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Abstract

Case summary An unusual case of an intraocular linear foreign body that migrated from the oral cavity, causing a severe endophthalmitis, in a cat is described. A 2-year-old female domestic shorthair cat presented with signs of infection from the left eye that had begun 2 weeks previously. Despite having been prescribed oral and topical antibiotics, there was a progressive worsening of the clinical signs. On ophthalmic examination the cat presented with severe endophthalmitis, secondary glaucoma and exposure keratitis of the left eye. Radiography demonstrated the presence of an intraocular linear metallic foreign body compatible with a sewing needle. During enucleation, when the globe was extracted, the sewing needle stayed in the orbit. When the needle was pulled away, a piece of thread was also retrieved, which demonstrated that the linear foreign body had migrated retrogradely from the oral cavity to the orbit through the pterygopalatine fossa. Surgical recovery was uneventful.

Relevance and novel information Intraocular foreign bodies may present in a variety of ways, which may hinder their clinical detection. The management and prognosis depend on the composition and location of the foreign body, as well as the possible presence of secondary infection. To the author's knowledge, this is the first time that a case of severe endophthalmitis following retrograde intraocular migration of a linear foreign body from the oral cavity to the orbit through the pterygopalatine fossa in a cat has been reported.

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Introduction

Intraocular foreign bodies may be characterised by a range of clinical signs. The variability of presenting signs results from the type, size, location and point of entry of the foreign material, and also from the severity of the initial trauma.¹ Because the history is often obscure or may not support the possibility of a foreign body, the clinician must have a high index of suspicion in unusual or non-responsive cases.¹

Endophthalmitis is a severe inflammation of the interior of the eye caused by the introduction of contaminating microorganisms following trauma, surgery or haematogenous spread from a distant infection site. It can also result from deep stromal keratitis with corneal perforation and intraocular seeding of organisms.² Despite appropriate therapeutic intervention, bacterial endophthalmitis frequently results in vision loss, if not loss of the eye itself.²

The clinical presentation, aetiology and surgical treatment of an unusual case of intra-ocular linear foreign body that resulted in severe endophthalmitis and visual loss in a cat is described.

Case description

A 2-year-old female domestic shorthair cat that resided indoors presented for an ophthalmology referral consultation at our hospital with complaints of signs of infection from the left eye, which had begun 2 weeks previously. The cat had been staying at a friend's house for the weekend and returned with a left painful eye. It had been prescribed oral and topical antibiotics by the referring veterinarian but there was a progressive worsening of the clinical signs. Two days prior the patient had also begun to present systemic signs of disease, being inappetent and lethargic.

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At the time of initial presentation, apart from being mildly dehydrated, no other abnormalities were detected on physical examination. Owing to pain manifestation on mouth opening, only a rapid inspection of the oral cavity looking for dental/gingival problems or fluctuation/redness behind the last upper molar tooth was performed initially, but no abnormalities were detected.

On ophthalmic examination the cat presented with an exposure keratitis of the left eye (OS), along with a secondary glaucoma and severe endophthalmitis. In the OS the menace response and the dazzle reflex were negative, the blink reflex was incomplete owing to globe enlargement, the cornea reflex was decreased owing to corneal permanent exposure and the pupillary light reflexes were impossible to evaluate owing to severe corneal opacity (Figure 1). In the right eye (OD) the reflexes were normal except for the indirect pupillary light reflex, which was absent. Schirmer tear test (Dina strips Schirmer-Plus; Luneau SAS) was within normal limits in the OD (17 mm/min) and decreased in the OS (12 mm/min). Intraocular pressure measurements (Tono-Pen XL; Medtronic Solan) were 18 mmHg in the OD and 45 mmHg in the OS. Slit-lamp biomicroscopy (SL14 Kowa Company) in the OD showed no signs of inflammation and indirect fundoscopic examination (Heine Omega 180; Herrsching) showed no abnormalities. Biomicroscopy and fundoscopy were impossible to perform in the OS owing to severe corneal opacity. The left cornea stained with fluorescein dye, showing an extensive exposure ulcerative keratitis.

