NOTE Surgery

Anaerobic Orbital Abscess/Cellulitis in a Yorkshire Terrier Dog

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ABSTRACT A retrobulbar abscess/cellulitis occurred in a Yorkshire Terrier dog. The clinical signs were exophthalmos, prolapsed nictitating membrane and purulent ocular discharge. Ultrasonography showed a marked soft tissue swelling of the retrobulbar tissues as well as echogenic parallel lines between the globe and the medial orbital rim. Surgical exploration of the orbit was performed and no foreign body was found. The pterygopalatine fossa was incised and therapeutic retrobulbar drainage attempted. A drain was placed to encourage ventral drainage of the abscess. Anaerobic cultures revealed heavy growth of gram-negative rods (prevotella bivia and prevotella buccae were isolated). Recovery was successful but subsequent treatment for keratoconjunctivitis sicca was necessary. A full recovery of tear production occurred after several weeks.

KEY WORDS: anaerobic, pterygopalatine fossa, retrobulbar abscess/cellulitis.

Orbital abscess/cellulitis is a serious clinical problem that can have grave visual consequences if an accurate diagnosis and appropriate therapy properly are not performed in a timely manner.

A four-year-old, 5 kg, neutered male Yorkshire Terrier was referred to the University of Wisconsin Veterinary Medical Teaching Hospital (VMTH) for evaluation of left periorbital swelling, exophthalmos, and prolapsed necrotic nictitating membrane with severe purulent discharge (Fig. 1). According to the owner, 2 weeks previously, the dog was experiencing pain when chewing, was anorexic, and also lethargic. Initially, the eye did not appear to be involved. The animal was taken to the owner’s regular veterinarian who then performed a complete blood count and skull/dental X-rays. A tentative diagnosis of cervical disc protrusion was made. The dog was treated with dexamethasone (1 mg/kg, IV) and carprofen (2.2 mg/kg, PO). In 24 hr, the dog seemed to recover, but 3 days later, the left eye became exophthalmic with periorcular swelling and prolapse of the third eyelid. In addition there was a severe mucopurulent discharge coming from a necrotic tract at the base of the nictitating membrane.

Physical examination at the VMTH revealed the dog to be depressed and right eye normal. The left eye was exophthalmic and deviated laterally with a significant periorcular swelling that was abnormally warm to touch as well as an abscessed draining necrotic fistulous tract located at the base of the nictitating membrane. There was also a linear superficial corneal erosion secondary to exposure. The cervical lymph nodes on the left side were enlarged. Pain was elicited when the dog’s mouth was opened for examination. The rectal temperature was 38.8°C and the remainder of the physical examination was normal. Because of the dog’s discomfort, further ocular and oral examinations were postponed until general anesthesia was performed. Our tentative diagnosis was a left orbital abscess with cellulitis. The dog was hospitalized for further diagnostic tests.

A CBC examination was performed, which revealed elevated white blood count (45,000/μL) with a left shift. The serum chemistry and urinalysis were both normal. The dog was sedated with midazolam (0.1 mg/kg, IM) and hydromorphone (0.1 mg/kg, IM). Anesthesia was induced with propofol (2 mg/kg, IV) and maintained with isoflurane and oxygen after tracheal intubation. The oral examination revealed the left pterygopalatine fossa to be slightly red and swollen, but no other oral lesion was found. Cytological evaluation of the discharge from the third eyelid revealed a large number of bacterial rods, macrophages, and degenerated and nondegenerated neutrophils. Swabs for aerobic and anaerobic cultures were taken from the fistulous tract. A fine needle aspirate

Fig. 1. Prominence of the globe and necrotic nictitating membrane, with periorbital swelling and severe purulent discharge (left eye).
was taken from the enlarged left submandibular lymph node revealed normal lymph cells with neutrophils, plasma cells and macrophages. Chest, orbital and dental X-rays were all normal. Orbital ultrasound revealed orbital cellulitis and two echogenic parallel lines between globe and medial orbital rim (Fig. 2). These findings suggested the possibility of a linear foreign body in medial periorbital space with retrobulbar cellulitis.

The dog was then taken to surgery for exploration of the orbital area, via the fistulous tract. A hemostat was introduced into the tract, but no foreign body was found after moderate exploration. Necrotic tissue was debrided from the nictitating membrane and tract, and the purulent material was irrigated with saline from the tract. A small incision was then made in the left pterygopalatine mucosa with a #15 surgical blade. Then an alligator forceps was inserted into the fistulous tract starting from the third eyelid and directed to the pterygopalatine fossa surgical wound. A 1/4 inch diameter penrose drain was pulled back through this tract to provide ventral drainage into the mouth (Fig. 3). The drain was secured to the palpebral surface of the third eyelid.

The dog was treated with systemic antibiotics, cephazolin (20 mg/kg, IV, every 8 hr), metronidazole (10 mg/kg, IV, every 8 hr, over 30 min) and ciprofloxacin (20 mg/kg, IV, every 24 hr). In addition maintenance therapy with lactated Ringer’s solution (3 ml/kg/hr, with added potassium 16 mEq/L). A neomycin/polymyxin/bacitracin ophthalmic ointment was applied to the left eye every 4 hr.

