnosis was panophthalmitis and/or retrobulbar mass. The regimen of treatment in either case was exenteration of the globe since there was no hope to save the vision. Exposure keratopathy and the subsequent corneal ulcers and corneal abscess were expected as sequelae to severe, long-term exophthalmos. Two months postoperatively, there was no recurrence of the tumor, although long-term recurrence is expected.

The anatomical conformation of equine orbit gives an excellent access. Orbitotomy is an opening made into the orbital space and used for biopsy, abscess drainage, and tumor mass and foreign body removal. In dogs the tranconjunctival approach, transection of orbital ligament or zygoma-

tic arch osteotomy, were described and recommended according to the plane of management of the orbital lesion.²¹ A bone flap from the zygomatic process of the frontal bone in equids could be created to explore the dorsolateral orbit of the horse.¹¹ Orbitotomy is a potentially difficult and hazardous procedure, as it may cause cranial nerve damage, extensive hemorrhage, and/or alter globe position.¹⁶ Upon ophthalmic examination and the presence of normal posterior eye wall in the second case, extension of the tumor to the retrobulbar area was ruled out. Transtemporal orbitotomy was conducted to save the globe (Fig. 7). Resection of the zygomatic process of the frontal bone seems to be an invasive technique; however, it could be useful and should be applied in cases with dorsal infiltrating orbital tumors.

The technique for orbitotomy described here seems to be a safe, noninvasive, and valuable procedure which gives good exposure and passage to the orbit, especially when the location and nature of the lesion is compatible to this site. Our results support the use of orbitotomy in equids with orbital mass, especially in the presence of a sighted eye. ■

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