

Identification of the Commonest Snake Species Causing Envenoming and Fatality among Snake Bites of Venomous Admission in Dilchora Referral Hospital.

D. Manyazewal.

Consultant Orthopedic Surgeon

Dilchora Referral Hospital, Dire Dawa, Eastern Ethiopia.

Email: mdortho.dessie3@gmail.com

Background: Snake bite is a common medical emergency in developing countries. The identification of snake species is important for optimal clinical management, because it allows clinicians to choose the appropriate treatment, anticipate complications, and there fore to improve prognosis. Moreover, helps in selection of specific antivenom and avoids antivenom-induced adverse reactions. The Objective the study is to Identify the commonest Snake species causing envenoming & fatal bites among snake bites of venomous admission in Dilchora referral Hospital from 2006-2011.

Methods: The diagnosis was based on the history and account of injury, observation of fang marks, snake identification (when possible) and signs and symptoms of envenoming in patients admitted to orthopedic ward for Supportive therapy without antivenom. Recording of necessary data and analysis were done by the Author. The study was conducted from 2006-2011.

Results: During the study period a total of 110(60 Male 54.5% and 40 Female 45.5%) envenomed patients were admitted in our orthopedic ward making male to female ratio 1.2:1(Table 1). Bites in Under 15 years account for 36(32.7%), in 15-44 years for 69(62.7%), in 45-54 years for 5(4.5%)(Table 1). Bite on the upper limb account for 40(36.4%), on the Lower limb for 66(60%) and on the head & trunk region 4(3.6%)(Table 2). Fatal bite account for 7(6.4%)(Table 3,4 &5). Known Poisonous snakes caused 86(78.2%) of total envenoming (Table5 and Figure 2).

Conclusion: Viper and Puff adder snakes were the commonest causes of fatal bites in our Hospital. Measures to be under taken are recommended.

Introduction

Snake bite is a common medical emergency in developing countries¹. Antivenom is the only Specific antidote (treatment) to snake venom and its timely administration reverses all systemic manifestation of envenoming^{1- 4}. WHO estimates that approximately 2,500,000 venomous snake bites per year result in 125,000 deaths world wid,100,000 of which are in Asia and approximately 20,000 in Africa^{3,4}. In Africa, the annual incidence rate of snake bite in the Benu Valley of North Eastern Nigeria is 497/100,000 population with a case fatality ratio 12.2%². Study done at a rural South African hospital showed that the case fatality rate for snake bite to be 2.9%⁶. It is generally agreed that the case fatality rate of snake bite in developing countries varies from 2% to 10%⁶⁻¹⁰. The high case fatality ratio of snake bite in tropical developing countries is the result of a combination factors including the scarcity of antivenom, poor health service and problems with transportation from rural areas to health centers^{2,5}. An Intervention including development of treatment protocol, Staff training, monitoring of compliance and patient education decreased snake bite mortality from 11%(8/72) to 1.3%(3/238) in rural Ghana¹¹.

The identification of snake species is important for optimal clinical management, because it allows clinicians to choose the appropriate treatment, anticipate complications, and therefore to improve prognosis. Moreover, helps in selection of specific antivenom and avoids antivenom-induced adverse reactions^{6,14,15}.

Material and Methods:

The diagnosis of snake bite was based on the history and account of injury, observation of fang marks, snake identification (when possible) and signs and symptoms of envenoming in all patients admitted to orthopedic ward for Supportive therapy without antivenom (antivenom is not available in our hospital). Identification of known Venomous snakes were performed by the author using bedside 20-minute whole blood clotting test (20WBCT) to snake bite victims with clinical signs of swelling and by comparing dead snakes presented in our hospital by patient's family with Online Pictures of venomous Snakes of Africa [<http://library.thinkquest.org>]. Recording of necessary data and analysis were done by the author.

The study was conducted from 2006-2011.

Results

During the study period a total of 110 envenomed patients were admitted in our orthopedic ward. The males were 60 (54.5%) and 50 (45.5%) were females. The male to female ratio was 1.2:1. The under 15-years accounted for 36 (32.7%) of the cases of snake bites. The majority (62.7%) of the patients were in the 15-44 years age group (Table 1).

