

Isolated ocular injury due to spitting cobra's venom

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ABSTRACT

Some species of venomous snakes spit venom in human eyes as a defence mechanism when threatened. If not detected and treated appropriately early, this can result in severe toxic ocular injury leading to potential blindness (snake venom ophthalmia). Not much is known of the clinical course and treatment guidelines due to the rarity of such occurrences. We present a case of isolated severe toxic ocular injury in one eye who reported to us with very poor vision following venom spit, which was promptly treated leading to a successful visual recovery. This is the first documented case of snake venom ophthalmia from Kuala Belait, Brunei Darussalam.

Keywords: Spitting cobras, snake venoms, corneal opacity, blindness

INTRODUCTION

Snakes bite when threatened. Some poisonous snakes such as the African spitting cobra (*Naja nigricollis*),¹⁻⁴ Elapid (genera *Naja* and *Hemachatus*),^{5,6} Crotaline viperoids,⁵ and Western diamond back Rattle snakes⁷ spray venom onto eyes as defence.^{5,8-10} Pure ocular injuries exclusively due to the spit of snake venom are rare.^{3,4,10} These cause severely painful^{5,10-12} and potentially blinding ocular envenoming (venom ophthalmia) allowing the snake to escape.³⁻⁵ Cobras can both bite and spit venom.¹³ Not much is

known about the clinical course and treatment guidelines due to the rarity of such human occurrences given that such incidents are restricted to areas where such snakes are prevalent.⁵ Furthermore, any delay or lack of appropriate and timely treatment may result in corneal damage, opacity, hypopyon, and/or blindness.^{1,2,4,5} We present a case of pure ocular injury secondary to a spitting cobra's venom which was promptly treated at our hospital. This is the first reported case in our district of isolated venom ophthalmia and its successful treatment.

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CASE REPORT

A 62-year-old local Malay man presented to the Casualty Department complaining of pain,

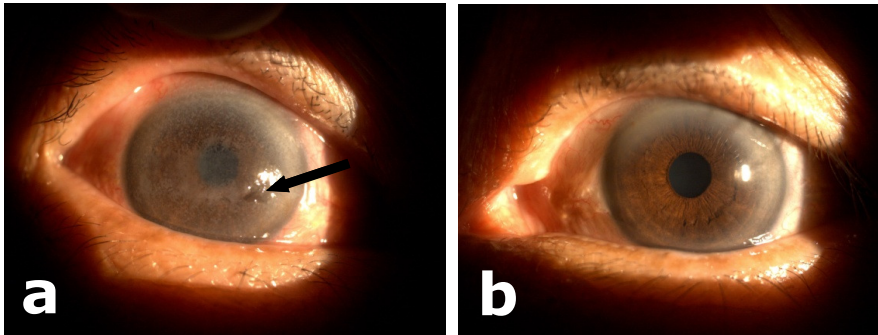


Fig. 1: a) Anterior segment colour photograph of the right eye (at presentation) showing evidence of acute necrosis of the corneal epithelium (black arrow) and widespread epithelial damage. Anterior segment details are not clear. Fig. 1; b) Anterior segment colour photograph of the unaffected left eye showing clear anterior segment.

irritation, severe burning sensation and blurring of vision in his right eye (RE). Apparently, while gardening without any protective eye wear, he stumbled upon a black cobra at close range. When challenged, it raised its hood and suddenly spat venom into his RE. The victim was familiar with snake morphology and hence promptly identified the snake as a cobra. It was about three feet long and about three feet away from the victim when it spat venom. He was immediately rushed to the hospital.

Upon evaluation, his vitals were stable. There were no adnexial inflammatory signs. His RE vision was counting fingers at two metres and his Left eye (LE) vision was 6/9 (Pin hole). His intraocular pressures were digitally normal in both eyes (BE). The RE cornea was hazy (Figure 1a). Fluorescein staining of the right cornea was positive revealing epithelial damage. There was evidence of toxic necrosis of the corneal epithelium with circumciliary and conjunctival congestion. There was no chemosis, limbal ischaemia or necrosis. Due to the corneal haze, his anterior chamber and fundus details were

not clear. LE evaluation was normal (Figure 1b). Extra-ocular movements and convergence were intact. There was no associated cranial nerve palsy. Systemic evaluation was normal.

His eyes were immediately irrigated with balance salt solution (BSS, Alcon) for approximately 20 minutes. Blood investigations including coagulation profile and renal profiles were normal. He was admitted to the medical ward for observation and treatment of possible effects of systemic absorption. He was treated with topical antibiotic (G. Ciprofloxacin) eye drops six times daily, anti-inflammatory drops (G. Dexamethasone with neomycin and polymyxin B sulphate) four times daily, cycloplegics (G. Homatropine 2%) twice daily, intraocular pressure lowering agents (G. Timolol Maleate 0.5 %) twice daily and Tetracycline eye ointment twice daily to his RE.

