SNAKE BITE IN GOMBE

DR. S. K. MUSTAPHA
DEPARTMENT OF MEDICINE
COLLEGE OF MEDICAL SCIENCES
UNIVERSITY OF MAIDUGURI
P.M.B. 1069 MAIDUGURI

Correspondence: DR. S.K. MUSTAPHA
P.O. BOX 153 MAIDUGURI, BORNO STATE

ABSTRACT

Aims: Snake bite is an important cause of morbidity and mortality in Nigeria as in many parts of the tropics. This study was undertaken to determine the prevalence and the clinical pattern of snake bite in Gombe.

Methods: Two hundred and seven (207) cases of snakebite admitted at the State Specialist Hospital Gombe over a 4-year period were retrospectively studied.

Results: The highest proportion was in the 21-30 years age group accounting for 36.9% of the total. There is a male preponderance with a male to female ratio of 6: 1. Most of the victims were bitten outdoors (75%). The lower limb was the most frequently bitten site (68.1%). The highest number of bites (77.3%) occurred during the rainy season, with farmers accounting for 64.2% of cases. Ninety-two percent of the bites occurred during the day. Systemic envenomation was noted in 46.4% of the victims. 96.6 % of them received polyvalent antivenom, while 89.5% and 78.4% received antibiotics and antitetanus prophylaxis respectively. The mortality rate was 10.6%.

Conclusion: The prevalence of snake bite in Gombe is high. The morbidity and mortality can be reduced through health education to avoid harmful traditional practices, prompt conveyance of victims to hospital and early administration of adequate doses of antivenom.

KEY WORDS: Snakebite, prevalence, clinical presentation, treatment, Gombe

INTRODUCTION

Snakebite is an important cause of morbidity and mortality in Nigeria as in many parts of the tropics. Although it is difficult to be precise about the actual number of cases, it is estimated that worldwide incidence of snakebite is in excess of 3 million per year with more than 150,000 deaths[1]. An estimated 10,000 deaths from snake bite occur every year in the savanna region of Nigeria[2]. There is a distinct seasonal variation in the incidence of snake bites with most cases occurring during the rainy season when people are involved in agricultural activities[3].

Three species of snakes are responsible for the majority of deaths and injuries associated with snake bites in Africa. These include carpet vipers (*Echis carinatus*), the puff adder (*Bitis arietans*) and the spitting cobra (*Naja nigricollis*)[4]. Of these, the carpet viper is responsible for most fatal bites in the northern savanna areas of Africa[2]. Gombe, which lies in the savanna region of Nigeria, is one of the areas with highest incidence of bites in the country[5]. This led to the designation of General Hospital Kaltungo in Gombe State as snake bite referral centre by the Federal Government, and the initial attempt to set up an anti snake venom (ECHITAB)

production centre in Gombe. This retrospective study has been done to determine the prevalence, clinical presentation and treatment of snakebite at the State Specialist Hospital Gombe.

PATIENTS AND METHODS

The study was done retrospectively at the State Specialist Hospital Gombe. The case records of 207 patients treated for snakebites between January1998 and December 2001 were studied. All relevant bio-social data were carefully noted and recorded. The circumstances of the bite, the site of the bite, the clinical presentation and the treatment given were all noted. Where documented, the type of snake was also noted. Identification was either from victims' description or when the snake was killed and brought along to the hospital.

RESULTS

A total of 207 cases comprising of 177 males (85.6%) and 30 females (14.4%) were recorded in the four-year period. The age and sex distribution of the victims are shown in table 1. There ages ranged from ? to 80 years with a mean of 25.8 years. The peak age of occurrence was in the 21-30 years group

Farmers were the most vulnerable occupational group followed by hunters and traders as shown in table 2. Most cases (77.3%) occurred during the rainy season (figure 1), and the great majority (92%) occurred during the day while farming (62.5%) or hunting (12.5%). In 25% of the cases the bite occurred at home while sleeping, sweeping or playing.

