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History and clinical signs

A 13-year-old, spayed female, German shepherd was referred to the ophthalmology service at the Western College of Veterinary Medicine with a 5-month history of right periocular swelling that had progressively worsened over the past 2 mo. Physical examination revealed that the dog was moderately overweight. Oral examination was normal. Pain was not elicited when the mouth was opened. Distant ocular examination revealed marked swelling of the conjunctiva and eyelid ventral to the right globe, prolapse of the third eyelid, exophthalmos, dorsolateral deviation of the globe, and epiphora (Figure 1). Neuro-ophthalmic examination, including menace, palpebral, direct and consensual pupillary light, and oculocephalic reflexes, was normal bilaterally. Schirmer tear test (Schirmer Tear Test Strips, Alcon Canada, Mississauga, Ontario) values were 16 and 17 mm/min in the right and the left eye, respectively. The fluorescein dye (Fluor-I-Strip AT, Ayerst Laboratories, St. Laurent, Quebec) staining was negative. Applanation tonometry (Tonopen XL, Biorad Ophthalmic Division, Santa Clara, California, USA) revealed intraocular pressures of 35 and 22 mmHg in the right and the left eye, respectively. Periocular palpation revealed a large, firm mass in the right ventromedial orbit, partially adherent to the ventral orbital rim. The right globe could not be retropulsed. Ophthalmic examination via slit lamp biomicroscopy (Osram 64222, Carl Zeiss Canada, Don Mills, Ontario) showed bilateral lenticular sclerosis and incipient anterior cortical and equatorial cataracts. Indirect ophthalmoscopy (Heine Omega 200, Heine Instruments Canada, Kitchener, Ontario) revealed ventral globe compression with a 360° serous retinal detachment involving the peripheral nontapetal and tapetal regions of the right eye, and focal retinal dysplasia in the dorsal tapetum of both eyes.

Discussion

Our clinical diagnosis was right orbital disease with subsequent serous retinal detachment and ocular hypertension. Given the history, signalment, and clinical findings, the most likely diagnosis was a primary orbital neoplasm (1,2). Other differential diagnoses included secondary orbital neoplasm (invasion from nasal tumor, intracranial tumor, pharyngeal tumor, or paranasal sinus tumor) or metastasis of another neoplasm to the orbit (1–4). Other less likely differential diagnoses, given the absence of pain and gradual progression of clinical signs, included an intraorbital foreign body, frontal sinus bacterial osteomyelitis, eosinophilic myositis, secondary orbital infection from spread of systemic mycotic disease, chronic orbital cellulitis or abscess, or zygomatic salivary cyst or mucocele (2,5–8).

A complete blood cell count, serum biochemical profile, and urinalysis were performed; the results were within normal reference ranges. Following the application of topical proparacaine (Ophthetic, Allergan, Markham,

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What are your clinical diagnoses, differential considerations, and diagnostic plans?

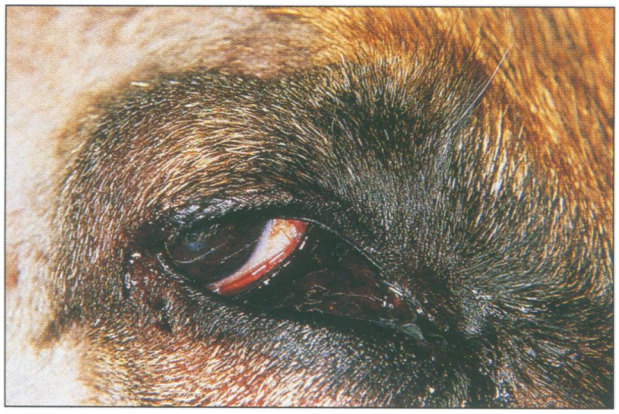

Figure 1. Right eye of a 13-year-old German shepherd with marked swelling ventral and medial to the globe, third eyelid prolapse, exophthalmos, dorsolateral globe deviation, and epiphora.

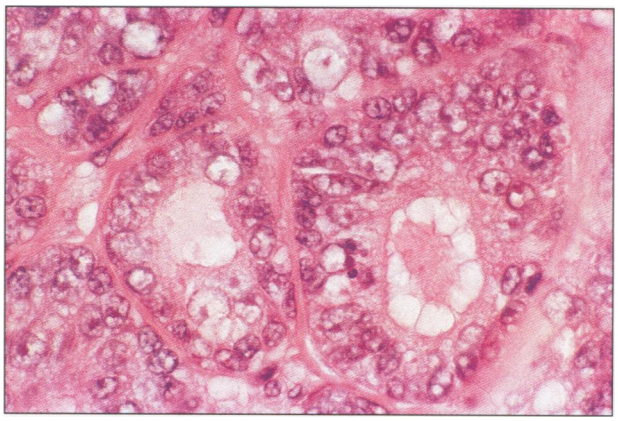

Figure 2. Photomicrograph of a hematoxylin and eosin-stained section from the orbital mass. Note the acinar arrangements, cytoplasmic vacuolation, cytologic criteria of malignancy, and multiple mitotic figures. These histologic findings were most consistent with an adenocarcinoma of either the zygomatic salivary gland or the gland of the third eyelid (250X).

