CASE REPORT
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SUCCESSFUL SURGICAL MANAGEMENT OF OCULAR SQUAMOUS CELL CARCINOMA THROUGH ORBITAL EXENTERATION IN A 12-YEAR-OLD HORSE

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ABSTRACT

Ocular squamous cell carcinoma affects the equine eye and adnexa. A 12-year-old female non-descript horse was presented with a history of progressively developed, highly inflamed protruding mass with reddish discharge on the right eye noticed since six months. Detailed history from the owner revealed that the lesion initially started as a protrusion from the eyelid and later progressed to an ulcerating mass. Based on the history and clinical findings, the condition was tentatively diagnosed as squamous cell carcinoma. The physiological and haematological parameters were within the normal limits. The horse was premedicated with xylazine at a dose rate of 1.1 mg/kg body weight and butorphanol at a dose rate of 0.2 mg/kg body weight. General anaesthesia was induced and maintained with ketamine hydrochloride at a dose rate of 2.2 mg/kg body weight. Additionally, retrobulbar nerve block was induced with 2 % lignocaine hydrochloride. After establishing a sterile surgical field, orbital exenteration was performed. Histopathological examination of stained tissue sections confirmed the condition as squamous cell carcinoma. The horse made an uneventful recovery without any recurrence after nine months of follow-up.

Keywords - Squamous cell carcinoma, neoplasm, horse, exenteration, eyelids, uneventful recovery

CASE HISTORY AND OBSERVATIONS

A 12-year-old crossbred female horse was presented to the Referral Veterinary Polyclinic and Teaching Veterinary Clinical Complex, IVRI, Bareilly, Uttar Pradesh, India with a history of progressive, highly inflamed and fibrous swelling with reddish

Figure 1: (a-c) Pink ulcerated mass approximately 6 cm in diameter protruding from the right eye with severe hemorrhagic ocular secretion.

discharge on the right eyes noticed since 9 months (Figure 1). The horse was reared in the outdoor with adequate exposure to sunlight daily. On general clinical examination, the horse was found to be dull and depressed with impaired vision on the right eye. The haematological (Table 1) physiological parameters including heart rate (36 beats/ min), respiratory rate (14 beats/ min**)** and temperature (38.6 °C) were within the normal range. No palpable abnormalities were noticed in the lymph nodes. Ophthalmic examination revealed a pink, ulcerative mass approximately 6cm in diameter protruding from the right eye with severe haemorrhagic ocular secretion (Figure 1). The right eye was completely occupied by the tumor and there was no vision. No ophthalmic abnormalities were detected in the left eye.

Table 1: Hematological parameters of the horse on the day of surgery

Parameter	Obtained value on day 0	Reference value
Hemoglobin (g/dL)	11.2	10.1–16.1
RBCs ($\times 10^6$ / L	5.9	6.0 – 10.4
WBCs ($\times 10^3$ / L)	7	5.6–12.1
Neutrophil (%)	68	52–70
Lymphocyte (%)	28	21–42
Monocyte (%)	02	0–6
Basophil (%)	0	0–7
Eosinophil (%)	02	0–2

Hematology reference values, The Merck Veterinary Manual - 11th edition (2016)

TREATMENT AND DISCUSSIONS

The animal was kept off feed for 12 hours. The horse was preanaesthetized with xylazine at a dose rate of 1.1 mg/kg body weight and butorphanol at a dose rate of 0.2 mg/kg body weight. The anaesthesia was induced with ketamine hydrochloride at a dose rate of 2.2 mg/kg body weight and the animal was placed in left lateral recumbency after aseptic preparation of the site (Figure 2a). Retrobulbar nerve block (RBNB) was induced using lignocaine hydrochloride (10 ml) at the caudal aspect of dorsal orbital rim using a 22-gauge spinal

Figure 2: (a) Aseptic preparation of the affected site. **(b)** The optic nerve, muscles, and blood vessels are resected along with the globe after ligation. **(c)** Sutures were removed on the 12th postoperative day. **(d)** Complete healing was noticed on the 20th day.

needle after aseptic preparation of the site. Preoperatively the horse was administered ceftriaxone at a dose rate of 30 mg/kg body weight and flunixin at a dose rate of 1.1 mg/kg body weight via the intravenous route. As a preventive measure, 5 ml tetanus toxoid was administered intramuscularly. A transpalpebral incision was made on the upper and lower eyelid parallel to and 2 mm away from the eyelid margins completely encircling the lateral and medial canthus. After reaching sufficient length of incision, the canthal ligaments and periorbital soft tissues were resected until the sclera was visible. The extraocular muscles were resected close to the sclera and the globe was immobilized. Lastly, the optic nerve, muscles and blood vessels were resected

