

RETROSPECTIVE AND PROSPECTIVE STUDY OF SNAKE BITE CELLULITIS

Kalanand Choudhary¹, Pradeep Soni²

¹Associate Professor, Department of Surgery, Lt. Shri, L.A.M.M.C, and Associate Hospital, Raigarh, Chhattisgarh.

²Professor, Department of Surgery, Lt. Shri, L.A.M.M.C, and Associate Hospital, Raigarh, Chhattisgarh.

ABSTRACT

BACKGROUND

This study is planned to assess the incidence and clinical manifestation of cellulitis and other surgical complication in snakebite patients in order to find out the nature and burden of the disease.

MATERIALS AND METHODS

This is a five-year retrospective and prospective study conducted in the Department of Surgery, Chhattisgarh Institute of Medical Sciences, Bilaspur and Chhattisgarh. Out of total 284 patients admitted with snakebite, 164 (58.7%) patients suffered cellulitis and other surgical complications, which was managed and analysed. The categorical data was expressed as rates, ratio and percentage.

RESULTS

Out of 164 (58.7%) patients who developed cellulitis and other changes, 75.2% were males and mean age of the study population was 34.3±14.7 years. Majority of patients had snakebite on lower limb (75.2%). The most common symptom complex was pain + swelling 70.3% at the site of the bite. 25 (15.2%) patients underwent wound debridement and 7 (4.26%) patients required skin grafting. 2 (1.2%) patients suffered from compartment syndrome and required fasciotomy, wound debridement and skin grafting.

CONCLUSION

The present study shows high incidence of cellulitis and other surgical conditions in patients with snakebite and most common clinical feature was pain + swelling (cellulitis). So, in any case of snakebite, proper precautionary measures should be taken to prevent them. If cellulitis and other surgical condition has already developed, then it should be treated promptly in order to prevent the loss of limb or life.

KEYWORDS

Snakebite, Cellulitis, Wound Debridement.

HOW TO CITE THIS ARTICLE: Choudhary K, Soni P. Retrospective and prospective study of snake bite cellulitis. J. Evid. Based Med. Healthc. 2017; 4(10), 541-544. DOI: 10.18410/jebmh/2017/104

BACKGROUND

Snakebite is a major public health problem throughout the world and particularly in rural areas. An authentic measure of the global burden of snakebite remains obscure, despite several attempts to estimate it.¹ The most common poisonous snakes among the list is common krait (*Bungarus caeruleus*) in this part of Chhattisgarh, others are cobra and viper.² Unlike many other public health risk, however, the burden of human suffering caused by snakebite remains unrecognised, invisible and unheard by the global public health community. The problem is so underrated that in April 2009, WHO added it in the list of neglected tropical diseases.¹ In spite of snakebite being a common public health problem in Chhattisgarh, there are few reliable data

available as most victims are treated by traditional healers and are lost to official statistics. It is important to decide not only the proper regimes, but also the modality and early treatment in surgical condition of snakebite.

This cross-sectional study was undertaken to assess the consequences, morbidity and mortality in the construct of rural India. India has the highest number of deaths due to snakebites in the world. Delay in seeking medical aid or ignorance among primary care physicians about the correct treatment of snakebite is also responsible for the high morbidity and mortality.³

The objective of this study is to assess the validity and safety of snakebite protocol for surgery, for close observation and timely management of surgical condition and their outcome in a patient of snakebite.

MATERIALS AND METHODS

This study was conducted at Chhattisgarh Institute of Medical Sciences, Bilaspur, Chhattisgarh, from January 2011 to December 2015. Out of the total 284 patients admitted with snakebite in Medicine Ward and ICU, 164 patients suffered surgical complications were managed and analysed. The admission records of the patients was reviewed and

Financial or Other, Competing Interest: None.

Submission 24-11-2016, Peer Review 11-12-2016,

Acceptance 25-01-2017, Published 01-02-2017.

Corresponding Author:

Dr. K. N. Choudhary,

#5, MIG 28, Parijat Castle Ring Road,

No. 2, Bilaspur, Chhattisgarh- 495001.

E-mail: kn_nutan@yahoo.co.in

DOI: 10.18410/jebmh/2017/104



compared with regard to their age, sex, site of the bite, severity of local and general symptoms and associated surgical conditions. The ethical clearance was taken from ethical committee of the institute.

Patient with definite history of snakebite with symptoms and signs of cellulitis with or without secondary infection secondary to snakebite such as pain, swelling, fever, discoloration of skin, etc. (as symptoms) and tenderness, local rise of temperature, swelling, blistering, ecchymosis, erythema, necrosis, blebs, gangrene, petechiae, bullae, compartment syndrome, etc. (as sign) were included in the present study.

Detailed history regarding complaints, site of bite and specific therapy for snake bite (ASV and traditional methods) was recorded. Thorough local and systemic examination was carried out with special reference to local symptoms and signs at the site of the bite. The timing of debridement, the type of surgical intervention was recorded and analysed.

Inclusion Criteria

All the patients with local symptoms and signs secondary to snakebite referred for surgical management by the treating physician.

