

Corneal Sequestration in a Cat - Treatment with Superficial Lamellar Keratectomy and Third Eyelid Flap Combined with Therapeutic Approach

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ABSTRACT

Background: Corneal sequestrum is a common ophthalmic condition in cats, particularly in brachycephalic breeds, whose anatomical features, such as exophthalmos and increased corneal exposure, predispose them to ocular disorders. This condition is characterized by a darkened plaque in the central or paracentral region of the cornea, affecting both the epithelium and stroma, and may progress to deeper layers, leading to corneal necrosis and risk of ocular perforation. Although its etiology remains uncertain, chronic trauma, viral infections, recurrent keratitis, and tear film abnormalities are frequently associated. Given this context, the present report aims to describe the clinical and surgical management of a corneal sequestrum case in a Brazilian Shorthair cat, treated through superficial lamellar keratectomy associated with a third eyelid flap and medical support, with emphasis on therapeutic efficacy and patient recovery.

Case: A 10-year-old, neutered male Brazilian Shorthair cat, weighing 5.2 kg, was presented to a private veterinary clinic with a complaint of a dark spot in the left cornea, reported by the owner to have been present for approximately 2 months with progressive enlargement. Ophthalmic examination revealed a paracentral amber-colored lesion, typical of corneal sequestrum, without additional ocular clinical signs such as pain, blepharospasm, or epiphora. Initial management included topical treatment with lubricating, antibiotic, and anti-inflammatory eye drops. Following complementary exams and systemic stability assessment, the patient underwent a superficial lamellar keratectomy, followed by placement of a third eyelid flap, aiming to provide mechanical protection to the cornea and promote epithelial regeneration. Postoperative care maintained topical therapy, with the addition of oral dipyrone for analgesia and use of an Elizabethan collar. Seven days after surgery, complete healing of the surgical wound was observed, with no signs of pain, inflammation, or other ocular complications. Follow-up over 6 months showed no recurrence of the condition, confirming the treatment's effectiveness.

Discussion: Although corneal sequestrum is more prevalent in brachycephalic breeds, it can also affect cats of other breeds, as demonstrated in this case involving a Brazilian Shorthair. The unilateral presentation, absence of additional clinical signs, and the lighter amber color of the lesion suggested a less aggressive form of the disease, allowing for favorable surgical planning and prognosis. Superficial lamellar keratectomy is considered the treatment of choice in advanced cases, as it enables effective removal of necrotic tissue, reduces recurrence rates, and facilitates faster functional recovery of the cornea. The association with a third eyelid flap, though subject to debate due to challenges in monitoring healing and applying topical medications, has shown benefits in providing physical protection to the cornea, stabilizing the tear film, and reducing exposure to irritants. The satisfactory clinical outcome in this case reinforces the applicability of this combined approach in managing corneal sequestrum in cats, even in breeds with lower predisposition. This case report contributes to the expanding body of clinical and therapeutic knowledge on the condition, emphasizing the importance of early intervention, appropriate surgical planning, and close postoperative follow-up in preserving ocular health in small animals.

Keywords: necrotizing keratitis, cornea, third eyelid flap, veterinary ophthalmology.

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INTRODUCTION

Veterinary ophthalmology has seen significant progress, with the development of advanced surgical and therapeutic techniques to preserve and restore ocular health in animals. Among the ophthalmic conditions affecting felines, corneal sequestrum is notable for its relatively high prevalence and potential to cause visual impairment. This condition is characterized by necrosis of stromal collagen, appearing as a pigmented corneal plaque. The pigmentation may vary from light amber to deep black, depending on the lesion's severity and progression [13]. Without proper treatment, it can lead to corneal perforation and serious ocular complications [1,10].

Although the exact etiology remains not fully understood, it is often associated with chronic corneal irritation, ulceration, ulcerative keratitis, and tear film disorders [7,11]. Brachycephalic breeds are at higher risk due to their exophthalmic eye conformation [3,14], though cases are also reported in non-brachycephalic cats [6,8].

Treatment strategies depend on the depth and extent of the lesion. In more severe cases, superficial lamellar keratectomy combined with a third eyelid flap is commonly adopted, given its effectiveness in promoting ocular healing and low recurrence rate [6,17].