The records showed that the foot was the most frequently bitten site (68.1%). Of these, 56% were on the left foot while 44% involved the right foot. 24.6% of the bites occurred on the hands (out of which 60.8% were on the right hand). In 15 cases (7.3%), the site of bite was not recorded.

In all the cases where the snake was identified (47.3%), the bite was by the carpet viper.

CLINICAL PRESENTATION

One hundred and ninety-two cases (92.8%) presented with pain, swelling and in some cases blisters at the site of bite. Signs of systemic envenomation (bleeding from the gum or fang puncture site, haematuria, haematemesis) were noted in 96 (46.4%) of the victims. In 15 cases there was no evidence of local or systemic envenomation. No neurotoxic features were reported in any of the patients.

Incision marks over the bite site, in some cases with local herbs on them, were noted in 22% of the victims. 14.0% of them had septic wound at the bite site, of which three presented with septicaemia.

30 (2.9%) of the patients had ingested herbs one of whom presented with jaundice possibly induced by the herbs.

One case of acute renal failure was documented.

TREATMENT AND OUTCOME

The treatment administered to the patients is shown in table 3. One hundred and ninety-nine (96.6%) of the patients received polyvalent antivenom (ASV) and 185 (89.3%) received antibiotics. One hundred and fifty-five (75%) and 7 (3.4%) of them were given tetanus toxoid (TT) and anti-tetanus serum (ATS) respectively, while 17.9% received blood transfusion because of anaemia from continuous bleeding.

Twenty-two of the patients di ed, giving a mortality rate of 10.6 %. Death was apparently secondary to intracranial haemorrhage in 18 of the victims. Three died of septicaemic shock from superimposed infection at the bite site. All 3 had incisions at bite site. In one, the limb was gangrenous apparently from a tight tourniquet. One victim died of acute renal failure. All the deaths occurred in those who presented more than 24 hours after the bite. All but one of them received ASV, indicating inadequate dose or ineffective ASV, or death was not due to the direct effect of the venom (septicaemia).

Table 1: Age and Sex Distribution of the Cases of Snake Bite

Age (years)	Sex		Total	%
	Male	Female		
0 – 10	3	2	5	2.7
11 – 20	42	12	54	28.9
21 – 30	63	6	69	36.9
31 – 40	20	4	24	12.8
41 – 50	18	2	20	10.7
51 – 60	9	1	10	5.3
>60	5	0	5	2.7
Grand total	**160**	**27**	**187**	**100**

Age not recorded in 20 patients

Table 2: Occupation of the Snake Bite Patients

Occupation	No. of patients (%)
Farmers	133 (64.2)
Hunters	22 (10.6)
Students	15 (7.3%)
Traders	22 (10.6)
Civil servants	8 (3.9%)
House wives	8 (3.8%)

Table 3: Treatment Given to the Patients

Treatment	No. of Patients
Polyvalent anti-snake venom	199 (96.6%)
Antibiotics	185 (89.3%)
Analgesic	108 (52.2%)
Tetanus toxoid	155 (75.0%)
Hydrocortisone	85 (41.1%)
Vitamin K	8 (3.9%)
Blood transfusion	38 (17.9%)
Anti-tetanus serum	7 (3.4%)
Promethazine	44 (21.2%)

DISCUSSION

The result of this study shows that Gombe state is one of the areas with high prevalence of snake bite in Nigeria as 207 cases were recorded at the State Specialist Hospital over a 4-year period. A ten-year review at Ilorin produced 115 cases[6] while a 20-year review at two of the largest hospitals in Benin produced 435 cases[7]. Hospital records fall far short of the actual number of snakebites owing to dependence on traditional healers. It has been reported that in most developing countries, up to 80% of individuals bitten by snakes first consult traditional healers before visiting a medical centre[8, 9]. Evidence of traditional intervention (incision or herbs) was noted in 22% of the victims in this study. It has been reported that only 8.5% of snakebite victims in Northern Nigeria actually attend hospital[10].

