

A 49-YEAR-OLD MALE PRIVATE SNAKE KEEPER WITH VENOM-SPIT OPHTHALMIA



Author: H. Joseph Pittman, RN, Trinity, FL

CE Earn Up to 8.0 Hours. See page 727.

Contribution to Emergency Nursing Practice

- The current literature on venom-spit ophthalmia indicates that it is well documented in regions native to spitting cobras, but to the knowledge of the author, it is poorly documented in US medical literature.
- This article notes that, with the growing popularity of private ownership of these exotic snakes, there is an increasing potential for emergency nurses to encounter cases of venom-spit ophthalmia as well as actual exotic envenomations.
- Key implications for emergency nursing practice found in this article are that rapid identification, assessment, and initiation of treatment with copious irrigation of the eyes are imperative to preventing severe or permanent ocular injury.

A 49-year-old man arrives in the emergency department via ambulance with a complaint of bilateral eye pain and blurred vision after being struck in the eyes with venom from his pet African spitting cobra (*Naja nigricollis*) (Figure).

The patient is a private snake keeper who owns a variety of exotic snakes not native to the United States. While cleaning enclosures, he neglected to wear his protective face shield and reached in to change a water dish, when the cobra hooded up and “spat” venom into his face. Within seconds, he experienced severe pain, blurred vision, and watering of his eyes. He immediately attempted to flush his eyes under running tap water without relief and called

emergency medical services for transport to the emergency department.

On examination, he was noted to have blepharospasm, redness, tearing, and bilateral periorbital edema. Visual acuity in both eyes was 20/100, and a Wood’s lamp examination with fluorescein dye revealed epithelial damage including evidence of necrosis, conjunctival congestion, and corneal hazing. His extraocular movements were intact, and intraocular pressure was 15 mm Hg (normal: <20 mm Hg) in each eye.

His eyes were immediately irrigated with 0.9% normal saline solution for 30 minutes. Tetracaine drops were instilled into each eye, and his visual acuity reassessed, showing improvement to 20/40 in both eyes. He was treated with tetracycline ointment twice daily, ciprofloxacin drops 6 times daily, cycloplegic drops (homatropine 2%) twice daily, and hydrocodone/acetaminophen 5/500, 1 tablet every 6 hours, as needed for pain. He was discharged with instructions to wear sunglasses when outside and referred to ophthalmology for follow-up.

There are more than 20 species of cobra (*Naja* and *Hemachatus* genera), which are easily identified by their characteristic hood. They are found throughout Africa and Asia from western Asia through the Philippines and China but are not native to Japan. In the United States, cobras were once only available to zoos and scientific institutions, but the exotic pet trade has increased their availability to private collectors. The lethality of cobra bites is well documented in the medical literature owing to the neurotoxicity of their venom, but some species known as spitting cobras are capable of forcefully ejecting venom from their fangs into the eyes of predators, allowing the snake to escape (Table). Although this behavior has been described in some native crotaline species such as the Western Diamondback rattlesnake (*Crotalus atrox*), spitting cobras are capable of targeting and spitting venom accurately up to distances of 3 meters.¹⁻³

Spitting cobra venom contains a complex mixture of neurotoxins, phospholipases, cytotoxins, and cardiotoxins.^{1,2,4} Local damage is caused by the cardiotoxins and cytotoxins that, upon coming in contact with ocular structures, cause periorbital soft-tissue swelling, local necrosis, conjunctival redness and edema, epithelial erosion,

H. Joseph Pittman, *Member, Tampa Chapter*, is Director, Florida Snakebite Institute, Emergency Department, Medical Center of Trinity, Trinity, FL.

For correspondence, write: H. Joseph Pittman, RN, 18106 Lembrecht Way, Tampa, FL 33647; E-mail: traumajunkiejoe@Juno.com.

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FIGURE
African or black-necked spitting cobra.

corneal ulceration, chemosis, hypopyon, anterior uveitis, and—potentially—permanent blindness.¹⁻⁴

The patient experienced spasm, severe pain, periorbital edema, conjunctival congestion, and diminished vision due to epithelial erosion and toxic necrosis. This type of envenomation is referred to as venom-spit ophthalmia or snake-venom ophthalmia. At 72 hours after injury, the patient was asymptomatic, his visual acuity was improved, and results of the slit-lamp examination were negative.

Because the venom also contains enzymes, ocular damage is increased with prolonged contact. Decontamination is the mainstay of treatment, and the eyes should immediately be continuously irrigated with copious amounts of water or saline solution.¹⁻⁶ Application of soothing liquids, such as milk or even beer, in the eyes have been reported to provide some relief, but are not recommended as the standard of care.^{1,2,5}

A detailed examination of the affected eyes should include testing for visual acuity, intraocular pressure,

and slit-lamp examination with fluorescein staining to assess corneal damage. Despite the fact that systemic envenomation caused by venom ophthalmia has not been documented, spitting cobras can bite, and patients should be assessed for fang marks that may be ignored because of distracting eye pain.^{2,4} Pain may be controlled using vasoconstrictor drops with weak mydriatic activity (eg, EPINEPHrine) and limited administration of anesthetic ophthalmic drops (eg, tetracaine). Topical cycloplegic drops (eg, homatropine) can be used to prevent posterior synechiae, ciliary spasm, and discomfort. In cases of increased intraocular pressures, pressure-lowering medications (eg, timolol maleate 0.5%) should be considered. Prophylactic antibiotic drops (eg, ciprofloxacin) should be instilled to prevent secondary keratitis and infection in the presence of corneal injury.¹⁻⁶ Tetracycline ophthalmic ointment has been shown to bind with the cardiotoxins, rendering them inactive and reducing the extent of corneal scarring.^{1,3-5}

The use of topical corticosteroids is not recommended because of possible increased corneal damage caused by enhanced collagenase activity during administration.¹⁻³ The use of intravenous antivenin has no role in treatment in the absence of systemic envenomation, and ophthalmic instillation of antivenin may cause increased local irritation and is contraindicated.^{1-3,5,6}

Discharge instructions should include information on eye protection, administration of medication, and referral to ophthalmology for follow-up. Most cases usually resolve without complications within 24 to 72 hours.²

Venom-spit ophthalmia is rare, even in regions where cobras are indigenous, but the exotic pet trade and private snake collectors make this a potentially more common envenomation facing US emergency departments.^{2,4} Timely and proper irrigation effectively removes venom, reduces damage, and provides effective first aid. Proper medication administration and compliance addresses pain, prevention of infection, and promotes healing. Ophthalmology

TABLE

Spitting cobra species

African spitting cobras

Black-necked spitting cobra (*Naja nigricollis*)
Mozambique spitting cobra (*Naja mossambica*)
Nubian spitting cobra (*Naja nubiae*)
Red spitting cobra (*Naja pallida*)
West African spitting cobra (*Naja katiensis*)
Rinkals cobra (*Hemachatus haemachatus*)

Asian spitting cobras

Chinese spitting cobra (*Naja atra*)
Javan spitting cobra (*Naja sputatrix*)
Mandalay spitting cobra (*Naja mandalayensis*)
Philippine spitting cobra (*Naja philippinensis*)
Samar spitting cobra (*Naja samarensis*)
Sumatran spitting cobra (*Naja sumatrana*)
Thai spitting cobra (*Naja siamensis*)

consultation and follow-up ensures continued management of this unique ocular injury.

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