

**PRE-HOSPITAL TREATMENT OF SNAKE ENVENOMATION IN PATIENTS  
PRESENTED AT A TERTIARY CARE HOSPITAL IN NORTHWESTERN INDIA**

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**ABSTRACT:** Snakebite is an important medical emergency. Anti-snake venom along with supportive care is the only specific treatment. However, many people put their faith in non-registered medical practitioners. Where medical aid is available, lack of trained health personnel jeopardizes the situation. This retrospective study, the first of its kind, was aimed at studying the pre-hospital treatment as well as the behavior of patients bitten by snakes and referred to the Postgraduate Institute of Medical Education and Research, Chandigarh, India. A total of 88 cases that occurred between January 1997 and December 2001 were studied. Seventy patients received treatment prior to admission (the majority was treated by non-registered medical practitioners, registered medical practitioners, and MBBS doctors). The various treatment modalities used were: anti-snake venom (ASV), tourniquet, incision and drainage (I&D), tetanus toxoid, injections, and tablets. Non-registered medical practitioners still preferred tourniquet and I&D. The patients who were referred within 24 hours stayed less time in the hospital and spent less money on the treatment compared to those who were referred after 24 hours. Non-registered medical practitioners and inadequately trained health staff are often the first contact of snakebite victims. Their traditional and unscientific methods of treatment lead to unnecessary morbidity and increased treatment cost. It is therefore necessary to train these people adequately so that proper treatment can be instituted at the earliest.

**KEY WORDS:** snake envenomation, clinical features, treatment, first aid.

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## **INTRODUCTION**

Snakebite is an important health problem in tropical countries. In India 15,000 out of 20,000 people die every year of snakebites (1). A lot of faith is put in traditional faith healers, snake charmers, and other alternative systems of medicine, such as ayurveda, unani medicine, homeopathy, and the Tibetan medicines and herbs (4). In semi-urban and rural areas these practitioners are often the earliest and easiest help available. This is compounded by the ignorance of people, lack of trained medical and paramedical staff, shortage and difficulties in transportation and storage of anti-snake venom in rural areas, and non-availability of rapid transport of the victims to hospitals. Due to the above-mentioned factors, a lot of valuable time is wasted resulting in considerable morbidity.

## **PATIENTS AND METHODS**

This retrospective study aimed at investigating the pre-hospital treatment and the behavior of patients referred to the Postgraduate Institute of Medical Education and Research, Chandigarh, India. This institute is a reference government hospital in Northwestern India that admits patients from the states of Punjab, Haryana, and Himachal Pradesh.

The records of the snakebite victims were obtained from the records library of the hospital. This library uses the ICD-10 system for classification of diseases. The relevant details were entered in a Performa on which the bite site, the type of treatment received before hospital admission, and the time taken by the victim to arrive at the hospital after the bite were recorded. The data was manually collected from the records, and the modalities of treatment preferred by the practitioners were analyzed. A total of 142 cases were included into the study, out of which only 88 patients presented available data. The data collected was crosschecked by two independent observers.

## **RESULTS**

The average time between the accident and hospital admission was 9 hours (varying from 1 to 288 hours). Most of the victims were young males living in rural areas (82.4%). Out of the 142 patients, 70 (49.3%) received first aid outside the hospital prior to

admission, 18 (12.7%) went directly to the hospital, and 54 (38%) patients had no available data (Figure 1). Out of the 70 patients that received first aid prior to admission, 29 were treated by non-registered medical practitioners (which included traditional faith healers, and persons practicing alternative systems of medicine and witchcraft); 4 were treated by registered medical practitioners; 5 by MD (Doctor of Medicine) doctors; and 35 by MBBS (Bachelor of Medicine/Bachelor of Surgery) doctors (Table 1).

The different modalities of treatment used were ASV (29 cases; most patients received it in inadequate doses - from 10 to 30 ml), tourniquet (16 cases), I&D (14 cases), tetanus toxoid (5 cases), intravenous fluids (4 cases), local medicines (4 cases), promethazine (1 cases), hydrocortisone (3 cases), and other injections – not specified in the records (3 cases); 3 patients had no details of the treatment available in the records, as shown in Table 2. Only one out of 42 patients requiring ventilation was intubated.

Further sub analysis of the data showed that 61 victims of snakebite arrived at the hospital within 24 hours, 23 arrived at the hospital after 24 hours, and 4 presented no available data.