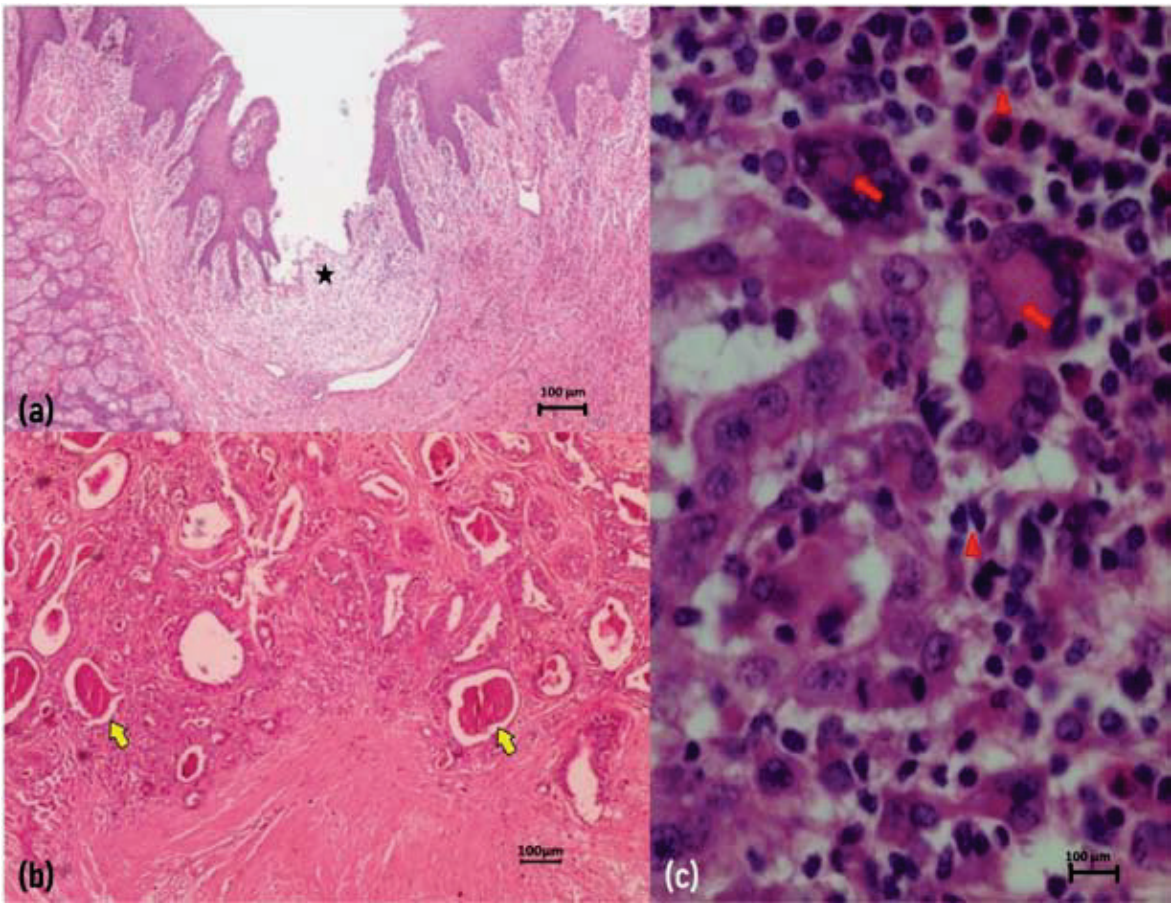

Figure 3: (a) Thickening of the epidermal cell layers with marked necrosis at multifocal areas (asterisk) and desquamation of epidermis. **(b)** Keratin pearls are seen in the hyperplasic epithelium (arrow) containing concentric rings of squamous epithelial cells. **(c)** Proliferative epithelium containing tumour giant cells (arrow) and frequent mitotic figures. Infiltration of inflammatory cells, mainly neutrophils and mononuclear cells, in the underlying dermal tissue (arrowhead).

along with the globe after ligation using polyglactin 910 (size 1-0) (Figure 2b). The subcutaneous tissues and deep fascial layers were sutured in simple continuous suture pattern using polyglactin 910 (size 1-0). The skin incision was closed in simple interrupted pattern using monofilament polyamide (size 1-0). Post-operatively, the animal was given systemic antibiotics and analgesics for ten days along with ocular antibiotics and anti-inflammatory eye drops. The skin sutures were removed on the 12th postoperative day (Figure 2c). The owner was advised to confine the animal in shade.

Histopathological examination of the sections from ocular growth revealed thickening of the epidermal cell layers with marked necrosis at multifocal areas (Figure 3a). Few to many keratin pearls were seen in the hyperplasic epithelium (Figure 3b). In the underlying dermal tissue, infiltration of inflammatory cells mainly neutrophils

and occasionally mononuclear cells were seen. There were few tumour giant cells as well as frequent mitotic figures in the proliferative epithelium (Figure 3c).

In the present case, the horse recovered uneventfully without any recurrence reported after twelve months of telephonic follow-ups. The most common type of neoplasms affecting equine eyelids are squamous cell carcinoma (SCC), sarcoid, papilloma, lymphosarcoma and melanomas (Valentine, 2006, Guialano 2011). Among the various ocular tumors, sarcoids commonly occur on the face, eyelid and forehead and squamous cell carcinomas occur in the ocular region (Dugan *et al*., 1991b). Regardless of the tumor type and nature, histopathology is mandatory for the confirmatory diagnosis of all tumors in equines (Montgomery, 2014). The exact etiology of OSCC is incompletely understood, but repeated exposure to sunlight and lack of periocular pigments are considered to be the major predisposing factors (Hendrix, 2005). Exposure to ultraviolet rays would cause mutation of the p53 gene which is the major regulator of genome integrity and cell cycle (Lane, 1992). In horses, the papilloma virus is one of the causative agents of OSCC (Mosunic *et al*., 2004). The light haired breeds of horses are highly susceptible to SCC as compared to horses having dark hair coats. The transpalpebral approach of exenteration is indicated for infectious or neoplastic conditions of the eye. Treatment of OCSS depends on the tumor size, location, extent of invasion, purpose of the animal, vision status of the animal and the financial condition of the owner. Tumors originating from the eyelid has higher rate of recurrence as compared to tumors from the nictitating membrane or limbus.

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