In this study, the highest proportion of snakebite was among the 21-30 years age group. This is similar to the findings of Hansdak *et al*, but differs from that of Opadijo[6] (highest proportion in the age group 11 to 20 years) and that of Abara *et al*[12] (highest proportion in the age group 31-40 years). There is preponderance of males among the victims, consistent with the findings in several other studies[6, 7, 12], but the male to female ratio of 6:1 observed in this study is higher than the ones reported in those studies (ratios ranging from 2:1 to 4:1), probably because men are the source of sustaining families in this part of the country, and are therefore more exposed to the risk of snake bite than the women.

The observation that the most frequent site of bite is the lower extremity suggests in most cases the snake is inadvertently trodden upon. Secondly, most men in the rural area walk bare footed without protection. Most cases of bites on the hands occurred in children and hunters putting their hands in holes or under shrubs. Some of the cases occurred in farmers while hoeing or gathering firewoods. The majority of bites occurred during the day, which is consistent with the findings of other authors[5, 6, 11].

In all the cases where the offending snake was identified (47.3%), it was the carpet viper (*Echis carinatus*). Even in those cases where the snake could not be positively identified, the predominant symptom i.e. haemorrhage with which the patients presented is more in keeping with a viperidae bite, and *Echis carinatus* is the commonest viperidae species in the Savanna region of Nigeria[5, 13]. It was found to be responsible for 66% of all snake bites in this area.[13] Two other viperidae, the puff adder (*Bitis arietans*) and the night adder (*Causus maculatus*) account for far fewer cases[14].

A surprising observation in this study is that no case of cobra bite was documented, and none of the patients had neurotoxic features. However, a previous study in Northern Nigeria has shown that cobras were responsible for 30% of all identified snake bites[15]. The non-documentation in this study could be because of lack of proper identification. The commonest cobra specie in this region, *Naja nigricollis* often bites its victims at night sometimes while they are asleep[10], making identification difficult, and neurotoxic features are rarely seen[16]. Thirdly, spontaneous haemorrhage, although characteristic of viperidae bites may occur in *Naja nigricollis* bites[10]. So the non-documentation of cobra bites did not necessarily mean there weren't any.

Although spontaneous haemorrhage (indicating systemic envenomation) was noted in 46.4% of the victims, it should be pointed out that, the absence of bleeding does not rule out systemic envenomation in *Echis carinatus* bite. Warrell's study of 115 *Echis carinatus* bites showed that the blood was incoagulable in 93% of the victims, while there was evidence of disseminated intravascular coagulation (DIC) in all of them[13].

Treatment profile of the patients show that 96.6% of them received polyvalent antivenom (ASV), ranging from 10 to 40 millilitres. The doses were not adequate in some of the patients. In severe cases of *Echis carinatus* envenomation with DIC as much as 150 millilitres of polyvalent antivenom can be administered using a simple clotting test as a guide[17]. One hundred and eighty five (89.3%) of them received antibiotics while 78.4% received tetanus toxoid or anti tetanus serum. The administration of antibiotic and anti tetanus prophylaxis is justified because snakes carry pathogenic microorganisms including *Clostridium tetani* as part of their normal oral micro flora[18]. In addition, the incisions seen in many of these victims serve as route of infection.

Hydrocortisone and promethazine, administered to 41.1% and 22.2% of the patients respectively, were as prophylaxis against hypersensitivity reaction to ASV. Although no case of hypersensitivity reaction had been recorded in this study, it has been reported in up to 21% of those receiving ASV[13]. These usually respond to conventional management including adrenaline, antihistamines and corticosteroids. The recommended therapy is to have adrenaline drawn up in readiness before the administration of ASV. The most effective prophylaxis is the administration of adrenaline immediately before the start of antivenom therapy, and is strongly recommended in asthmatics and those who have reacted to equine serum in the past[2].

The mortality rate from this study was 10.6%. This is similar to previous reports from Africa[2, 6, 13, 14]. Most of the deaths noted in this study occurred in spite of ASV administration. This could be because of late presentation, administration of inadequate or inactive ASV, or presentation with complications such as septicaemia on which the anti venom has no effect.

