A SERIES OF SNAKE BITES

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SUMMARY: Twenty-eight cases of snake bite, presumptive or proven are reported. Our experience at the British Military Hospital, Dharan showed that attempts to identify the types of snakes were of little value. Each case was treated expectantly, and energetic measures started once symptoms or signs developed.

Introduction

Most textbooks of general and tropical medicine deal with the treatment of snake bite. Almost all give detailed descriptions of the common poisonous snakes, how to identify them and the suspected lesion.

This study of snake bites was made because it was apparent that such textbook details appeared to bear little relevancy to practical matters here. In most cases the snakes were not seen at all, or so fleetingly that a useful description could not be obtained. The bites themselves showed a number of variations, with no obvious correlation between appearances and clinical developments.

Background

The cases described were all seen at the British Military Hospital, Dharan during the 1973 monsoon season. Dharan is in Kosi Zone, Eastern Nepal, latitude 27° and 28°N, longitude 86° and 88°W, 1250 feet above sea level, on the North Indian Plain just south of the Himalayan foothills. Dharan town, population 50,000 borders on the British Gurkha Cantonment in which the Military Hospital is situated. Immediately to the south there is a thick belt of jungle. To the east and west the country is agricultural. During the monsoon from June to October the temperature varies between 22.2 and 35.6°C and the humidity between 70 and 95 per cent.

Pre-hospital details

All but six of the patients were bitten during the hours of darkness (6 p.m. to 6 a.m.), and it is worth noting that house lighting in Dharan and in the villages is by paraffin lamps. It is understandable that few were able to describe the snake. The most that could be said was those which were seen in cases 3, 4, 14, 20, 22 and 28, were probably not cobras. On the other hand the snake which bit the patient case 28, although on description suggested a grass snake, undoubtedly caused generalised symptoms. An identification chart of snakes commonly found in Nepal is not available, and even if it had been, would have been of little value. In this context it is interesting how widely authorities here vary in their identification of snake species. A snake killed outside the nurses quarters in the hospital was identified by local Nepali, Indian and British "experts" as cobra, cobra-type, krait and grass snake. In no instances were attempts made to catch snakes which had bitten. All snakes are greatly feared here, and the casualty's only interest is to get to hospital as quickly as possible.

Which of the patients had really been bitten and which had but only scratched themselves and thought they were bitten is a matter of conjecture. In a few cases only were the typical puncture marks seen (cases 2, 12, 17, 26 and 27). Some of these patients developed local symptoms and one, case 2 systemic symptoms.

In all but three casualties the home first aid treatment of multiple tourniquets was used. It may be significant that of cases 1, 10 and 16 who had no tourniquets applied, two died. No patients had sustained obvious limb or circulatory damage from their tight, sometimes triple tourniquets. This was probably because most casualties arrived at the hospital soon after injury. In only two cases had the bitten area been incised (cases 17 and 24) and the latter patient was locally infected.

Course in hospital

Upon admission to hospital home made tourniquets were removed and a skin-tight Singer tourniquet applied proximal to the wound. A history was taken, but as can be seen from Table I this was unhelpful in trying to decide what type of snake venom we could be dealing with. The site of injury was gently washed with Eusol, and quarter hourly observations were started: pulse, temperature, respiratory rate and blood pressure were checked. Haemorrhagic and neurological signs were searched for, and routine observations for developing signs were charted. The urine was tested routinely for blood. All the patients were frightened but none were clinically shocked. Most patients were surprised that antivenin was not administered immediately. However care was taken to explain that most snakes were not poisonous, and that antivenin would be given if necessary. For reassurance the casualty was always shown the ampoules of antivenin. A mega dose of crystalline penicillin was given intramuscularly as was the first dose of tetanus toxoid. During the day the patient was usually observed in the casualty department; if signs more than minor local swelling developed, and at night, he was transferred to the ward.

All patients suffered local pain, sometimes numbness or tingling. In some cases this was probably psychogenic, though the congestion distal to the home made tourniquets was possibly the cause of the symptoms in many patients. Penicillin and tetanus toxoid were given and local symptoms responded satisfactorily. Blistering was seen in three instances as was local haemorrhage or bruising. In three patients neurological symptoms developed and in case 6 evidence of systemic bleeding. The two casualties brought in dead are presumed to have died of neurotoxin. One boy, case 4, was found to have pulmonary tuberculosis and was detained for treatment of that condition.

