Neurotoxic Envenoming Following Bites by the Malayan Krait *(Bungarus candidus)*

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Abstract

The author reports three cases of patient bitten by the Malayan krait *(Bungarus candidus).* Within two to six hours after bites, patients developed ptosis, ophthalmoplegia, dysarthria, dysphagia and generalized paralysis requiring assisted ventilation. After ventilatory support and other supportive treatments, all patients gradually recovered to normal activity.

Key word : Neurotoxic Envenoming, The Malayan Krait *(Bungarus Candidus)*

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In Thailand, neurotoxic venomous snakes of medical importance include cobras and kraits[1]. Cobra bites are reported more frequently than bites by other neurotoxic snakes[2,3]. The Malayan krait *(Bungarus candidus)* is common in South-East Asia, but there is only one published clinical report of bites by this species[4]. In this paper, the author reports the clinical features and management experience in three patients bitten by *B. candidus.*

CASE REPORT

Case 1

A 41-year-old Thai monk was bitten on the left finger at 11 pm while sleeping in his room. The snake was *B. candidus.* He was taken to Chon Buri Hospital within half an hour. Six hours after admission he had bilateral ptosis, blurred vision, dysarthria, and dysphagia. He was transferred to the intensive care unit where he was intubated and ventilated with mechanical ventilator.

Physical examination revealed two fang marks on the left little finger with minimal local swelling. He was fully conscious and could move his limbs sluggishly. He had bilateral ptosis and ophthalmoplegia. Pupillary responses were normal.

Because antivenom for *B. candidus* was not available, the patient was treated supportively with intravenous fluid and mechanical ventilator. Paren-

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teral antibiotics was given to treat nosocomial pneumonia related to the use of mechanical ventilator. He gradually improved and was ventilated for four days.

Case 2

A 62-year-old woman was bitten on the left leg at 8 pm, while lying in her wooden house. The dead snake brought by the relatives was identified as *B. candidus*. She was taken to the local hospital within two hours, during which she developed bilateral ptosis, dysarthria and dysphagia. She was referred to Chon Buri Hospital.

Physical examination, six hours after the bite, revealed two fang marks on her left calf with minimal local swelling. The patient was fully conscious. She had bilateral ptosis and ophthalmoplegia. Pupillary responses were normal. There was generalized paresis of both upper and lower limbs. She was intubated and ventilated and transferred to the intensive care unit.

Because antivenom for *B. candidus* was not available, the patient was treated supportively with intravenous fluid and mechanical ventilator. Parenteral antibiotics and omeprazole were given to treat nosocomial pneumonia and upper gastrointestinal bleeding which developed during the course of treatment. She remained intubated and ventilated for eight days. All her symptoms and signs subsided over two weeks.

Case 3

A 22-year-old Thai male rubber-tapper was bitten on the left foot at 4 am. He inadvertently trod on snake in the dark and was bitten as he made his early morning round of the rubber trees. The dead snake brought by the patient was identified as *B. candidus*. Within two hours he was unble to open his eye lids. He was taken to the local hospital. On examination he had bilateral ptosis, dysarthria and dysphagia. Motor power grading was IV/V. Because of difficulty on breathing, he was intubated and ventilated manually.

On admission to Chon Buri Hospital, five hours after the bite, the patient was fully conscious. There were two fang marks on the dorsum of the left foot with minimal local swelling. He was transferred to the intensive care unit, during which he developed progressive weakness of the whole body. He had severe bilateral ptosis and ophthalmoplegia. Twenty-four hours later, his pupils were fixed and dilated. There was no response to the doll's -head maneuver. The attending physician suspected coma with irreversible anoxic brain damage. However, after careful evaluation, he responded with slight movements of his fingers and toes.

He was treated with intravenous fluid and mechanical ventilator. Antivenom for *B. candidus* was not available. Neostigmine 1 mg was administered intravenously without clinical improvement. Paren-

Table 1. Summary of clinical details in three patients envenomed by *Bungarus candidus*.