The differential diagnoses included retrobulbar abscess, cellulitis, hematoma or neoplasia, traumatic injury and intraocular foreign body.

Complete blood count (CBC) and serum chemistry analysis were performed. Intravenous fluid therapy was initiated to correct dehydration. A two-view radiological examination was proposed before a computed tomography scan to investigate the possibility of traumatic injury or intraocular foreign body.

Skull radiographs (dorsoventral and laterolateral view) showed an intraocular linear metallic foreign body compatible with a sewing needle, measuring approximately 6 cm in length, located inside the left ocular globe, in close contact with the back of the orbit, as can be seen in Figure 2. CBC yielded leukocytosis, the rest of the analytic values being within normal limits. Being a blind, painful eye, enucleation was proposed.

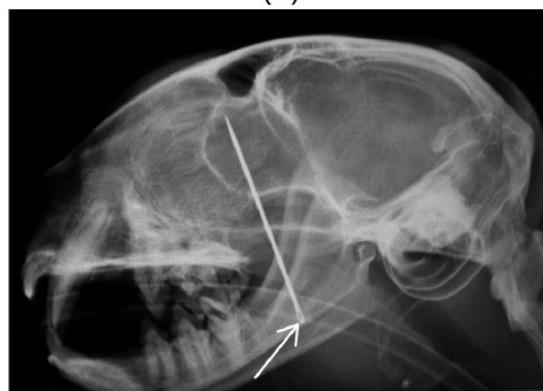
The patient was premedicated for postoperative analgesia and sedation with butorphanol at a dose of 0.1 mg/kg (Dolorex; Intervet), dexmedetomidine at a dose of 0.01 mg/kg (Dexdomitor; Esteve Veterinaria) and ketamine at a dose of 7.5 mg/kg/body weight (Imalgene; Merial) IM; anaesthetised with propofol at a dose of 2 mg/kg body weight IV (Propofol Lipuro; B Braun Medical); and endotracheal intubation was performed and anaesthesia was maintained with isoflurane. During



Figure 1 Patient at initial presentation showing severe endophthalmitis, secondary glaucoma and exposure keratitis of the left eye



(a)



(b)

Figure 2 (a) Dorsoventral radiograph of the skull showing an intraocular metallic foreign body, compatible with a sewing needle, measuring approximately 6 cm in length, located in the interior of the left orbit, in contact with the posterior orbit. (b) Laterolateral radiograph of the skull showing an intraocular metallic foreign body with a small hole in its ventral extremity (arrow), compatible with a sewing needle, measuring approximately 6 cm in length, located in the interior of the left orbit. The endotracheal tube is visible inside the mouth and trachea

intubation, the oropharynx was carefully examined but no string was detected. On induction, cefadroxil at a dose of 10 mg/kg body weight (Cefadroxil; Laboratórios Mylan) and metronidazole at a dose of 10 mg/kg body weight (Metronidazole; B Braun Medical) were administered intravenously, and meloxicam at a dose of 0.2 mg/kg body weight (Meloxidyl; Ceva) was given subcutaneously for the control of postoperative pain.

Periocular skin of the left eye was aseptically prepared. Surgery was performed using the subconjunctival enucleation technique to allow corneal visualisation during the procedure owing to the risk of corneal perforation by the needle. After a lateral canthotomy, the bulbar conjunctiva and Tenon's capsule were incised. Using blunt dissection, the plane between the sclera and Tenon's capsule was extended deeper into the orbit and extraocular muscle insertions were transected. With specially curved enucleation scissors, an attempt was made to transect the optic nerve and surrounding blood vessels. This was difficult to achieve because the metallic foreign body was located in a position that did not allow complete closure of the scissors. The globe was carefully removed from the orbit, while trying to prevent leakage of contaminated material from the vitreous cavity through the needle entry point, leaving the sewing needle attached to the back of the orbit (Figure 3). When the needle was pulled away, a piece of thread approximately 10 cm long attached to it was also retrieved, which demonstrated that the linear foreign body had migrated retrogradely from the mouth to the orbit through the pterygopalatine fossa (Figures 4 and 5). The rest of the enucleation procedure was performed in a routine manner.