Table 1. Number of Envenomed Cases of Snake Bites by Gender and Age in Years from 2006-2011

Age in Years	Gender		Total
	Male	Female	
0-4	6(5.5%)	5(4.5%)	11(10%)
5-14	10(9.1%)	15(13.6%)	25(22.7%)
15-24	14(12.7%)	8(7.3%)	22(20%)
25-34	20(18.2%)	17(15.5%)	37(33.6%)
35-44	6(5.5%)	4(3.6%)	10(9.1%)
45-54	4(3.6%)	1(0.9%)	5(4.5%)
+55	-	-	-
Total	60(54.5%)	50(45.5%)	110(100%)

Table 2. Number of Envenomed Cases of Snake Bite by Main Clinical Syndrome and Location of Bite from 2006 -2011

Clinical Syndrome	Location of the bite			Total
	Upper limb	Lower Limb	Head & Trunk	
Syndrome 1: Massive Swelling with Incoagulable blood	30(27.3%)	41(37.2%)	-	71(64.5%)
Syndrome 2: Massive Swelling with Coagulable blood	7(6.4%)	19(17.3%)	2(1.8%)	28(25.5%)
Syndrome 3: Mild swelling only with Coagulable blood	3(2.7%)	6(5.5%)	2(1.8%)	11(10%)
Syndrome 4: Neurotoxicity or paralysis	-	-	-	-
Total	40((36.4%)	66(60%)	4(3.6%)	110(100%)

Table 3. Number of Envenomed Cases of Snake Bite by Age in Years and Outcome of Bites

Age in Years	Out come of the bite		Total
	Fatal	Non fatal	
0-4	2(1.8%)	9(8.2%)	11 (10%)
5-14	-	25(22.7%)	25 (22.7%)
15-24	-	22(20%)	22 (20%)
25-34	2(1.8)	35(31.8%)	37 (33.6%)
35-44	3(2.7%)	7(6.4%)	10 (9.1%)
45-54	-	5(4.5%)	5 (4.5%)
+55	-	-	-
Total	7(6.4%)	103(93.6%)	110(100%)

Table 4. Number of Envenomed Cases by Clinical Syndromes and Outcome of the Bites

Clinical Syndrome	Outcome Of the bite		Total
	Fatal	Non-Fatal	
Syndrome 1:Massive Swelling with incoagulable blood	5(4.6%)	65(59.1%)	70(63.7%)
Syndrome 2:Massive Swelling with coagulable blood	2(1.8%)	24(21.8%)	26(23.6%)
Syndrome 3:Mild swelling only with coagulable blood	-	14(12.7%)	14(12.7%)
Syndrome 4: Neurotoxicity/Paralysis	-	-	-
Total	7(6.4%)	103(93.6%)	110(100%)

Table 5. Number of envenomed cases by types of snake species identified and Out come of the bite from 2006-2011

Types of Snake Species Identified	Out come of the bite		Total
	Fatal	Non fatal	
1. Africa's Known most dangerous snake [http://library.thinkquest.org]			
1.1 Saw-Scaled or carpet Viper	5(4.5%)	58(52.7%)	63(57.3%)
1.2 Puff Adder	2(1.8%)	21(19.1%)	23(20.9%)
	-	-	-
2. Other local Snake Species presented to our Hospital	-	9(8.2%)	9(8.2%)
3. No Snake identified	-	15(13.6%)	15(13.6%)
Total	7(6.4%)	103(93.6%)	110(100%)



Figure 1. shows the results of 20-minutes whole blood clotting test for victims of snake bite With clinical swellings. Coagulable blood (Rt. Hand) and incoagulable blood (Lt.Hand)



Viper



Puff Adder

Figure 2. Shows the two Dead snake species caused envenoming & fatal bites as presented for identification by families in Dilchora referral hospital from 2006-2012.

Bite on the upper limb accounted for 40 (36.4%), on the Lower limb for 66(60%) and on the head & trunk region for 4(3.6%) of the cases. Massive local swelling with incoagulable blood occurred in 71(64.5%) of the clinical syndrome, Massive local swelling with coagulable blood were seen in 28(25.5%) of the clinical syndrome, Mild local swelling with coagulable blood in 11(10%) of the clinical syndrome and there was no cases presenting with clinical Syndrome of neurotoxicity/paralysis (Table 2 and Figure1).

There were 7 deaths, giving a fatality rate of 6.4% (Table 3,4 and 5). Known Poisonous snakes caused 86(78.2%) of total envenoming (Table 5 and Figure 2).