	Case 1	Case 2	Case 3
Age (yr)/Sex	41/M	62/F	22/M
Time of bite	11 pm	8 pm	4 am
Site of bite	finger	leg	foot
Interval between bite and hospital admission (h)	1/2	2	3
Swelling at site of bite	mild	mild	mild
Ptosis	+	+	+
Ophthalmoplegia	+	+	+
Dysphagia	+	+	+
Quadriparesis	+	+	+
Respiratory paralysis	+	+	+
Hyporeflexia	+	+	+
Fixed dilated pupils	-	-	+
Days on ventilator	4	9	25
Complications	Pneumonia	Pneumonia UGIB	Pneumonia UGIB

UGIB = upper gastrointestinal bleeding

teral antibiotics and omeprazole were given to treat nosocomial pneumonia and upper gastrointestinal bleeding which developed during the course of illness. Due to prolonged paralysis, tracheostomy was performed on the tenth hospital day. Ptosis and ophthalmoplegia recovered on day 10, and motor function recovered on day 18. He was ventilated for 25 days and gradually improved.

DISCUSSION

Cobras and kraits contain potent polypeptide toxins that act on the neuromuscular junction. Major component of these toxins are alpha-bungarotoxin and beta-bungarotoxin. Alpha-bungarotoxin produces a nondepolarizing block of the postsynaptic acetylcholine receptor. Beta-bungarotoxin inbibits release of acetylcholine from the presynaptic nerve terminal(5).

The clinical features of the three patients are stereotypical. Within six hours after bites, patients develop ptosis, diplopia, blurring of vision, dysarthria and dysphagia. These symptoms are followed by weakness affecting the upper and lower limbs, and by respiratory paralysis requiring assisted ventilation. In patients with generalized flaccid paralysis, slight movements of the digits may be possible, allowing the patients to signal that they are conscious. It is unlikely that neurotoxic venoms have any effect on the central nervous system in humans. Paralyzed patients are fully conscious unless they are hypoxemic from respiratory failure or hypotensive from circulatory failure. Generalized flaccid paralysis of the whole body with fixed dilated pupils may be misinterpreted as coma with irreversible anoxic brain damage.

B. candidus usually bites at night while the victims are asleep at home. The snake enters human dwellings at night in search of its prey (rodents, toads, lizards) and may strike at a sleeping person if startled(6). Because the venom produces negligible local effects, the patient may not even realize that they have been bitten or may not seek early medical treatment.

Although cobra bites are reported more frequently than krait bites, the incidence of *B. candidus* bites has probably been underestimated. In a study of 46 cases of fatal snakebites in Thailand, cobras and kraits were responsible for 26 deaths (*B. candidus* for 13, *Naja kaouthia* for 12, and *B. fasciatus* for 1). Major causes of death were respiratory failure and complications of prolonged mechanical ventilation(7).

Because antivenom for *B. candidus* is not available in Thailand, treatment is symptomatic and supportive. Endotracheal intubation should be performed at an early stage, when pooling of secretions in the pharynx becomes evident, before airway obstruction or repiratory arrest has developed. The patient can be ventilated manually with an anesthetic or Ambu bag or, preferably, with a mechanical ventilator. All effects of neurotoxic envenomation are fully reversible; therefore, artificical ventilation should always be attempted. The survival with complete recovery of these three patients illustrates the value of prolonged assisted ventilation, particularly when effective antivenom is not available. Factors contributing to good outcome in this series include: early hospital admission, early intubation and assisted ventilation, and full intensive care facilities.

Cholinesterase inhibitors have a variable but sometimes useful effect in some patients envenomed by some species of cobras and kraits(3,4,8). It is worth trying the drugs in all cases of severe neurotoxic envenoming.

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พิษต่อระบบประสาทในผู้ป่วยถูกงูทับสมิงคลากัด

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รายงานผู้ป่วยสามรายที่ถูกงูทับสมิงคลากัด หลังจากถูกกัดประมาณสองถึงหกชั่วโมง ผู้ป่วยทุกรายมีอาการหนังตาตก กล้ามเนื้อตาเป็นอัมพาต พูดไม่ชัด กลืนลำบาก และมีอาการอ่อนแรงทั่วไปจนต้องใช้เครื่องช่วยหายใจ ผู้ป่วยทุกรายได้รับการรักษาด้วยการใช้เครื่องช่วยหายใจและรักษาแบบประคับประคอง จนหายเป็นปกติดี

คำสำคัญ : พิษต่อระบบประสาท, งูทับสมิงคลา

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