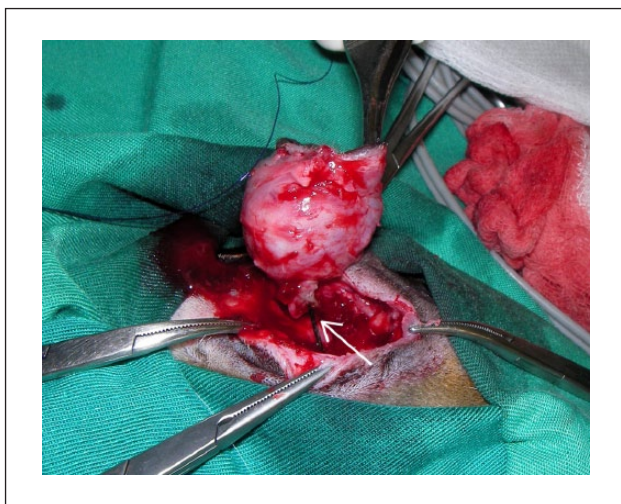


Figure 3 During the enucleation procedure, the globe was carefully removed from the orbit, while trying to prevent any leakage from the contaminated material inside the vitreous cavity, leaving the sewing needle (once inside the ocular globe) behind, attached to the posterior part of the orbit (arrow)

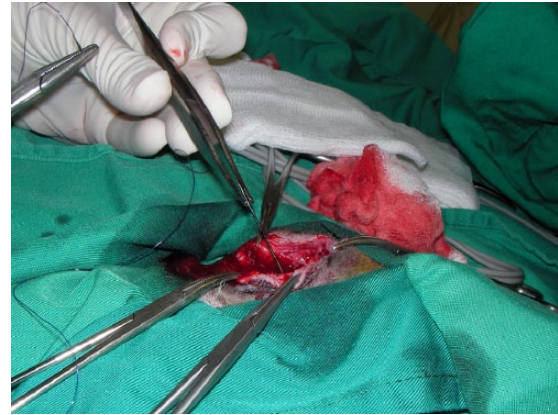


Figure 4 When the needle was pulled away, a piece of thread (approximately 10 cm long) attached to it and previously lodged in the oesophagus was also retrieved, demonstrating that the linear foreign body had migrated retrogradely from the mouth to the orbit through the pterygopalatine fossa

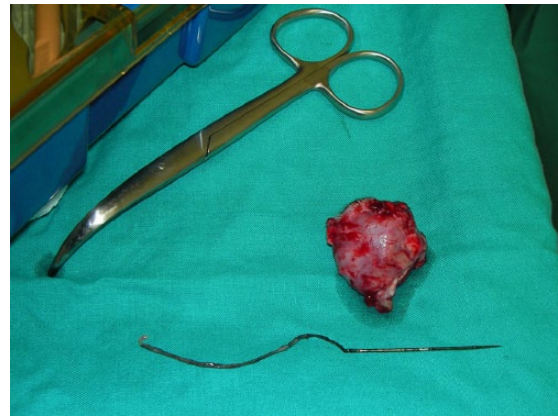


Figure 5 Curved enucleation scissors, resected ocular globe and linear foreign body with the sewing needle and the attached thread

Bacterial culture was negative. Histopathology revealed destructive ocular changes with necrosis, and the presence of cocci in the ocular tunica fibrosa and vitreous cavity, but no evidence of neoplastic changes. The specific area of penetration of the foreign body into the eye was identified as corresponding to the lamina cribrosa of the sclera.