Exclusion Criteria

1. Cases with symptoms and signs of cellulitis secondary to bite due to other poisonous creatures.
2. Cellulitis due to other causes.
3. Doubtful cases of snakebite.

RESULTS

Out of the total 164 patients who developed cellulitis and other surgical complications, 75.2% were males and 24.7% were females as shown in the table. In patients with cellulitis, most were aged between 31-45 years (37.3%) and 20-30 years (35.8%) as shown in the table. The mean age of the study population was 32.4 ± 13.75 years.

In the present study, majority of the patients had snakebite on lower limb (75.2%) and most common symptom complex noted was pain + swelling in 70.3% (115) of the patients followed by pain in 15.6% (26), swelling in 10.6% (17), pain + swelling + fever in 7% (12), pain + discoloration of skin (gangrene) in 5%⁴ and pain + fever in 2.3%.⁵ Five patients who had received debridement without ASV administration due to positive skin reaction and 20 patients had received ASV and delayed debridement. Two patients of non-poisonous snakebite had experienced skin necrosis requiring skin grafting. Five patients of poisonous snakebite had suffered skin necrosis required skin grafting. Two patients of poisonous snakebite suffered from compartment syndrome where fasciotomy and skin grafting were performed. Out of 164 patients, 9%⁶ patients do not

require ASV injection possibly because of non-poisonous snakebite.

Staphylococcus aureus was the most common pathogen followed by E. coli in wound infection pattern. Monomicrobial infection was more common than polymicrobial infection.



Figure Showing Snakebite Gangrene in Left Hand

Characteristics	Number	Percentage (%)
Male	123	75.2
Female	41	24.7
<20 years of age	33	20.1
20-30 years of age	59	35.8
31-45 years of age	61	37.3
46-60 years of age	10	06.0
>60 years of age	01	0.6
Upper limb	41	24.8
Lower limb	123	75.2
Pain + Swelling	115	70.3
Pain + Swelling + Fever	12	07.0
Pain + Discoloration of skin	08	05.0
Pain + Fever	04	02.3
Pain	26	15.6
Swelling	17	10.6

Table 1. Showing Basal Characteristics of patients. Distribution (n=164)

Surgical Condition	Patient with ASV Injection	Patient without ASV Injection
Cellulitis	149 (90.8%)	15 (09%)
Skin necrosis followed by skin grafting	20 (12%)	05 (03%)
Fasciotomy	20 (12%)	05 (03%)
Compartment syndrome	02 (1.2%)	01 (0.6%)

Table 2. Showing Surgical Condition and their Treatment. Distribution (n=164)

Characteristics	Present Study	Anjum et al ¹	Nisar et al ⁷	Ahmed et al ⁸	Chetan et al ⁶	Sudhir D et al ⁹	Pandey et al ¹⁰	Butt et al ¹¹
Male	75.2%	68.7%	61.5%	69.4%	74.2%	-	-	-
Female	24.7%	31.3%	38.5%	30.5%	25.7%	-	-	-
Male:Female	3:1	2.1:1	1.6:1	2.2:1	2.8:1	-	-	-

Upper limb	24.8%	-	44.6%	-	25.7%	34.3%	28%	-
Lower limb	75.2%	-	55.4%	-	74.2%	62.2%	66%	-
Pain	15.6%	-	-	-	62.1%	90.6%	-	100%
Swelling	10.6%	-	-	-	54.5%	73.9%	-	100%
Fever	07.0%	-	-	-	7.5%	-	-	8.3%
Pain + Swelling	70.3%	-	-	-	-	-	-	-
Table 3. Showing Comparison of Different Studies. Distribution (n=164)								

DISCUSSION

In the present study, males outnumbered females with male-to-female ratio 3:1. Similar observations have been made in other studies also as shown in the table. The commonest age group presented was 20-40 years. In the present study, 75.2% of the patients presented with snakebite in the lower limb, which is comparable to other studies as shown in the table. The commonest clinical presentation was pain + swelling at the site of the bite seen in 70.3% of the patients. On comparison of clinical manifestation, wide variation observed could be attributed to the geographical and sociodemographic variation in the study area comprising of different types of snakes, the timing between the snakebite and admission to medical facility.

The fang mark from neurotoxin predominated snakebite are not remarkable with pain or swelling and difficult to identify. Petechiae, oedema, swelling and ecchymosis are remarkable from haemotoxin predominated snakebites. Severe localised pain, haemorrhagic bullae are also prominent. Duration from snakebite and accompanied soft tissue presentation are also useful in identifying snakebites. Progressive swelling of extremities may cause compartment syndrome and fasciotomy is usually required.³

Because, fasciotomy is the usual treatment for other causes of compartment syndrome, it is reasonable to consider it for the management of compartment syndrome induced by snake venom. Indeed, some practitioners have advocated for early fasciotomy in nearly all victims of rattle snake envenomation.⁵

From a surgical perspective, the first dilemma the clinician faces on managing a snakebite wound is determining whether to perform debridement on the wound site. In the past, early removal of snake venom by surgical methods was recommended as immediate management.^{12,13,14}

Due to fear of complications caused by antivenoms, several authors in the past have performed wide debridement as soon as possible followed by application of tourniquets or ice bags while omitting the use of antivenoms.¹⁵ Immediate debridement is no longer the treatment of choice in managing snakebites, rather the current standard of care is administration of ASV followed by delayed debridement.^{16,17,18}

However, to date, very few studies have explored the clinical and laboratory profile of snakebite cellulitis and gangrene and beneficial role of ASV in the treatment of surgical complication in snakebite patients. Also, no such study was done our setting earlier.

