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CASE SERIES

SNAKE BITE: CASE SERIES OF PATIENTS PRESENTED TO GONDAR UNIVERSITY HOSPITAL, NORTH WEST ETHIOPIA.

Desalew Mekonnen, MD[1*], Tadesse Mitiku, MD[1] Yenesew Tamir, MD[1] Aklilu Azazh, MD[2]

ABSTRACT

Snakebite is an important public health challenge. Venomous snake bites cause significant morbidity and mortality if treatment measures, especially antivenom therapy, are delayed. We did a case series of 27 adult patients admitted after snakebite to the medical wards of Gondar University Hospital (GUH) from September 2013 to August 2014. The age range was from 15 to 74 years. The male to female ratio was 8:1. The majority (25) of patients presented after 12 hours of being bitten. Most of the bites occurred on the legs. Hematologic complications, including prolonged bedside whole blood clotting test, bleeding complications and Disseminated Intravascular Coagulation, were the common complications detected. The case fatality rate was 4/27 (14.8%). Availability of affordable snake specific antivenom is recommended. A large population study is needed to address the burden in Ethiopia.
***Keywords**: snake bite, ante venom, Gondar University Hospital*

INTRODUCTION

Snakebite is a neglected public health problem. Rural populations are frequent victims as they go about their daily food production and animal rearing activities and as they reside in the comfort of their homes. Despite urbanization and destruction of their habitat, venomous snakes remain plentiful in most parts of Africa. Unfortunately, many of these snakebite cases go unreported and thus do not appear in official epidemiological statistics. Health workers often have little or no formal training in the management of snakebite, and appropriate antivenom is rarely available (1).

Envenomation after snakebite is an underestimated and neglected public health issue responsible for substantial illness and death as well as socioeconomic hardship to impoverished populations living in rural and tropical Africa. In developed nations, snakebite typically occurs during recreational activities, whereas in developing countries it is an occupational disease more likely to affect young agricultural workers, predominantly men (2).

The exact burden of human suffering attributable to snakebite is difficult to determine because bites occur most commonly in rural areas where the first impulse of many bite victims is to seek the help of a trusted traditional healer rather than go to a Western-style hospital where their attendance may be recorded and reported to a national authority (3). Local bite site complications as well as systemic coagulation and neurological consequences are the contributory factors for increased morbidity and mortality if treatment measures are delayed, especially antivenom therapy (1).

The 20 minute whole blood clot test (WBCT) has been predictive of the presence or absence of systemic envenomation from snakebite, and has guided the successful management of mild and moderate systemic envenomation, and spared patients with no evidence of systemic envenomation from potential side effects of antivenom (5). Scarcity and delay of administration of antivenom, poor health services, and difficulties with transportation from rural areas to health centers are major factors that contribute to the high case-fatality ratio of snakebite envenomation (2, 7, 8).

In Ethiopia, there is an increasing expansion of mechanized commercial farms in previously arid and less populated areas including Northwest Ethiopia where large sesame farms are located (7). These sites are thought to be populated with snakes. Recent hospital records revealed increasing numbers of snakebite cases presenting to Gondar University Hospital. Since the year 2011, the hospital pharmacy is availing polyvalent antivenom drugs despite frequent stock outs.

In Ethiopia, except for a case report at a rural health center in the Southwest Ethiopia (8), there are no publications revealing the disease magnitude as well as the available interventions. The present study aims to demonstrate the tip of the iceberg of the disease burden as well as to stimulate further research.

MATERIALS AND METHODS

A retrospective case series of 27 patients presenting to Gondar University Hospital after sustaining snakebite from September 2013 to August 2014 was studied.

[1]Department of Internal Medicine, College of Medicine and Health Sciences, University of Gondar
[2]Department of Emergency Medicine, College of Health Sciences, Addis Ababa University
* Corresponding author desalewm@yahoo.com

Medical records were retrieved and data was collected using a structured datasheet. The results were analyzed manually and descriptive statistics were used. Permission to produce this case series from the patient records was obtained from Gondar University Hospital administration. No personal patient identifiers were used.

RESULTS

The Gondar University Hospital treatment protocol for snakebite patients was as follows. Patients were initially accepted at the emergency department. Visible snake bite wounds were cleaned and those with superinfections were treated with antibiotics. Tetanus immune globulin was given for all patients who presented within 72 hours of the accident. Whole blood clotting tests were performed for all patients on the time of presentation and as needed by the clinicians. Those patients with prolonged clotting for more than 20 minutes received intravenous infusion antivenom.