Discussion

The study has shown that majority (62.7%) of the envenoming occurred in young adults agd 15-44 years followed by Children under 15 years (32.7%). The finding is in agreement with other reports^{6,12,13,14}. Most (64%) bite occurred to the lower limb. This is also consistent with many Studies^{6,12,14}. It is also evident that massive local swelling with incoagulable blood is the commonest (64.5%) clinical syndrome followed by massive local swelling with coagulable blood(25.5%). Such clinical syndromes were documented in bites with saw scaled viper and

puff adder snake species respectively¹³. During the study period there was no single patient admitted with clinical syndrome of neurotoxicity/paralysis indicating that snake bites due to Cobra and mambas species were rare to find in our hospital¹³. Saw-scaled viper and puff adder snakes were the leading species resulting venomous admission and fatal bites in our hospital. Case fatality between syndrome 1 and syndrome 2 presentations and between Viper and Puff adder snakes bite did not show statistically significant difference ($P < 0.05$). The identification of snake species is important for optimal clinical management, because it allows clinicians to choose the appropriate treatment, anticipate complications, and therefore to improve prognosis. Moreover, helps in selection of specific antivenom and avoids antivenom-induced adverse reactions^{6,14,15}. Hence, It is crucial for physicians and other Health workers to be familiar with the most common venomous snakes in Ethiopia and the management of their bites in humans.

The proportion of fatal bites 6.4% documented in this study is higher than the recent finding 1.3% in rural Ghana¹¹ and 2.9% in South Africa⁶ However it is significantly Lower than the finding 12.2% in Nigeria². Higher proportion of fatal bites documented in our study is due to lack of comprehensive Interventions including use of antivenom, development of treatment protocol, Staff training, monitoring of compliance and patient education¹¹.

Conclusion

Viper and Puff adder snakes were found to be the commonest causes of envenoming and fatal bites in our Hospital. Hence procurement of antivenom in our Hospital must ensure the consideration of these two venomous species.

Recommendation

1. Further nation wide study to document the most common venomous snakes species, incidence, morbidity, and mortality of snake bites in Ethiopia.
2. Interventions including use of Antivenom, Development of management protocol, staff training etc. should be implemented to decrease morbidity and mortality of snake bites in Ethiopia.
3. Education of rural communities on snake bite, avoidance of useless or dangerous first-aid measures, and the importance of rapid transport of victims to treatment centers should be widely implemented.

Acknowledgement

I would like to pass my heart felt thanks to Ato Anteneh Mekonen, Chief librarian Dilchora Hospital, Who helped me in downloading the Online pictures of Venomous Snakes of Africa and the patient's family who brought the dead snakes to Dilchora Hospital.

References

1. Stock RP, Massougbodji A, Alagon A, Chippaux JP. Bringing antivenom to sub-Saharan Africa. *Nat Biotechnol.* 2007; 173-177 [pub Med]
2. Gutierrez JM, Theakston RD, Warrel DA. Confronting the neglected problem of snake bite envenoming: the need for Global partner ship. *PLoS Med.* 2006; 3(6):e150.
3. Pinho FM, Zanetta DM, Burdmann EA. Acute renal failure after *Crotalus durissus* snake bite: a prospective survey on 100 patients. *Kidney Int.* 2005; 67:659-667.
4. Sitprija V. snake bite nephropathy. 2006; 11:444-448.
5. Cheng AC, Winkel K. call for Global Snake bite control and procurement funding. *Lancet.* 2001; 357:1132.

6. Ogubanjo GA, Management of Snake bites at rural South African hospital,SA Fam Pract 2009; 51(3)224-227.
7. Paul VK. Animal and Insect bites. In:Singh M,ed. Medical emergencies in Children. 2nd edition.New Delehi:Sage Publications;1993.
8. Hansdak SG,Lallar KS,Pokharel P,et al. A clinico epidemiological study of snake bite in Nepal. Tropical Doctor 1998; 28:223-6.
9. Heap BJ,Cowan GO. The Epidemiology of snake bite presenting to British military Dharan during 1989. JR Army med Corps 1991; 137(3):123-5.
- 10.Kulkarni ML,Anees S. Snake venom poisoning: experience with 633 cases. Ind pediatri 1994; 31(10):1239-43.
11. L.EA Vissera, SAkyei-Faried,D.WA Belcher,Protocol and monitoring to improve snake bite out comes in rural Ghana,Journal Home,Volume98,Issue5,May 2004,pp 278-283.
- 12.Muguti GI, Maramba A, Washaya CT, Snake bites in Zimbabwe: a clinical study with emphasis on the need for antivenom. Cent Afr J Med 1994; 40(4):83-8.
13. David A Warrell, Snake bite in sub-Saharan Africa, Africa Health, July 1999,pp5-9.
14. Wangoda R.,Watmon B.,Kisige M, Snake bite management: Experiences from Gulu Regional Hospital Uganda, East and Central African Journal of Surgery, 2004; 9 (1) : 82-86.
15. Alirol E, Sharma SK, Bawaskar HS, Kuch U, Chappuis F (2010) Snake Bite in South Asia: A Review .PLoS Negl Trop Dis 4(1): e603. doi:10.1371/journal.pntd.0000603