Given this context, this report describes the case of a Brazilian Shorthair cat diagnosed with unilateral corneal sequestrum, treated with superficial lamellar keratectomy and a third eyelid flap. A detailed account of the surgical procedure and postoperative management is provided, aiming to contribute to current literature and emphasize the importance of a tailored therapeutic approach to ensure optimal recovery in affected patients.

CASE

A 10-year-old, neutered male Brazilian Shorthair cat weighing 5.2 kg was presented with a progressive amber-colored corneal lesion in the left eye, 1st noticed approximately 2 months prior. Over this period, the lesion had gradually increased in size. Notably, the cat did not exhibit any signs of ocular discomfort, such as discharge, conjunctival hyperemia, pruritus, or blepharospasm. According to the medical history, the animal had developed a corneal ulcer in the same eye approximately 2 years earlier, which was managed conservatively.

On general physical examination, the patient was found to be well hydrated, with normally pigmented oral and ocular mucous membranes, a capillary refill time (CRT) of 2 s, and a body temperature of 39°C. No oculonasal discharge was observed at the time of evaluation.

On ophthalmic examination, the right eye exhibited a weak direct pupillary light reflex and a positive menace response. Intraocular pressure, measured using a tonometer, was 21 mmHg. The anterior chamber showed no significant alterations, and the lens demonstrated signs of nuclear sclerosis. Visualization of the fundus and vitreous humor was limited due to partial obstruction by the third eyelid. However, a reflective area was noted, suggesting the presence of inactive chorioretinitis.

In the left eye, where the amber-colored lesion was located, a similarly weak direct pupillary light reflex and a positive menace response were observed. Intraocular pressure was measured at 24 mmHg. A paracentral amber corneal lesion, consistent with corneal sequestrum, was clearly visualized. No other significant abnormalities were detected in the anterior chamber, aside from the presence of keratic precipitates and lens sclerosis. The fluorescein test was negative for corneal ulcers in both eyes, effectively ruling out active ulcerative lesions (Figure 1).

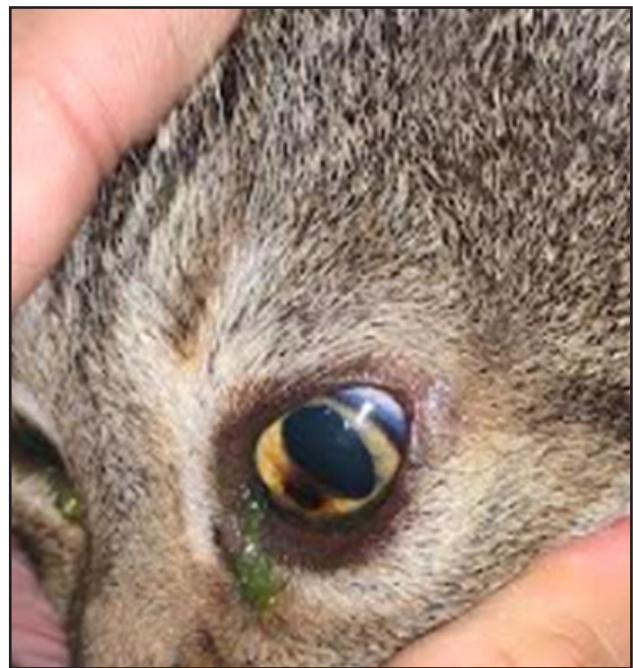


Figure 1. Cat with corneal sequestrum prior to surgical intervention, showing a paracentral amber-colored lesion in the left cornea. Fluorescein staining confirmed the absence of corneal ulceration.

Based on the clinical findings and patient history, a diagnosis of corneal sequestrum in the left eye was established. Consequently, surgical intervention was recommended, specifically superficial lamellar keratectomy with coverage using the nictitating membrane.

While awaiting surgery, the patient was placed on supportive medical therapy involving topical ophthalmic medications in the left eye to maintain hydration and lubrication. The prescribed regimen included Hyabak^{®1} [1 drop, 4 times daily], Tobrex^{®2} [1 drop, 4 times daily], and Still^{®3} [1 drop, twice daily], with a minimum interval of 6 min between each application. Additionally, the use of an Elizabethan collar was advised to prevent self-inflicted ocular trauma.

Preoperative evaluations were conducted, including a complete blood count, a biochemical profile (urea, creatinine, albumin, alanine aminotransferase, and alkaline phosphatase), electrocardiogram, and Doppler echocardiography. All parameters were within the normal reference ranges for the species, with the exception of a mild hyperproteinemia (9.2 g/dL) and slightly lipemic serum.