CONCLUSION

During the period of 5 years (January 2011-December 2015), a total of 284 cases of snakebites were admitted out of which 164 patients developed symptoms and signs of cellulitis. In the present study, males (75.2%) were commonly affected compared to females (24.7%). The commonest age group affected was 31-45 years (37.3%) and this can be attributed to highest number of males in this age group work in fields.

In the present study, 75.2% of patients presented with snakebite in the lower limb because most of the time man gets bitten while walking or standing.

The most common symptom complex noted was pain + swelling in 70.3%, which was due to haemotoxin present in the venom. The study shows high incidence of pain and swelling (cellulitis) in patients with snakebite, hence in any case of snakebite, proper precautionary measures should be taken to prevent the complication like strict limb elevation, ASV injection, appropriate antibiotic coverage and angioedema measures. When cellulitis has progressed for complications like compartment syndrome, necrotising fasciitis and gangrene, then immediate proper surgical intervention is required to prevent loss of limb or life. Suspected snakebite should get prompt immediate first aid in field and early transportation to nearest medical facility. Progression of signs and symptoms also indicated for ASV therapy even after several days of snakebite. Observation for progression of oedema (cellulitis) and systemic signs maybe continued during and after ASV infusion.

The limitation of the study is smaller sample size and limited population. Further multicentre studies including large sample can give a clear picture regarding accurate incidence and clinical manifestation of cellulitis and other surgical complications in snakebite in a given population, which may be helpful in forming a better management plan.

REFERENCES

- [1] Anjum A, Hussain M, Hanif SA, et al. Epidemiological profile of snake bite at tertiary care hospital, north India. J Forensic Res 2012;3:146.
- [2] Punde DP. Management of snake-bite in rural Maharashtra: a 10 year experience. Natl Med J India 2005;18(2):71-75.
- [3] Ong JR, Ma HP, Wang TL. Snake bites. Ann Disaster Med 2004;2(Suppl 2):80-88.
- [4] Huang TT, Blackwell SJ, Lewis SR. Tissue necrosis in snakebite. Tex Med 1981;77(9):53-58.
- [5] Dart RC. Can steel heal a compartment syndrome caused by rattlesnake venom? Ann Emerg Med 2004;44(2):105-107.

- [6] Chetan PR, Sagar K, Naveen PR. Incidence and clinical features of snakebite cellulitis at KIMS, Hubli. *Journal of Evolution of Medical and Dental Sciences* 2014;3(71):15070-15077.
- [7] Nisar A, Rizvi F, Afzal M, et al. Presentation and complication of snakebite in a tertiary care hospital. *J Coll Physicians Surg Pak* 2009;19(5):304-307.
- [8] Ahmed SM, Nadeem A, Agarwal S, et al. Retrospective analysis of snake victims in northern India admitted in a tertiary level institute. *J Anaesthesiol Clin Pharmacol* 2012;28(1):45-50.
- [9] Sudhir WD, Rambhau GD. Clinical profile of snake bite cases in Marathwada, India. *Indian Journal of Fundamental and Applied Life Sciences* 2011;1(4):93-99.
- [10] Pandey DP. Epidemiology of snakebite based on field survey in Chitwan and Nawalparasi districts, Nepal. *J Med Toxicol* 2007;3(4):164-168.
- [11] Butt KZ, Anwar F, Rizwan M, et al. Snakebite: experience in a field hospital. *Professional Med J* 2010;17(2):263-268.
- [12] Huang TT, Lynch JB, Larson DL, et al. The use of excisional therapy in the management of snakebite. *Ann Surg* 1974;179(5):598-607.
- [13] Glass TG. Early debridement in pit viper bites. *JAMA* 1976;235(23k0):2513-2516.
- [14] Glass TG Jr. Treatment of rattlesnake bites. *JAMA* 1982;247(4):461.
- [15] Frank HA. Snakebite or frostbite: what are we doing? An evaluation of cryotherapy for envenomation. *Calif Med* 1971;114(5):25-27.
- [16] Yin S, Kokko J, Lavonas E, et al. Factors associated with difficulty achieving initial control with crotalidae polyvalent immune fab antivenom in snakebite patients. *Acad Emerg Med* 2011;18(1):46-52.
- [17] Lavonas EJ, Gerardo CJ, O'Malley G, et al. Initial experience with crotalidae polyvalent immune fab (ovine) antivenom in the treatment of copperhead snakebite. *Ann Emerg Med* 2004;43(2):200-206.
- [18] Ruha AM, Curry SC, Albrecht C, et al. Late hematologic toxicity following treatment of rattlesnake envenomation with crotalidae polyvalent immune fab antivenom. *Toxicon* 2011;57(1):53-59.