Four case reports are given to illustrate the series in Table I.

Case reports

Case 1

KT, a male aged 12, bitten at 9 p.m. on right thumb in a shop at home in Dharan. The snake was not seen, but there were clear bite marks. A tourniquet was not applied at home. On arrival at hospital at 10 p.m. he was fully conscious with no cyanosis, but had difficulty in protruding his tongue. After a test dose 20 ml of antivenin was given intravenously. He was unconscious by the time he was admitted to the ward. Cardiac arrest occurred three times during the night, and despite further antivenin, steroids and all possible attempts to resuscitate him, he died next morning at 10 a.m.

Table I
Series of twenty-eight cases of snake bite

Case No.	Sex	Age	Place where bitten	Description of snake	Time bitten	Area of bite	Signs and symptoms	Treatment
1	M	12	Shop	None	9pm	Thumb	Neurological	Antivenin
2	M	11	Shop	None	9pm	Heel	Neurological	Antivenin
3	M	14	Field	Black	1pm	Leg	Swollen leg	3 hour observation
4	M	14	Tree	Light coloured	2pm	Hand	Local swelling	6 hour observation
5	F	30	House	None	4am	Leg	Local bruising	6 hour observation
6	M	46	Path	None	7pm	Leg	Swelling. Pyrexia 101°F. Haematuria	Admission for 7 days
7	F	35	Field	None	8pm	Hand	Local pain	Overnight observation
8	M	40	House	None	8pm	Leg	Local pain	Overnight observation
9	F	32	House	None	6.30am	Leg	Local pain and bruising. Pyrexia 99.8°F	6 hour observation
10	M	3	Field	None	2pm	Hand	Local swelling. Cyanosis	Brought in dead
11	F	30	Field	None	9pm	Ankle	Local swelling. Shock	Overnight observation
12	F	45	Field	None	10pm	Leg	Local pain	Overnight observation
13	F	7	House	None	7.30pm	Toe	Pain	6 hour observation
14	M	29	Garden	Green	9pm	Leg	Pain	3 hour observation
15	M	34	House	None	4am	Leg	Local pain and swelling: Pain in chest. Dryness of mouth. Blurring of vision	Antivenin. 36 hour observation
16	F	65	Path	None	1.45am	Leg	None	Brought in dead
17	M	50	House	None	2am	Hand	Knifecuts	36 hour observation
18	F	5	Field	None	6pm	Foot	Pain	Overnight observation
19	M	40	Field	None	4pm	Foot	Pain	Overnight observation
20	M	40	House	White	8pm	Toe	Swelling pain. Pyrexia 100°F	Overnight observation
21	M	7	House	None	evening	Foot	Swelling and pain	Overnight observation

Table I (continued)

Case No.	Sex	Age	Place where bitten	Description of snake	Time bitten	Area of bite	Signs and Symptoms	Treatment
22	M	40	House	Brown	5am	Ankle	Local haemorrhage	36 hour observation
23	F	30	Field	None	10pm	Toe	Local pain	Overnight observation
24	M	22	Field	None	8pm	Foot	Multiple cuts. swelling. Pyrexia 99°F	36 hour observation
25	M	40	Field	None	8pm	Ankle	Local blistering. Swelling. Pyrexia	36 hour observation
26	F	13	House	None	3am	Finger	Bite. Swelling. Pain locally. Pulseless	8 hour observation
27	F	30	House	None	5.30am	Thigh	Local swelling	6 hour observation
28	F	25	Field	Green	9am	Finger	Bite. Pain. Swelling. Blistering, Giddy-ness. Headache. Pyrexia	Overnight observation

Case 2

LM, a male aged 11, bitten on the foot in the same incident as case 1. The snake was not seen and bite marks were not obvious. A tourniquet was not applied at home, but 5 ml intravenous antivenin was given in Dharan before admission to the hospital. On arrival at the hospital at 1.25 a.m., three and a half hours after being bitten, he complained of diplopia, his speech was slurred, there was nystagmus and his pupils were dilated. A further intravenous 5 ml of antivenin was given and the symptoms gradually wore off. At 1.30 p.m. that day the patient complained of blurred vision and bilateral ptosis was noted, there was left facial paralysis and the patient felt drowsy. A further 10 ml intravenous antivenin was given. He became asymptomatic within the next twenty-four hours.