As there were no signs of systemic venom absorption and normal blood parameters, the patient was discharged and continued on topical medications in his RE.

On clinic review, he was asymptomatic five days after starting the treatment. The RE vision improved to 6/7.5 with clear cornea, negative fluorescein staining and no conjunctival congestion (Figure 2). The left LE examination remained the same. His topical medications were tapered, and he was asked to attend for follow-up periodically to monitor for any late sequelae.

DISCUSSION

Pure snake venom ophthalmia is rare and is often restricted to regions where these snakes are found.^{3, 4, 10} Even then, such occurrence is considered uncommon. PubMed search revealed several reports from the Southeast Asian region.^{8, 10, 11} To our knowledge, there had only been one reported case of snake venom ophthalmia from Brunei Darussalam. This was a case of a 40-year-old man who was treated with copious irrigation and topical antibiotic.¹⁴ Our case is the first reported case from Kuala Belait which differed from the reported literature in that the patient did not have any soft tissue inflammation, necrosis or facial nerve palsy.⁵

Spitting snakes maximise damage by spraying the venom on the victims face tar-

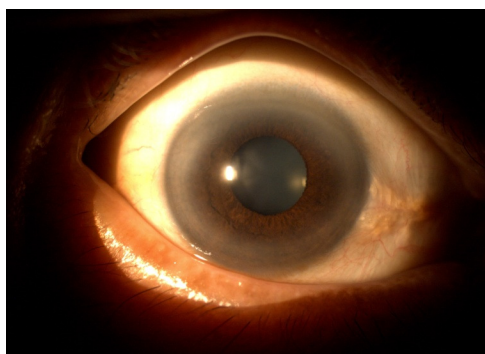


Fig. 2: Anterior segment photograph of the affected eye showing complete healing of the corneal epithelium and the anterior segment details are now clear (after five days of treatment).

geting their eyes by fast undulating head movements while spewing the venom, thereby increasing the coverage area.⁸ When the spit snake's venom comes in contact with the ocular structures, local inflammatory responses like periocular soft tissue swelling,^{1, 2, 9, 10} local necrosis,²⁻⁵ conjunctival erythema,^{4, 11} chemosis,^{2, 6} corneal oedema,² epithelial erosion^{2, 11}, corneal ulcer,^{3, 4} anterior uveitis,⁴ hypopyon,⁵ and subsequent corneal scarring occur which could result in permanent blindness.^{2, 4, 9} Our patient had pain, irritation and conjunctival congestion with evidence of corneal epithelial toxic necrosis in the RE (Figure 1).

The local damage caused by the venom is due to cytotoxins⁴ and cardiotoxins⁶ which could cause corneal opacification and blindness.¹⁵ The local corneal changes are due to histamine, acetylcholine, and endogenous corneal damaging factors.² Systemic envenoming following local spit has not been reported in humans.⁵ Cobra venom can cause blindness also by biting, causing bilateral optic neuritis and cortical blindness.¹³ The mainstay of venom ophthalmia treatment is prompt, copious and continuous irrigation with fluids.^{1, 3-5, 7, 12} In addition, topical antibiotics⁴⁻⁶, topical heparin^{2, 6, 9, 10}, and cycloplegics⁵, have been recommended. The role of topical anti-snake venoms is controversial. Some studies favour it^{9, 11} while others did not find any benefit.⁵ The use of steroids has not been routinely recommended.^{2, 5} While one study did not recommend topical steroids and tetracycline ophthalmic ointment based on a rabbit model⁹, another study recommended tetracycline ophthalmic ointment as it had been found to reduce the extent of corneal scarring in humans.⁶ Our case was

treated in accordance with reported literature by copious and continuous irrigation of the eye.^{1, 3-5, 7, 12} Since we could not rule out any occult intraocular inflammation due to impaired visualisation secondary to corneal changes, cycloplegics (G. Homatropine 2% BD) and topical steroids-antibiotic eye drops (G. neomycin sulphate equivalent to neomycin 3.5mg, polymyxin B sulphate 10,000 units, dexamethasone 0.1% QID) were instilled. In addition, topical antibiotic drops (G. Ciprofloxacin six times a day) and tetracycline eye ointment⁶ BD were administered. Intraocular pressure lowering medication (G. timolol Maleate 0.5 % BD) was added to control any possible secondary post inflammatory intraocular pressure spike. Topical heparin drops and anti-snake venom were not used in this patient.

We report this case in view of its rarity and unique presentation, and to highlight the importance of systematic evaluation and prompt referral. A timely and properly performed continuous irrigation removes the maximal toxic load from the eye and reduces the ocular complications.

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