The animal was placed under general anesthesia and positioned in right lateral recumbency for the surgical procedure. Following antisepsis of the periorcular region with a diluted iodine solution

(1:50) and irrigation of the corneal surface with sterile saline, the surgery commenced using an ophthalmic lid speculum to maintain adequate exposure.

The surgical technique involved the creation of quadrangular incisions in the corneal epithelium using an ophthalmic scalpel (Figure 2A), extending into the superficial stroma to allow careful excision of the necrotic tissue (Figure 2B). Subsequently, a conjunctival flap was created by apposing the bulbar conjunctiva to the nictitating membrane using simple interrupted sutures (Figure 2C). A 5-0 monofilament nylon suture was employed to provide structural support and protection to the cornea, thereby promoting optimal healing.

Postoperative management included the continuation of the previously prescribed ophthalmic medications. In addition, dipyrone⁴ [Dipyrone drops[®] - 25 mg/kg, PO, once daily for 3 days] to provide analgesia. Emphasis was placed on maintaining the use of the Elizabethan collar and strictly adhering to the prescribed intervals between eye drop applications.

The patient was re-evaluated 7 days after surgery. At that time, the surgical wound was observed to be fully healed, with no signs of ocular discomfort. The sutures were removed (Figure 3), and the owner was advised to continue with the prescribed postoperative care regimen.

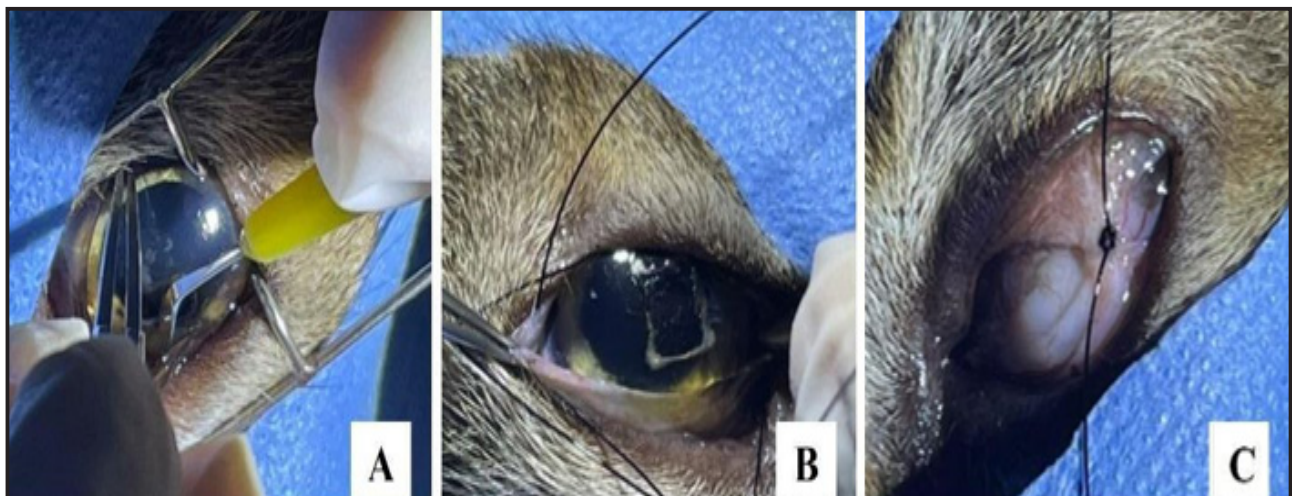


Figure 2. Ophthalmic procedure involving superficial lamellar keratectomy and third eyelid flap for the treatment of corneal sequestrum in a cat. A- Exposure of the surgical field using an ophthalmic eyelid speculum. B- Quadrangular incisions made to excise the affected corneal region. C- Third eyelid flap sutured over the cornea to provide postoperative protection.



Figure 3. Clinical appearance of the left eye 7 days after superficial lamellar keratectomy and third eyelid flap, showing favorable healing progression with no signs of inflammation or ocular discomfort.

DISCUSSION

Feline corneal sequestrum, although its etiology and pathogenesis are not yet fully elucidated, is a relatively common ocular condition in cats, particularly among brachycephalic breeds such as Persians and Himalayans [7,13]. It is recognized as the 2nd most prevalent corneal lesion in felines, accounting for 14.8% of 477 cats diagnosed with keratopathies [6].