Although the left periorcular area was still swollen on day 2, but with normal temperature to touch. The drain was functional evidenced by a seromucopurulent discharge draining from both ends of the penrose. Warm compresses were applied to the left eye twice a day. Subsequently the dog began to eat, therefore the antibiotics were switched from intravenous to oral therapy. Since there was a strong suspicion of anaerobic infection, the cephazolin was changed to penicillin VK (12.5 mg/kg, PO, every 6 hr). Metronidazole and ciprofloxacin were continued at the same dosage. Aspirin (10 mg/kg, PO, every 12 hr) was started as an analgesic and antiinflammatory.

On day 3, the drain was still functional and there was less discharge and swelling. Oral antibiotic medical therapy was continued but the aspirin was discontinued due to slight bloody feces. On day 4, at the time of discharge, the orbital drain was removed and the animal discharged on the same oral antibiotics and ophthalmic ointment (frequency reduced to bedtime application only). An ophthalmic triple antibiotic solution every 6 hr was additionally dispensed to facilitate application of antibiotic on the cornea.

Ten days later at reexamination, the left eye was observed to be normally aligned. The eyelid swelling had regressed, and the protrusion of the nictitating membrane was nearly resolved (Fig. 4). The dog could now open his mouth widely. The temporary tarsorrhaphy sutures were removed, and a complete ophthalmic examination was followed, which revealed that the corneal erosion had healed and no other ocular abnormalities except for decrease tear production was low for the left eye; (Schirmer tear test: 8 mm/min). In an attempt to increase tear production, 0.2 % cyclosporine ophthalmic ointment was started every 12 hr.

Four weeks postoperatively, the third eyelid appeared normal, and the Schirmer tear test (15 mm/min) was also normal. Oral and topical antibiotics were discontinued and the cyclosporine ointment was decreased from twice to once a day.

Orbital inflammation usually presents as an unilateral retrobulbar abscess or retrobulbar cellulitis, and characterized by acute onset, variable exophthalmos, periorbital swelling, prolapsed third eyelid, fever and pain [1, 13]. The degree of exophthalmos is proportional to the amount of accumulated orbital material and may vary from slight to severe exoph-
The usual causes of orbital abscess/cellulitis include trauma, foreign body penetration through the oropharynx or facial skin, sinus infection, abscessation of the tooth roots, and hematogenous spread from other locations [6]. Extension of myositis from the muscles surrounding the orbit, salivary retention cysts/mucocele are also causes of orbital inflammation [12]. Affected dogs are usually anorexic and depressed. Pain is severe on eye palpation and especially on oral examination associated with movement of the temporomandibular articulation [4]. A CBC will usually reveal a neutrophilic leucocytosis with or without a left shift [8].

Plain radiography is less likely to be of diagnostic value. Proliferative or destructive osseous lesions and radiodense foreign materials are best visualized with X-ray [12]. The use of ultrasonography, however, is very beneficial to diagnose of the retrobulbar abscess and retrobulbar cellulitis [3, 9]. Diagnostic imaging of the orbit was very useful and important in this case. We could find fistulous tract caused the abscessation and orbital cellulitis; however no foreign body was found. Commonly, surgical drainage is often required in anaerobic infections of tissue, as antibiotic therapy alone may be insufficient [2, 14]. In this case, surgical exploration based on the results of ultrasound with both aerobic and anaerobic cultures of deep necrotic fistulous tract was necessary for diagnosis and appropriate therapy. In addition, penrose drain placement was very effective to provide ventral drainage from the orbit. Technically, as the hemostat is advanced in a blind fashion into an area richly supplied by blood vessels (maxillary artery) and nerves (optic nerve) care must be taken when doing biopsy or advancing hemostat in this site. True-Cut® biopsy needle for diagnosis at this site would not be recommended because there is a possible of trauma to the maxillary artery or optic nerve. Irrigation of the retrobulbar area is a controversial issue because exacerbation of the exophthalmos and spreading of infectious organisms have been cited as possible complications [12]. On the other hand, there is a report that irrigation with crystalline penicillin has been beneficial [11].

Systemic antibiotic therapy and surgical drainage resulted in complete remission of clinical signs. Because of a strong suspicion of anaerobic infection, the early use of systemic penicillin as well as metronidazole was logical. In this case anaerobic bacterial cultures had yielded heavy growth anaerobic microorganisms (prevotella bivia and prevotella buccae) from the fistulous tract. A foreign body was not found in the exudate or tract of the necrotizing membrane, however, a penetration and inoculation of the orbit by a foreign body was believed to be the cause for the fistulous tract at the base of the third eyelid and the eventual abscessation. It was suspected that initial steroid therapy for cervical disc protrusion had occurred soon after the occult inoculation and therefore accelerated bacterial proliferation and the abscessation.

Generally, the prognosis of the orbital abscess is guarded [10, 12]. Orbital infection may be accompanied by uveitis [7]. In this case, keratoconjunctivitis sicca had occurred on the left eye due to the damage of the third eyelid gland and possibly the orbital lacrimal gland. In most cases, as in this case, the exophthalmos regresses within 36 to 48 hr after appropriate therapy has begun, and general the condition subsequently improves markedly, but if foreign body is retained in the orbit, recurrences are to be expected [12]. Complete re-examinations should be continued to follow the tear production.

REFERENCES