Title – OCULAR SNAKE-BITE INJURY: SUXAMETHONIUM REVISITED

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Abstract

Eye and facial injuries from captive snakes are rare and can be devastating, often requiring urgent surgical management. We report a case of a patient with facio-ocular injuries due to Python molurus snakebite. The snake had caused a full thickness injury to his left globe which required exploration under a rapid sequence general anaesthesia. This case report describes the management of an open eye injury where suxamethonium was used after a risk benefit analysis in the given clinical setting.

Keywords – snake bite, suxamethonium, intraocular pressure, open eye injury
OCULAR SNAKE-BITE INJURY: SUXAMETHONIUM REVISITED

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Introduction

Injuries from animal bites pose an occupational health risk for animal handlers. Penetrating injury to the eye from snakebites is rare with very few cases reported in literature. The management of such injuries often poses medical, surgical and anaesthetic challenges. This case report describes the management of an unusual perforating eye injury in the emergency setting and visits the debate surrounding the use of suxamethonium.

Case report

A 26 yr old reptile carer employed by a safari park, weighing 75 Kg presented to our institution with a snake bite injury to his face and eyes caused by a python snake. The snake had grabbed the patient’s face with its jaws. The upper jaw had caused lacerations to the left side of the face and the lower jaw to the right side. The patient had suffered a full thickness corneo-scleral perforation to the left eye resulting in an anterior hyphaema. He also had multiple superficial lacerations to both the eyelids. The patient was scheduled for an emergency exploration of the eyes under general anaesthesia. Intravenous ceftriaxone was commenced as a prophylaxis against atypical salmonella infection and meningitis. The injury had occurred after a full meal and the patient had complained of nausea hence a rapid sequence induction was undertaken. On examination of the patients’ airway, mouth opening was adequate with a Mallampati grade 2 and a thyromental distance of more than 6 cms. Following preoxygenation and cricoid pressure, anaesthesia was induced with a slow bolus of 75 micrograms of remifentanil and 500mg of thiopentone sodium. Suxamethonium 100mg
was used to facilitate endotracheal intubation with a south facing RAE endotracheal tube. A remifentanil infusion 0.1µg/kg/min was commenced. Anaesthesia was maintained with a mixture of oxygen in air and isoflurane and 30mg of rocuronium administered to maintain muscle relaxation. Intravenous paracetamol (1g) and diclofenac (75mg) were administered to aid postoperative analgesia.

The surgery lasted for 1 hour 45 minutes. The surgical procedure consisted of repair of a full thickness corneo-scleral injury and washout of the hyphaema of the left eye. The residual neuromuscular block was reversed with neostigmine 2.5mg and glycopyrrolate 0.5mg. The anaesthetic, extubation and recovery were essentially uneventful.

On the second postoperative day, a routine indirect ophthalmoscopy revealed a small full thickness scleral perforation with localized retinal tear in the left eye. This injury was separate to the original laceration and correlated to a tooth mark caused by the snake bite. There was no vitreous expulsion noted and the tear was repaired by argon laser retinopexy under topical anaesthesia.

Intravenous ceftriaxone was continued for a week along with topical eye drops of ofloxacin 0.3%, betamethasone 0.1% cyclopentolate 1%. The patient made good visual recovery subsequent to the laser retinopexy and was discharged home after one week.

**Discussion**

Penetrating eye injuries are rare following animal or snake attacks. The non-venomous snakes such as pythons and boas kill their prey by wrapping themselves around the victim’s body or asphyxiating them by grabbing the face. The python molurus species have sharp recurved teeth and bites from this result in deep penetrating injuries. Captive snakes’ teeth harbour various gram negative bacteria such as pseudomonas and klebsiella.¹ Severe
infections result from these bites and prophylactic use of broad spectrum antibiotics is recommended.

Venomous snakes on the other hand have various types of venoms which if swallowed do not pose a risk but when injected causes local as well as systemic symptoms. Neurotoxin in the venom affects extraocular muscles. Injection of the venom to the eye such as from a spitting cobra leads to ‘snake venom spit ophthalmia’ which is manifested by severe pain, conjunctivitis, corneal ulcerations, secondary infection and eventual blindness. Fortunately our patient was bitten by a non venomous snake and was spared serious ocular and systemic sequel.

As far as use of suxamethonium for rapid sequence induction is concerned, it was done to facilitate a rapid sequence intubation of the trachea. The patient had presented with a high risk of gastro-oesophageal reflux as he had sustained the injury soon after a meal and had been feeling nauseous preoperatively. Although examination of his airway did not reveal an anticipated difficult intubation, suxamethonium was chosen as the agent for rapid sequence intubation for its speed of onset and spontaneous reversibility.

Suxamethonium is well known to cause increase in intraocular pressure (IOP) which can potentially lead to loss of vitreous humour if there is an open eye injury. Under normal circumstances, the IOP ranges between 10-20 mmHg. Studies have demonstrated that IOP increases at 1 min following an intravenous injection of suxamethonium with a maximum effect at 2-4 min and return to baseline at 6 min. Ocular extrusions occurring secondary to the use of suxamethonium has always been a theoretical concern but interestingly, there are no published report of this particular adverse effect occurring in literature. This sudden but brief increase in IOP can be modified pharmacologically by using various sedatives and opioids, or pretreatment with a small dose of non depolarizing agent thus minimizing the risk
of expulsion of vitreous contents in an open eye. A retrospective review of 100 patients with open eye injury patients failed to reveal any evidence of vitreous expulsion following suxamethonium usage.\textsuperscript{5} Factors such as rubbing or forceful blinking of the eye, crying, coughing, vomiting and valsalva maneuver on the other hand are shown to be more risky.\textsuperscript{6,7}

Another retrospective study of 8 cases of open eye surgery by Chidiac when suxamethonium was used for rapid sequence anaesthesia failed to report any cases of vitreous expulsion or any additional ocular problems. These patients were pretreated with opioids, lignocaine, thiopentone or propofol to attenuate the rise in intraocular pressure which is caused by suxamethonium.\textsuperscript{8}

It is interesting to note that overall visual outcome of our patient was not adversely affected despite severe globe injury and usage of suxamethonium. It is noteworthy that this patient had a second penetrating injury which was not discovered until the first postoperative day. Use of suxamethonium for the first anaesthetic had not led to any secondary damage which demonstrates that the IOP increase and visual loss are perhaps overestimated. It is possible that a combined use of thiopentone and remifentanil for induction mitigated the rise in the IOP in our patient and smooth induction and emergence helped prevent complications. Rocuronium was considered but not used as the eye hospital is in a remote location and sugammadex was not available in our institution either, otherwise high initial dosage of rocuronium would have been a suitable alternative for rapid sequence induction. In cases of “can’t intubate, can’t ventilate” suxamethonium is still the ideal option if sugammadex in not available to terminate muscle paralysis after rocuronium.
Conflict of Interest – None

REFERENCES


