

Cataract surgery in an African lion (*Panthera leo*) with anterior lens luxation

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Abstract Mature cataract had caused change in appearance of the eye and complete blindness in an aged African lion. Early surgical removal of the lens is the only effective treatment for mature cataract, and if surgery is not performed soon after maturation of the cataract, total blindness may remain after surgery. The present report describes a mature cataract of unknown cause with anterior lens luxation in a 20-year-old African lion treated by intracapsular extraction of the lens. On clinical examination, immature cataract of the right eye and mature cataract with anterior lens luxation of left eye were diagnosed. The entire lens, including anterior and posterior capsules, was removed by routine surgical techniques described for such a procedure. The lion suffered self-trauma of the eye 48 h after surgery, and three sutures were disrupted. Antibiotic drops and Cefazolin were administered with extreme difficulty for 1 week. The lion was saved, but keratitis developed in the left eye.

Keywords Cataract surgery · Lion · Anesthesia

Introduction

Cataract comprises a common group of ocular disorders manifested by lens opacities of varying size and shapes and varying in etiology and rate of progression (Cooley 2001).

Cataract in felines is uncommon and, whereas in the dog, many cases of cataract are presented to the veterinary ophthalmologist, opacity of the lens in the cat is a rare presenting sign (Seitz and Weisse 1979; Appel et al. 2006; Sigle and Nasisse 2006; Barnett and Crispin 1998). Feline cataract is, therefore, almost always secondary in form and can be classified under postinflammatory, traumatic, metabolic, and secondary to other eye diseases (Seitz and Weisse 1979). To date, there are no proven reports of primary, hereditary, and noncongenital cataract in cats (Seitz and Weisse 1979; Barnett and Crispin 1998). However, Rubin (1986) reported three cases in related Himalayan cats in which the condition was bilateral (Rubin 1986). Nutritional cataract has been described in felines, including a deficiency of arginine occurring in young kittens (Olivero et al. 1991). Bilateral and unilateral cataract has also been reported in several of the big cats, tigers, cheetahs, leopards, and black leopards and always in animals hand-reared from birth and frequently given a variety of supplements in addition to various milk substitutes (Cooley 2001; Seitz and Weisse 1979). Primary lens luxations, in the absence of glaucoma and anterior uveitis, occur in older cats (more than 10 years of age). The management of cataract in felines is similar to that in the dog, and surgical removal of the lens is the only effective treatment for mature cataracts (Cooley 2001; Seitz and Weisse 1979). Medical therapy for cataracts is ineffective and delays in effective therapy may cause lens-induced uveitis (Cooley 2001; Slatter 1990). Four methods of surgical correction commonly used are dissociation, extra-

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capsular extraction, phacoemulsification, and intracapsular extraction of the lens (Cooley 2001; Slatter 1990). Although cataract in the cat is commonly secondary to another eye disease and rarely to a retinal disorder, cataract surgery seldom results in severe intraocular inflammation (Seitz and Weisse 1979). A cat blind with bilateral cataract does not always adapt well and cataract surgery in this species can be particularly rewarding (Seitz and Weisse 1979). In cat, lens luxation, both unilateral and bilateral, occurs less frequently than in dog, and primary hereditary lens luxation has not been reported in the cat (Olivero et al. 1991; Barnett and Crispin 1998). Feline secondary lens luxation may follow trauma, anterior uveitis, and glaucoma, particularly the latter when the zonular fibers have been stretched by the increased intraocular pressure and in hydrophthalmos by globe enlargement (Seitz and Weisse 1979). In the case presented in this study, we report our experiences of cataract surgery in an African lion with anterior lens luxation of unknown cause.

Clinical report

A 20-year-old male African lion, weighing 263 kg, was referred to the Clinic of School of Veterinary Medicine, with a history of blindness for 2 years. On clinical examination, immature cataract of right eye and mature cataract with anterior lens luxation of left eye were diagnosed (Fig. 1). Tonometry with Schiøtz tonometer was performed under local anesthesia by tetracain HCl drop. Intraocular pressure was 23 and 25 mmHg for right and left eyes, respectively. There was no evidence of uveitis at clinical examination. Hematological examination (PVC: 35, total WBC: 11,000/ μ l, neutrophil: 88/ μ l, eosinophils: 2/ μ l, and lymphocytes: 10/ μ l) and serum biochemical profile (total protein: 8.92 g/dl, fibrinogen: 400 mg/dl, albumin: 3.1 g/dl, blood urea nitrogen: 66 mg/dl, creatinine: 10.1 mg/dl, glucose: 95 mg/dl, cholesterol: 156 mg/dl, ALT: 37.6 U/l, AST: 71 U/l, ALP: 50 U/l, GGT: 4.5 U/l, and triglyceride: 223 mg/dl) were performed after 24-h fasting. According to clinical examination and the owners' request, intracapsular extraction of the left eye lens was chosen as the treatment policy (Fig. 2). Anesthesia was induced using diazepam 0.2 mg/kg IM and ketamine HCl 10 mg/kg IM and followed by halothane 2.5% in semiclosed system after intubation.

