Intraocular extraskeletal osteosarcoma in a rabbit (Oryctolagus cuniculus)

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ABSTRACT. An 8-year-and-9-month-old male, lop-eared rabbit (Oryctolagus cuniculus) presented with gradual enlargement of the left eye to 4 × 4 × 4 cm and exophthalmos. The animal died 3 months later, and necropsy was performed. On gross pathology, the intraocular tissue was effaced and occluded by a hard, light-gray mass. Histologically, the mass comprised spindle-shaped to angular cells arranged in interlacing bundles with abundant production of osteoid, bone and cartilage, consistent with osteosarcoma. Limited cases of intraocular neoplasm have been reported in pet rabbits. To the best of our knowledge, this represents the first pathologic documentation of intraocular osteosarcoma in a rabbit.

KEY WORDS: eye, intraocular osteosarcoma, neoplasm, rabbit

Osteosarcoma is a neoplasm of malignant osteoblasts producing osteoid and immature bone [14]. In rabbits (Oryctolagus cuniculus), several cases of osteosarcoma have been reported. This neoplasm can occur in various bones or joints, such as the glenohumeral joint, intertarsal joint, sacrococcygeal joint, and rib [7–9, 13]. Extraskeletal osteosarcoma is a mesenchymal tumor with production of osteoid primarily occurring in tissues other than bones or joints. In dogs and cats, this tumor has been reported in various tissues such as skin and mammary gland [14]. In rabbits, occurrences of extraskeletal osteosarcoma have been reported in the lip, oral cavity and skin [11, 12, 16]. Primary intraocular osteosarcoma has been reported on rare occasions in dogs, cats and an umbrella cockatoo (Cacatua alba), but no previous reports have described this pathology in rabbits [3, 5, 6, 15, 18]. This report describes both the clinical history and pathologic findings of intraocular extraskeletal osteosarcoma in a pet rabbit.

This case involved an 8-year-and-9-month-old male, lop-eared rabbit weighing 1.9 kg. Medical history for this animal included hypermature cataract at 3 years and 1 month old, glaucoma and posterior lens luxation of the left eye at 4 years and 1 month old and glaucoma of the right eye at 5 years and 11 months old. Three months before its death, the rabbit showed gradual enlargement of the left eye and exophthalmos at 8 years and 6 months old. On physical examination, a mottled white-to-pink mass was identified in the left eye. Exophthalmos progressed, and the rabbit died with signs of respiratory failure. Cosmetic necropsy was performed in the Laboratory of Veterinary Pathology at Nihon University.

On gross examination, the left eye showed marked protrusion from the orbit and measured 4 × 4 × 4 cm. The corneal surface of the eye was diffusely covered by a thick, dry, brown-to-red layer of crust (Fig. 1). At enucleation, no connection was apparent between the eye and this overlying orbital tissue or cranial bone. When the eye was bisected after fixation and decalcification, the intraocular tissue had been effaced and occluded by a hard, light-gray bony mass (Fig. 2). Other representative gross findings included hemothorax, multiple pulmonary masses, and a rubbery cutaneous mass. The pulmonary masses were tan to gray, soft, spherical and up to 1 cm in diameter. No significant gross lesions were observed in the bone tissue, but we could not preserve bone tissues for histopathology due to the cosmetic necropsy.

On histopathologic examination, tissue samples were removed and fixed in 10% neutral-buffered formalin solution. The left eye was decalcified in Plank-Rychlo solution (Muto Pure Chemicals, Tokyo, Japan) for about 72 hr. After trimming, representative tissues were embedded in paraffin, sectioned at a thickness of 5 µm, and stained with hematoxylin and eosin. Histologically, the intraocular mass represented highly cellular, invasive neoplasm, effacing almost all intraocular tissues (Fig. 3). The neoplasm comprised spindle-shaped to angular cells arranged in interlacing bundles with abundant eosinophilic fibrous matrix and significant production of osteoid, bone and cartilage (Figs. 4 and 5). The neoplastic cells contained small amounts of eosinophilic cytoplasm with indistinct cell borders. Nuclei were medium-sized, round to oval with coarsely stippled chromatin and distinct nucleoli. Anisocytosis and anisokaryosis were moderate, and 20 mitoses were seen per 10 high-power fields (400×) (Fig. 6). Although the neoplasm had invaded caudally over the sclera, no evidence suggested invasion to the orbital tissue or optic nerve, and
Fig. 1. Gross appearance at necropsy. The left eye is markedly enlarged. The cranial aspect of the eye, suggesting the cornea, is protruded and diffusely covered by a thick layer of crust.

Fig. 2. Gross appearance of the left eye. In cross-section, the intraocular tissue is completely effaced and occluded by a hard, light-gray mass. Arrows: pre-existing sclera. Bar=1 cm.

Fig. 3. The intraocular mass comprises a highly cellular neoplasm with production of abundant amorphous osseous matrix between neoplastic cells. These cells have invaded caudally over the sclera. Arrows: pre-existing sclera. Hematoxylin and eosin stain. Bar=500 µm.

Fig. 4. Neoplastic cells have produced a small amount of cartilaginous matrix. Hematoxylin and eosin stain, Bar=100 µm.

Fig. 5. Abundant production of lacy strands of osteoid, surrounded by neoplastic cells. Asterisk: osteoid. Hematoxylin and eosin stain, Bar=50 µm.

Fig. 6. The neoplasm comprised spindle-shaped to angular cells arranged in interlacing bundles. The neoplastic cells showed moderate pleomorphism. Hematoxylin and eosin stain, Bar=50 µm.
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