Due to their distinct anatomical conformation, brachycephalic breeds exhibit greater susceptibility, comprising approximately 70 to 90% of reported cases. In contrast, domestic shorthair cats account for about 10 to 20% of the occurrences [5,7,14]. Although the patient described in this report belongs to the Brazilian Shorthair breed, which is generally associated with a lower prevalence, the presence of corneal sequestrum in this case highlights the importance of considering this condition across all feline breeds, regardless of their anatomical predisposition.

The study by Multari *et al.* [14] reported no apparent predisposition for age or sex in cases of feline corneal sequestrum, affecting cats between 8 months and 15 years of age, with a prevalence of 70% observed in individuals under 6 years old. Although the patient in the present case was 10 years old, the literature

indicates that younger animals are more commonly affected, underscoring the need to consider this condition across all age groups.

The paracentral amber-colored lesion observed in this patient is characteristic of corneal sequestrum [13], which most frequently develops in the central or paracentral region of the cornea, but may also present in the superotemporal, superonasal, or inferonasal quadrants [12]. Unilateral presentation, as observed in this case, is consistent with most documented occurrences, except in brachycephalic breeds, where bilateral involvement may be more frequent due to exophthalmic eye conformation [6,7].

Additional clinical signs such as blepharospasm, epiphora, and conjunctival hyperemia are commonly associated with corneal sequestrum [1,7]. However, in the present case, the absence of these signs suggests that the corneal epithelium remained intact, likely minimizing the patient's discomfort. The chronic nature of the lesion appears to have resulted in a lighter pigmentation of the necrotic plaque, which may be indicative of a less severe form of the condition [13].

Despite a clear clinical diagnosis, differential diagnoses should include corneal foreign bodies, dermoids, and limbal melanomas, among others [11]. Comprehensive ophthalmic examinations are essential to identify predisposing factors such as keratitis, corneal ulcers, and tear film abnormalities, which are known conditions that increase the risk of corneal sequestrum [1,7,10].

In this case, the diagnosis was confirmed through direct observation of the amber-colored lesion, with no other significant abnormalities detected in the complementary examinations. The presence of inactive chorioretinitis in the contralateral eye may suggest a possible infection by *Toxoplasma gondii*, a pathogen previously associated with corneal sequestrum in the literature [2]. Studies such as that of Cullen *et al.* [3] have demonstrated the presence of *T. gondii* DNA in affected corneal tissues, suggesting a possible pathogenic role, although it remains unclear whether the parasite acts as a primary or secondary agent [9].

Therapeutic decision-making should take into account both the degree of corneal involvement and the clinical signs presented by the patient. In this case, although no signs of ocular pain were observed, superficial lamellar keratectomy was elected as the treatment of choice, in conjunction with pharmacologi-

cal management. This approach was selected based on evidence indicating that conservative treatment tends to have low efficacy, with a high recurrence rate and slow resolution of the necrotic plaque [1,15].

While conservative therapy may be effective in certain cases - with recovery periods ranging from 1 to 12 months [4] - keratectomy is generally preferred when aiming for a faster recovery and reduced recurrence risk [1,14]. In the present case, superficial lamellar keratectomy was successfully performed, allowing for complete lesion removal and a favorable postoperative outcome.

The use of a nictitating membrane flap was selected to provide additional protection to the cornea. Although the application of the third eyelid flap remains a topic of debate, primarily due to challenges in monitoring wound healing and reduced penetration of topical medications [16], this technique has shown effectiveness by promoting rapid corneal healing and reducing the risk of recurrence [5,17].

Postoperative management included the administration of topical antibiotics, artificial tears, and analgesics, in accordance with recommendations from the literature. An Elizabethan collar was also used to prevent self-inflicted ocular trauma [7,10]. The patient

responded well to treatment, with complete wound healing observed within 7 days and no signs of pain or discomfort.

In summary, this case report highlights the effectiveness of combining superficial lamellar keratectomy with a third eyelid flap, supported by adjunct pharmacological therapy, in the treatment of corneal sequestrum in a Brazilian Shorthair cat. The outcomes reinforce the viability of this surgical approach as a promising therapeutic option for preserving corneal integrity and preventing severe complications, such as corneal perforation. The patient's satisfactory recovery and absence of recurrence after six months underscore the potential of this treatment to restore ocular health and maintain quality of life in affected animals.

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