Postoperatively, medical treatment consisted of oral meloxicam at a dose of 0.1 mg/kg body weight (Meloxidyl; Ceva) for 4 days and amoxicillin plus clavulanic acid at a dose of 10 mg amoxicillin and 2.5 mg clavulanic acid/kg body weight (Synulox; Pfizer) for 7 days. Additionally, topical gentamicin drops (Gentocil; Laboratório Edol) were applied q8h for 7 days to the skin

suture. An Elizabethan collar was advised. The cat improved with no complications.

Discussion

Intraocular foreign bodies are a common consequence of penetrating ocular trauma. Early diagnosis and removal of intraocular foreign bodies is very important to determine further management and the final result of treatment. Intraocular foreign bodies may present in a variety of ways, which may hinder their clinical detection.³ Management and prognosis depend on the composition and location of the foreign body, as well as the possible presence of secondary infection.³ In this case the 2 week duration of the disease without a definite diagnosis increased the severity of the endophthalmitis and worsened the vision prognosis.

Intraocular foreign bodies can be classified according to their composition as (1) metallic, such as steel; (2) non-metallic, which may be inorganic, such as glass; and (3) organic, such as wood or vegetable matter.³ Some of these can be tolerated when left in the eye, including those made of glass, plastic, graphite, stone, aluminum or gold. However, objects contaminated with organic matter can cause significant morbidity.⁴ In the present case the foreign body was metallic but allowed communication with the oral cavity, which facilitated the progression of infection.

In humans, the most common cause of the introduction of intraocular foreign bodies is the wielding of a hammer.⁵ In veterinary medicine, the most common ocular foreign bodies are grass awns or other plant material that will usually lodge within the conjunctiva or behind the nictitating membrane, and can be removed using thumb forceps following instillation of a topical anaesthetic.^{6,7} Grass awns can even perforate the globe, and Tovar et al have already described a case of intraocular grass that had migrated through the sclera, causing a suprachoroidal abscess with choroidal and retinal detachment in a cat.⁸

Linear foreign bodies are relatively common in feline patients, usually causing plication of the small intestine with the risk of perforation, peritonitis and death.⁹ The intraorbital location of a linear foreign body is very unusual. In the present case the sewing needle entered the pterygopalatine fossa, perforating the orbit and the ocular globe caudally, and the thread was swallowed.

The metallic needle was easily recognised in the plain radiograph, allowing for the definite diagnosis of the aetiology of the endophthalmitis. Radiography is an ancillary procedure and a minimum of two radiographic views should be taken.¹ It may be useful in identifying and locating intraocular/orbital foreign bodies, with detection rates of 69–90% for metallic foreign bodies and 71–77% for glass; however, the detection rate for organic material, such as wood, is low (0–15%).³

Treatment for an intraocular foreign body depends on its nature, size and location; the extent of associated tissue damage; and the amount of uveal inflammation.⁵ Foreign bodies located within the posterior segment of the globe are usually accompanied by a substantial amount of intraocular haemorrhage and retinal detachment, and are difficult to retrieve. Pars plana vitrectomy and magnetic retrieval of foreign material (in cases of iron-metallic foreign bodies) are procedures employed in humans but their use has not yet been reported in animals.¹ Regardless of the type of foreign body, endophthalmitis is a possible sequela that may necessitate enucleation or evisceration.¹

Bacterial culture was probably negative because the patient had previously been prescribed oral antibiotics, which prevented bacterial growth; although, in cats, the oral cavity bacterial flora is very rich in anaerobic pathogens.

To the author's knowledge, this is the first time that a case of severe endophthalmitis following retrograde intraocular migration of a linear foreign body originating from the oral cavity in a cat has been reported.

Conclusions

In this case, the penetrating injury led to trauma of the ocular tissues, secondary glaucoma and exposure keratitis, rendering the eye blind and painful. It allowed for bacterial migration from the oral cavity, so endophthalmitis was a predictable sequela. The eye necessitated enucleation. Evisceration was not advisable owing to the presence of endophthalmitis and the higher risk of sarcoma development in cats.

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Conflict of interest The author does not have any potential conflicts of interest to declare.

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