Case 6

IN, a male aged 46, from Kerabari, 30 miles from Dharan. Bitten on the right ankle at 7 p.m. walking along a path two hours' walk from his village, the snake was not seen. He applied a mid-calf tourniquet and walked home, and slept with the tourniquet on. He then put on another mid-calf tourniquet before leaving for the hospital. He arrived twenty-four hours after being injured. The whole leg was oedematous. Bite marks were clearly visible. The patient was treated expectantly, and apart from transient haematuria and pyrexia, maximum 101°F, no other systemic involvement became apparent. He was mobilised gradually and was discharged after 7 days in hospital.

Case 10

SC, a male aged 3 from Ghopa, near Dharan. This child's father was working in the fields some way from home, the child playing nearby. The child put his hand into a

hole and was apparently bitten, the snake was not seen. A tourniquet was not applied and the father ran for one and a half hours to the hospital carrying his son, who died just before arriving at the hospital. The only signs were a single puncture mark over a vein on the dorsum of the hand, and cyanosis of the lips. It must be assumed that this child had received an intravenous dose of venom.

Snakes found in Dharan

Specimens of snakes kept in the British Military Hospital, using Gharpuroy (1935) as a guide, have been identified (Table II). However it is noteworthy that none of the

Table II
Poisonous snakes found in Dharan

Species	Type	Length	Colour	Markings	Effect of venom
Vipers	Russel	3-5 feet	Buff to brown	Black spots solid or hollow	Swelling, blistering, sloughing
	Common green (Bamboo snake)	2-3 feet	yellow, green, brown	Yellow or white line on flanks	Swelling, nausea, vomiting, pyrexia
	Brown Himalayan	2 feet	Brown	Mottling	Swelling, nausea, vomiting, pyrexia
Cobras	Indian	6-8 feet	White, buff, brown, black	Hood and spectacle marking	Neurotoxic
	King	8-15 feet	Yellow, green, brown, black	Hood and spectacle marking	Neurotoxic
Kraits	Common	3-4 feet	Black	Narrow white bands	Neurotoxic and haemorrhagic
	Banded	5-6 feet	Black	Broad white bands	Neurotoxic and haemorrhagic

snakes caught in the Cantonment were killed after biting a person. Those people bitten and listed in Table I all received their injury outside the Cantonment, and on no occasion was the culprit snake killed, nor was a remotely reliable opinion on the nature of the snake obtained.

Discussion

The snake bite series described is one based upon recent practical experience. Our findings differ in some respects from the facts as taught academically. No reliance could be placed upon a description because the snake was not usually seen and never caught. Most cases occurred during the night and a fair number of bites were on the hands, in both respects differing from Reid (1972). Local signs are obscured by swelling caused by home made tourniquets, and the typical fang-marks were rarely seen.

With so little to be gained from the history or from the initial symptoms and signs, treatment had to be expectant, except in the two cases where neurological involvement

was already obvious upon admission. Events proved the soundness of this policy, and the risks of unnecessary antivenin administration were avoided. The first priority is the application of a skin-tight tourniquet. Each case was observed for at least six hours, antivenin being given if neurological or marked general haematological symptoms developed. Symptoms localised to the injured limb would not appear to warrant administration of antivenin; analgesics and antihistamines usually relieved the symptoms and penicillin and tetanus toxoid were always given prophylactically. All patients discharged after observation were advised to return in the unlikely event of anything untoward developing. There is no doubt that they would have come back had this been necessary, but none did, except for their follow-up antitetanus injections.

Conclusion

The British Military Hospital, Dharan is the last hospital in the Army where almost the entire spectrum of tropical diseases and injuries can be seen. Important amongst these are snake bite injuries. The series studied shows the importance of applying first principles in the treatment of this condition.

Acknowledgements

Only a proportion of the cases listed were treated personally by the writer. All the medical officers at the British Military Hospital have had occasion to deal with snake bites.

REFERENCES

- REID, H. A. (1972). *Tropical Doctor* 2, 4.
GHARPUROY, K. G. (1935). *The Snakes of India*. Bombay Press.

Honorary Consultants

To the Army

Professor J. B. E. Baker, M.A., B.Sc., B.M., B.Ch., has been appointed Honorary Consultant in Pharmacology to the Army with effect from 1 September 1974, in succession to Professor H. C. Stewart, who has retired.

Mr. J. P. Williams, M.Chir., F.R.C.S., has been appointed Honorary Consultant in Urology to the Army with effect from 27 July 1974, in succession to Mr. H. G. Hanley who has retired.