

Morbidity After a Bite from a 'Non-Venomous' Pet Snake

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ABSTRACT

We report the first recorded case of morbidity from the bite of a red-neck keelback snake (*Rhabdophis subminiatus*) from South East Asia. This is a species of the Colubrid family which originated from South East Asia. Severe envenomation from this snake was reported as poisonous in the West as far back as 1978⁽¹⁾ but it is still being classified as non-venomous. This classification led our patient to keep this 'harmless' snake as a pet. We recommend that this snake be reclassified as 'venomous' or at least warnings be issued to the public not to keep it as a pet.

Keywords: non-venomous snake, pet snake, reptile

INTRODUCTION

The bite from a non-venomous snake is generally considered harmless to humans. We present the first reported case in South East Asia of a bite from a red-neck keelback (*Rhabdophis subminiatus*) that led to clinically significant morbidity. It is a snake widely distributed in South East Asia and is classified as 'non-venomous'.

There has been 4 previously reported cases⁽¹⁻⁴⁾ (all from the West) of morbidity arising from the bite of this snake.

Although the major morbidity associated with a non-venomous snake bite is from secondary infection, victims can develop major coagulopathies⁽⁵⁾.

CASE REPORT

Mr OPS, a 21-year-old student presented to the A & E Department two days after he was bitten on his left middle finger by his pet snake. The snake had held onto him for 2 minutes. Subsequently, he developed a swelling of his right knee, haemoptysis and bleeding from his gums and skin. On examination, the patient was noted to be bleeding from excoriated skin and had a swollen right knee. Abrasions were noted at the site of the bite. There were no other abnormalities. On admission, he was in disseminated intravascular coagulopathy (DIVC). His initial prothrombin time was > 60 seconds (control 12) and partial thromboplastin time > 120 seconds (control 27). His fibrinogen level was undetectable and the D-Dimer

was 2 µg/mL. He remained in DIVC for the next 14 days.

Consequently, he developed gross haematuria as well as haemorrhage in the right iliopsoas muscle. The latter resulted in weakness of his right leg, probably due to compression neuropathy. His haemoglobin level dropped from 15.5 gm to 8.8 gm (Table I). He was given 59 bags of fresh frozen plasma, 76 bags of cryoprecipitate and 2 units of packed red cells during hospitalisation.

He also developed a fever due to an infected haematoma on his left shin. This resolved after it was evacuated and a course of first generation cephalosporin was given.

He was able to ambulate upon discharge although he had not regained full power in his right hip. On his last review, his general condition had improved and his fibrinogen level had risen to 2.5 gm/L.

DISCUSSION

This case illustrates that a bite from a snake classified as 'non-venomous' is not necessarily associated with a benign course. In this case, the morbidity associated with the snake bite was predominantly that of coagulopathy with bleeding diathesis and associated complications. The main haematological defect was that of decrease fibrinogen in which the most appropriate treatment was cryoprecipitate.

The course of this case, although self-limiting, did lead to a debilitating clinical course for the patient. The treatment was mainly supportive and rehabilitation included intensive physiotherapy.

The snake was identified by an expert from the Singapore Zoological Gardens as a redneck keel-back (*Rhabdophis subminiatus*). It is classified as 'non-venomous' and is found locally. This is a colubrid snake (back-fanged snakes) which has no venom apparatus for injecting venom into its victims, but instead, its Duvernoy's glands secrete a mixture of coagulation enzymes into the saliva which is injected into the victim by grooved fangs.

There are various similarities between this case and the previously reported ones⁽¹⁻⁴⁾. All the patients thought that their pet snakes were 'non-venomous'. There was a history of the bite being prolonged in this case (the snake had held on to Mr OPS's finger for 2 minutes) as in Mather et al's⁽¹⁾ and Cable et al's⁽²⁾

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Table 1 – Hematological results

Date	Haemoglobin (gm/dL)	Prothrombin (second)	Partial prothrombin (second)	Fibrinogen (mg/L)
21/1/98	15.5	> 60	> 120	0 (detectable)
26/1/98	13.7	> 60	> 120	0
29/1/98	9.8	20	31	0
2/2/98	8.9	14	32	0
6/2/98				50
18/2/98	13.7	12	26	1200
13/5/98	16.8	12	26	2500

cases. Cable et al had examined this species of snake while it was feeding and postulated that 'a prerequisite for substantial envenomation by this species is that it be able to hold on to its prey for a time sufficient to allow injection of venom by the relatively primitive fangs⁽¹⁾.

The other cases^(3,4) reported that their victims had been bitten more than once. It would seem that the bite from this 'harmless' snake becomes dangerous when there is prolonged or multiple exposure and sufficient amount of secretion injected. These apparent time or dose requirements for substantial envenomation probably accounts for the general impression that the redneck keel-back is harmless and can be kept as a pet.

The effects of envenomation are identical in all these cases ie. severe and prolonged bleeding. Fibrinogen was undetectable initially and fibrinogen degradation products could be demonstrated. The mechanism of the coagulopathy was investigated by a few investigators⁽⁵⁻⁷⁾. Iddon and Theakston⁽⁵⁾ studied the biological properties of the venom in mice and showed that the venom of this snake contained a strong Factor X activator and activated prothrombin to a lesser extent. Hoffmann et al⁽⁶⁾ on the other hand, reconstructed the mechanism of action of the toxin by studying a human victim⁽⁴⁾. In contrast, they found evidence for a strong prothrombin activation and only limited activation of Factor X. Hoffmann et al postulated that these differences may be explained by the differences in species or the time factor. The mice were studied minutes after they were injected with the venom whereas the human subject was studied on the fifth day after the snakebite. The findings of

Hoffmann et al were supported by Zotz et al⁽⁷⁾ who demonstrated that the *Rhabdophis subminiatus* venom gland extract directly activates prothrombin and Factor X activation could not be demonstrated. All the victims recovered after supportive treatment and there were no deaths reported.

CONCLUSION

We recommend that the red-necked keelback be considered a dangerous animal and the public be discouraged from keeping it as a pet. However, there will always be people who have a penchant for keeping unusual pets. This case is presented to highlight the fact that snakes classified as non-venomous are not always harmless. Caution will have to be exercised when managing patients bitten by 'non-venomous snakes'.

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