Ontario), fine needle aspirates of the orbital mass were taken; cytologic examination of Wright-Giemsa-stained direct smears revealed clusters of large epithelial cells with large nuclei, prominent nucleoli, and numerous cytoplasmic vacuoles. The cytologic findings were most compatible with an epithelial tumor of glandular origin. We advised and completed routine sedation and general anesthesia. A wedge biopsy of the mass was taken transconjunctivally by using a 6400 Beaver blade (No. 6400 Beaver Eye Blade, Becton Dickinson AcuteCare, Franklin Lakes, New Jersey, USA). Light microscopic examination of formalin-fixed, hematoxylin and eosin-stained sections revealed well demarcated, variably sized lobules separated by fibrovascular connective tissue trabeculae. Acinar arrangements predominated and most cells had numerous dispersed cytoplasmic vacuoles. Numerous cytologic criteria of malignancy were noted, including marked anisokaryosis, irregular nuclear borders, abnormal nucleolar morphology (angular forms noted), and a high mitotic index (Figure 2). The histologic diagnosis was adenocarcinoma of either the zygomatic salivary gland (9,10) or the gland of the third eyelid (11).

Thoracic, abdominal, and skull radiographs; orbital and abdominal ultrasonographs; and zygomatic sialographs were taken. Thoracic radiographs revealed round, radiodense regions within the right caudal lung lobe. Abdominal radiographs revealed moderate hepatomegaly and splenomegaly. Skull radiographs revealed a large mass between the right zygomatic arch and the frontal sinus. There was osteolysis of the lateral aspect of the frontal bone. Ultrasonography of the right globe and orbit, using a 7.5 MHz sector transducer, revealed a large mass of low echogenicity occupying the ventromedial orbit and extending posteriorly, resulting in ventral globe compression. Linear echogenicities were detected in the vitreous that were compatible with the retinal detachments noted clinically. Abdominal ultrasonography revealed a large cavitated hepatic mass and a small round mass within the spleen. A retrograde contrast zygomatic sialogram was performed following instillation of 3.0 mL of iohexitol (Omnipaque 300: Winthrop Pharmaceuticals, New York, New York, USA) through a 27-gauge lacrimal cannula seated into the right oral zygomatic papilla and duct; contrast medium was observed extending around the globe, filling the mass, and in continuity with the zygomatic salivary gland. Based on these findings, our diagnosis was zygomatic salivary gland adenocarcinoma with local invasion and systemic metastases. A primary systemic neoplasm with orbital metastasis could not be eliminated as a possibility. The 360° serous retinal detachment and ocular hypertension were likely due to globe compression and interference with ocular venous drainage and aqueous exit, respectively.

Palliative exenteration of the right orbit was performed via a routine transpalpebral approach the following day. The globe and orbital contents were placed

in Bouin's fixative and submitted for histological examination. Light microscopic examination of hematoxylin and eosin-stained sections confirmed our diagnoses of zygomatic salivary gland adenocarcinoma and retinal detachment and degeneration. The dog was euthanized 14 wk postoperatively, due to lethargy and inappetance.

In dogs, approximately 90% of orbital tumors are malignant, with about 75% being primary tumors (12). Long-term prognosis for dogs with primary orbital neoplasms is poor, with less than 15% surviving beyond 3 y (12). In cases with metastasis, prognosis for survival is grave.

Primary glandular orbital epithelial neoplasia may arise from either the gland of the third eyelid, the zygomatic salivary gland, or the lacrimal gland (9,10). Zygomatic sialography is useful in confirming the tissue of orbital tumor involvement (10). The biological behavior of zygomatic salivary gland adenocarcinomas in dogs is not well documented. In 2 cases previously reported, metastases were not noted; both cases showed local bony invasion, as evidenced by osteolysis of the zygomatic arches (9,10).

Exenteration, in this case, was palliative. Euthanasia was also a humane option. Exenteration of the affected orbit is usually the optimal therapy, if the neoplasm invades intraconally or if metastasis of a primary orbital tumor or the primary site of a metastatic neoplasm cannot be identified (12). Certain orbital tumors, including some epithelial neoplasms, may respond to irradiation or chemotherapeutic drugs used following or instead of exenteration, radical orbitotomy/orbitectomy, or orbital reconstruction (12).

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