The available antivenom was polyvalent and manufactured in Egypt. The cost of a vial of antivenom was 800 Ethiopian Birr (40 USD). One patient on average requires 3 to 6 vials of the antivenom, but due to the high cost of the drug the majority of patients received 1 to 3 vials. Adjunct blood and plasma transfusions were given as per individual patient indications, but still with limited availability.

A total of 27 cases of snakebite victims presenting to Gondar University Hospital were analyzed. The age ranged from 15 to 74 years (median age of 25 years). The male to female ratio was 8:1. Most of the patients were from the rural community (n=24). Most of the bites occurred on the leg. Except for two cases, almost all patients presented after 12 hours of the accident. Coagulation abnormalities, including bleeding, Disseminated Intravascular Coagulation (DIC) and WBCT were detected and were the main complications. There were no cases with neurologic complication. Case fatality rate was 4/27(14.8 %). The case details are listed in Table 1.

Table 1: Cases of snake bite presented to Gondar University Hospital from September 2013 to August 2014.

Case no	Age in years	Sex F=Female M=Male	Address Urban/ Rural	Duration to presentation after bite <12hr	>12hr	Bite site	Tourniquet applied Yes/No	Prolonged clotting time Yes/No	Complications[#*] Yes/No	Outcome on Discharge (Alive/Died)
1	74	F	Urban		×	Left leg	No	Yes	No	Alive
2	24	M	Rural		×	Right hand	No	Yes	Yes	Died
3	16	M	Rural		×	Left leg	No	No	No	Alive
4	30	M	Rural		×	Left leg	No	Yes	Yes	Died
5	20	M	Rural		×	Left leg	No	No	No	Alive
6	19	M	Rural		×	Left leg	No	Yes	No	Alive
7	15	F	Rural	×		Right leg	No	Yes	No	Alive
8	18	M	Rural		×	left leg	No	Yes	Yes	Died
9	35	M	Rural		×	Left leg	Yes	Yes	Yes	Died
10	27	M	Rural		×	Right hand	Yes	No	No	Alive
11	30	M	Rural		×	Left leg	No	No	No	Alive
12	38	M	Rural		×	Right leg	Yes	Yes	Yes	Alive
13	18	M	Rural		×	Right leg	No	No	No	Alive
14	27	M	Rural		×	Right leg	Yes	Yes	Yes	Alive
15	56	M	Rural	×		Right leg	Yes	Yes	Yes	Alive
16	25	F	Rural		×	Right leg	No	Yes	Yes	Alive
17	26	M	Rural		×	Right leg	yes	Yes	No	Alive
18	45	M	Rural		×	Left leg	No	Yes	Yes	Alive
19	21	M	Rural		×	Right leg	No	Yes	Yes	Alive
20	21	M	Urban		×	Right leg	Yes	Yes	Yes	Alive
21	52	M	Rural		×	Left leg	No	Yes	Yes	Alive
22	25	M	Rural		×	Left leg	No	Yes	Yes	Alive
23	19	M	Rural		×	Right leg	No	Yes	Yes	Alive
24	47	M	Rural		×	Left leg	No	Yes	Yes	Alive
25	50	M	Rural		×	Left leg	No	Yes	No	Alive
26	34	M	Rural		×	Right leg	No	Yes	Yes	Alive
27	20	M	Rural		×	Right leg	No	Yes	Yes	Alive

[#]complications related to snake bite (Disseminated Intravascular coagulation, bleeding from other sites, sepsis, renal failure). [*]One patient can have more than one complication.

DISCUSSION

Snakebites are frequent in rural areas while individuals are doing their routine field activities (1, 9-11), but many healthcare providers in these settings have limited access to the numerous and relatively expensive laboratory studies used to diagnose envenomation and guide early management of these victims. We expect snakebite and it's complications to be increasing in the Gondar area as a result of the expansion of large farms where snake inhabitants are disturbed by the victims during farming activity (5). In the absence of an advanced laboratory, detection of systemic envenomation at high risk of coagulation disorders can be done using the bedside whole blood clotting test. In our study the prolonged whole blood clotting test result was consistent with the complications and mortality and can be used as an indication for early initiation of antivenom administration (9).

Our patients had delayed presentation consistent with other studies in a resource limited setting (10, 11) which potentially contribute to advanced complications. The causes of delayed presentation could be multi-factorial, including lack of access to transportation, and initial traditional therapy and self treatment at home. Snake bites were more common among males with the ratio of 8:1, which is consistent with other studies (11-13). Most of the bites occurred on the leg as described in other Asian and African studies (12-14).