This study has shown that the prevalence of snake bite is high in Gombe state. The morbidity and mortality can be reduced through health education to avoid harmful practices such as incision of the bite site and application of tight tourniquet. The importance of prompt conveyance of the victim to hospital should be emphasised. An effective and affordable anti venom should be made available. Towards that, the effort to start the production of the ECHITAB antivenom in Nigeria should be accelerated.

ACKNOWLEDGEMENTS

I wish to express my gratitude to the Medical Director of the State Specialist Hospital Gombe for providing access to the Hospital records. I also thank Miss Elizabeth Danladi of the Medical Records Office for her assistance in retrieving the patients' records.

REFERENCES

1. White J. Bites and stings from venomous animals: a global review. Ther Drug Monit 2002; 65-68.
2. Pugh RN, Theakston RD. Incidence and mortality on snake bite in Savanna Nigeria. Lancet 1980; 2 (8205): 118-3.
3. Warrell DA. Snake bite in sub-Saharan Africa. Afr Hlth 1994; 21: 5-9.
4. Warrell DA. Animals and disease. In: Principles of Medicine in Africa. Parry EHO (ed.). Oxford University Press, 1984; 114.
5. Warrell DA, Arnett C. The importance of bites by the saw-scaled or carpet viper (Echis carinatus): epidemiological studies in Nigeria and a review of the world literature. Acta trop 1976; 33 (4); 307-41.
6. Opadijo OG, Omotoso ABO. Snake bite in Ilorin: A review of 115 cases. Nig Med Practitioner 1996; 32 (3/4): 30-32.
7. Omagbai EKI, Nworgu ZAM, Imhafidon MA *et al.* Snake bites in Nigeria: A study of the prevalence and treatment in Benin city. Trop Pharm Res 2002; 1 (1): 39-44.
8. Chippaux JP. Snake bite epidemiology in Benin (West Africa). Toxicon 1988; 27: 37.
9. Snow RN. The prevalence and morbidity of snake bite and treatment-seeking behaviour among a rural Kenyan population. Ann Trop Med Parasitol 1994; 88: 665-671.
10. Pugh RNH, Theakston RDG, Reid HA *et al.* Malumfashi Endemic Diseases Research Project. XIII. Epidemilogy oh human encounters with the spitting cobra, Naja nigricollis, in Malumfashi area of Northern Nigeria. Ann Trop Med Parasitol 1980: 74: 523-530.
11. Hansdak SG Lallar KS Pokharel P *et al* . A clinico-pathological study of snake bite in Nepal. Tropical Doctor. 28: 223-226.
12. Abra OE, Ayandiran DA, Adeloye A. Snake bite in Igbo-Ora, Ibara District, Western Nigeria. Nig Med J 1977; 1: 107-111.
13. Warrell DA, Davidson NMcD, Greenwood BM *et al.* Poisoning by bites of the saw-scaled or carpet viper (Echis carinatus) in Nigeria Q J Med 1977; 46 (181): 33-62.
14. Pugh RN Theakston RD. A clinical study of Viper poisoning. Ann Trop Med Parasitol 1987; 8 (12): 135-49.
15. Ogala WN, Obaro SK. Venomous snake bites in Children in the Tropics: the Zaria experience. Nig Med Practitioner 1999; 21: 5-9.
16. Warrell DA, Greenwood BM, Davidson NMcD *et al.* Necrosis, haemorrhage and complement depletion following bites by the spitting cobra (naja nigricollis). Q J Med 1976; 45: 1-22.
17. Paul VK. Animal and insect bites. In: Singh M (ed.). Medical Emergencies in Children. New Delhi; Sagar publications, 1993.
18. Theakston RD, Philips RD, Looareesuwan S *et al.* Bacteriological studies of the venom and mouth cavities of wild Malayan pit vipers (Calloselama rhodostoma) in Southern Thailand. Trans R Soc Trop Med Hyg 1990; 84 (6): 875-879.