The entire lens, including anterior and posterior capsules, was removed by a routine surgery described for intracapsular extraction of the mature cataract (Slatter 1990). Before surgical intervention, the lion was administered Cefazolin 20 mg/kg intravenously and continued the same dose intramuscularly with 8 h intervals for 7 days. Gentamycin drops every 8 h were also used to prevent possible postoperative infections. After removal of the lens,

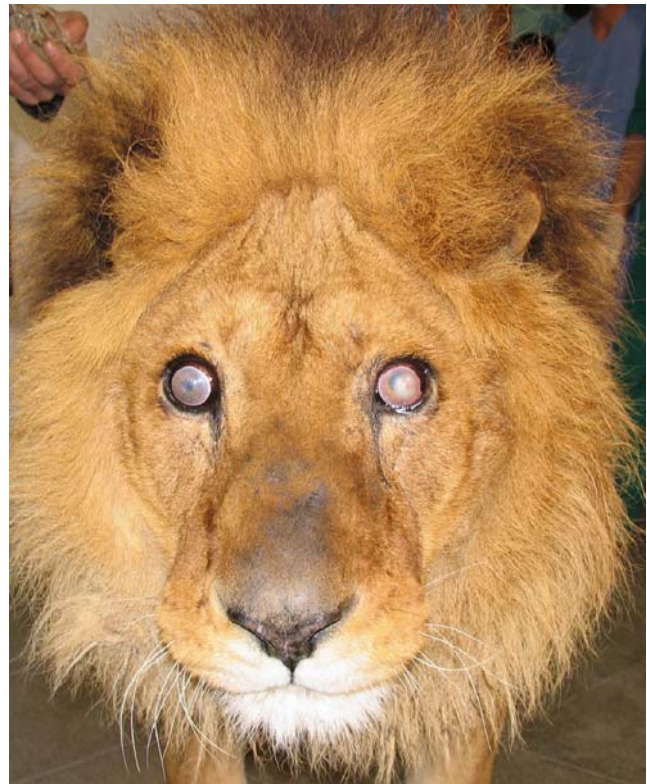


Fig. 1 Mature cataract with anterior lens luxation in the left eye

simple interrupted suture by 05 silk was used to close the incision line on the cornea. An Elizabethan collar was used to protect the eye after surgery. The lion recovered after surgery without any problem. Failing vision remained after surgery as demonstrated by testing the eye with light 24 h after surgery. The lion had self-trauma of the eye 48 h after surgery, and three sutures were disrupted. Antibiotic drops and Cefazolin were administered intermittently and with extreme difficulty for 1 week. The lion was saved but keratitis developed in the left eye.



Fig. 2 Intrecapsular extraction of the cataract

Discussion

We report an unusual case of cataract in lion. In recent literatures, high success rate of cataract surgery has been reported (Appel et al. 2006; Sigle and Nasisse 2006; Barnett and Crispin 1998). In 1969, Magrane, in a series of 429 cases, demonstrated that with accurate and detailed case selection and a meticulous approach to operative technique and postoperative treatment, a success rate of over 90% can be achieved in dogs (Magrane 1969). The success rate has also been related to the experience of the surgeon (Slatter 1990). Cataract development is a normal process of aging, but cataracts also develop due to eye injuries, certain diseases, or medications (Slatter 1990; Barnett and Crispin 1998; Gonzalez-Alonso-Alegre and Rodriguez-Alvaro 2005). Genetics may also play a role in cataract development (Seitz and Weisse 1979; Wallace et al. 2005; Gelatt and Mackay 2005). The case presented in this study had cataract of unknown cause, but effects of aging and previous trauma cannot be ruled out. Surgical removal of the lens is the only effective treatment for mature cataract (Slatter 1990). In the case presented in this study, the intracapsular extraction of lens was used because of anterior lens luxation. This method is used when a cataractous lens has shifted out of position and is no longer held firmly in place inside of the eye (Slatter 1990; Barnett and Crispin 1998). Regardless of the type of procedure, there are many postoperative medications and important home care instructions to be followed after the surgery (Seitz and Weisse 1979; Slatter 1990; Barnett and Crispin 1998). In the recent literatures, cataract surgery has a high success rate in dogs and cats, as long as the rest of the eye is healthy (Slatter 1990; Barnett and Crispin 1998). The success rate of cataract surgery is decreased if the eye has a history of previous inflammation, or is actively inflamed. Uveitis must be controlled before cataract surgery can be attempted but other eye problems such as retinal disease and glaucoma must also be ruled out (Barnett and Crispin 1998; Adkins and Hendrix 2005). Risks involved with surgery in wild life and exotic animals include those associated with general anesthesia. Anesthetic risks are minimized by evaluating preoperative laboratory tests and performing a complete physical examination. The data collected from these tests are then used to develop an appropriate anesthetic protocol (Wenker 1998). Induction, maintenance, and recovery in our case were done very well without any complication, despite very old age. Uveitis and glaucoma are the two most immediate and common complications encountered in the days after cataract surgery (Slatter 1990; Barnett and Crispin 1998). Many cats are medicated before surgery to combat the uveitis that occurs once the eye is opened, and these medications are continued for weeks after the surgery. Intraocular pressure is monitored closely after surgery, and

antiglaucoma drugs are started if needed (Barnett and Crispin 1998). The use of medications and measurement of the eye pressure in small cats are simply done, but these kinds of works in wild life animals are almost impossible. One day after surgery, postoperative care in our case was difficult as the lion attempted to attack any personnel in close proximity, even his trainer. Pressure within the eye was not monitored. The lion was very aggressive, so, for monitoring the eye pressure, light anesthesia was needed. In the dark, the lion showed response to the light but failing vision remained after surgery. The cataract surgery reported in this study failed because of poor postoperative care. The lion was saved but with keratitis in the operated eye. Use of some method such as temporary tarsorrhaphy may have beneficial effect on these surgery results in wild animals. In conclusion, early treatment should be considered in cataract cases to prevent uveitis and total blindness. However, postoperative care presents the most critical problem in wild animals and difficulty with these processes often adversely affects the quality of postsurgical progression.

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