Hematologic complications such as prolonged whole blood clotting test, Disseminated Intravascular Coagulation and bleeding were the common complications observed, consistent with other studies in Turkey (15). We did not find cases with neurological complications. The case fatality rate was 4/27 (14.8%), higher than that of other studies in developing counties including 4% in Pakistan (11) and 1.8% in Zimbabwe (14).

The higher rate of mortality could be due to delayed presentation, lack of adequate and snake specific antivenom and inappropriate supportive therapy such as correction of coagulopathy. The amount of available antivenom was less than demand and due to it's high cost and to supply interruptions. There is no national guideline for the treatment of snakebite in Ethiopia, and this potentially thwarts the emergency management of snake bites in primary health facilities. We believe that unless provided with management protocols, health professionals at these primary sites will face challenges in the management of snake bite. For effective management and antivenom administration, patients have to be referred to tertiary centers with ensuing significant delay contributing to systemic envenomation complications. The majority may potentially die during the referral process. We believe that these reported cases represent the tip of the iceberg, and the majority of cases may remain at their local sites.

Recommendations: Local guideline and training for health workers on the management of snakebite has a paramount benefit in addressing the alarmingly increasing snakebite complications. The availability of affordable and continuous supply of snake specific antivenom is strongly recommended. Public awareness on the prevention of snakebite, early health facility visits after the bite and avoidance of traditional harmful therapies will help in preventing morbidity and mortality. A large population based study will be helpful to further clarify the snakebite burden in Ethiopia.

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REFERENCES

1. Guidelines for the Prevention and Clinical Management of Snakebite in Africa, World Health Organization regional office for Africa, 2010.
2. Cruz LS, Vargas R, Lopes AA. Snakebite envenomation and death in the developing world. Ethn Dis. 2009 Spring;19(1 Suppl 1):S1-42-6.
3. Warrell DA. The global problem of snakebite: its prevention and treatment. In: Gopalakrishnakone P, Tan CK (eds), Recent Advances in Toxinology Research, vol. 1. National University of Singapore. 1992.
4. Gaus DP, Herrera DF, Troya CJ, Guevara AH. Management of snakebite and systemic envenomation in rural Ecuador using the 20-minute whole blood clotting test. Wilderness Environ Med. 2013 Dec; 24(4):345-50.
5. Worku F. The role of large scale commercial agriculture investment and its policy implications in Ethiopian economy. Paper Prepared for presentation at the "2015 World Bank Conference on Land and Poverty" The World Bank - Washington DC, March 23 - 27, 2015. Ethiopian Development Research Institute, Ethiopia.
6. Brown NI. Consequences of Neglect: Analysis of the Sub-Saharan African Snake Antivenom Market and the

Global Context. PLoS Negl Trop Dis. 2012 Jun; 6(6): e1670.
7. Scheske L, Ruitenberg J, and Bissumbhar B. Needs and availability of snake antivenoms: relevance and application of international guidelines. Int J Health Policy Manag. 2015 Jul; 4(7): 447–57.
8. Tameru K. Snakebite envenomation at Aysha refugee camp health center. Ethiop Med J. 2006 Jan; 44(1):75-9.
9. Gaus DP, Herrera DF, Troya CJ, Guevara AH. Management of snakebite and systemic envenomation in rural Ecuador using the 20-minute whole blood clotting test. Wilderness Environ Med. 2013 Dec; 24(4):345-50.
10. Sharma SK, Chappuis F, Jha N, Bovier PA, Loutan L, Koirala S. Impact of snake bites and determinants of fatal outcomes in southeastern Nepal. Am J Trop Med Hyg. 2004 Aug; 71(2):234-8.
11. Hayat AS, Khan AH, Shaikh TZ, Ghouri RA, Shaikh N. Study of snakebite cases at Liaquat University Hospital Hyderabad/Jamshoro. J Ayub Med Coll Abbottabad. 2008 Jul-Sep; 20(3):125-7.
12. Suleman MM, Shahab S, Rab MA. Snakebite in the Thar Desert. J Pak Med Assoc. 1998 Oct; 48 (10):306-8.
13. Rahman R, Faiz MA, Selim S, Rahman B, Basher A, Jones A, d'Este C, Hossain M, Islam Z, Ahmed H, Milton AH. Annual incidence of snake bite in rural bangladesh. PLoS Negl Trop Dis. 2010 Oct 26; 4(10):e860.
14. Nhachi CF, Kasilo OM. Snake poisoning in rural Zimbabwe, a prospective study. J Appl Toxicol. 1994 May-Jun; 14(3):191-3.
15. Köse R. The management of snake envenomation: evaluation of twenty-one snake bite cases. Ulus Travma Acil Cerrahi Derg. 2007 Oct; 13 (4):307-12.