From the 61 victims that were admitted within 24 hours, 18 went directly to the hospital, 19 had gone to non-registered medical practitioners, who used tourniquet (9 cases), I&D (7 cases), injection (1 case), and tablet (1 case); 4 had gone to registered medical practitioners, who used tourniquet and I&D (2 cases), ASV (1 case), injection (1 case), and some pills (1 case); 24 had been treated by MBBS doctors, who administered ASV (14 cases), tetanus toxoid (4 cases), intravenous fluids (2 cases), and injections (2 cases), I&D (1 case), and tourniquet (1 case); and only one had been treated by a MD doctor, who intubated the patient and referred him for ventilatory support. Thirty-eight patients required ventilatory support (average duration of 32.3 hours); 4 patients developed renal failure requiring dialysis (average duration of 18 hours), and their average hospital stay was 6.95 days.

Out of the 23 snakebite victims who arrived at the hospital after 24 hours, 10 had been treated by non-registered medical practitioners, who used tourniquet (4 cases), I&D (3 cases), pills (2 cases), injection (1 case), and ASV (1 case); 11 had been treated by MBBS doctors that administered ASV (9 cases), tetanus toxoid (1 case), intravenous fluids and injections (2 cases each), and I&D (1 case); and 4 had been treated by MD

doctors, who administered ASV to all the cases, but only 3 patients received ASV in adequate doses – the 4 patients were referred for management of acute renal failure. Only 1 patient was neuromuscular and required ventilatory support, the remaining 22 were hemostatic requiring dialysis (approximately 25 hours) and showed an average hospital stay of 13 days. The average cost of hospital stay was Rupees 3000 for those admitted to the hospital within 24 hours, and Rupees 25000 for those who were admitted after 24 hours.

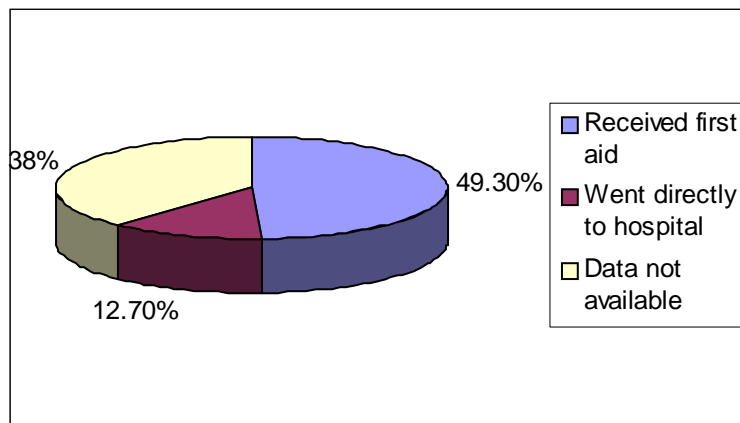


Figure 1: Percentage of patients that received first aid before hospital admission.

Table 1: Qualifications of the practitioners who administered first aid after the snakebite.

TREATED BY	NUMBER OF PATIENTS
Non-registered medical practitioners	29
MBBS doctors	35
MD doctors	5
Registered medical practitioners	4
Data not available	75

Some patients received more than one type of practitioner.

Table 2: Types of treatment given after snakebite.

TYPES OF TREATMENT RECEIVED*	NUMBER OF PATIENTS	PERCENTAGE (%)
ASV	29	41.42
Tourniquet	16	22.86
Incision and drainage	14	20
Tetanus toxoid	5	7.14
Intravenous fluids	4	5.71
Local medicines	4	5.71
Promethazine injection	1	1.42
Hydrocortisone injection	3	4.28
Other injection	3	4.28
Data not available	3	4.28

\*Some patients received more than one type of treatment.

## DISCUSSION

Snakebite is an important medical emergency in some parts of the world. In many regions, a lot of faith is put in non-registered medical practitioners rather than in the rational use of anti-snake venom and life support measures, the only proven effective therapies. There is a lack of systematic data on the number of people treated by these non-registered medical practitioners, since only a minority manages to reach hospitals directly. In Kenya, it was found that 68% of the snakebite victims had sought treatment from traditional healers (5). In a study of pediatric patients from India, it was found that only 12% received such treatment (3).

The various modalities used by these non-registered medical practitioners include witchcraft, traditional herbs, tourniquet, incision and drainage, and various injections. When medical aid is available, ASV is administered in non-therapeutic doses resulting in wastage of precious drugs and increased risk of reactions in addition to waste of time. In our study, out of the 29 patients who received ASV, only 3 received it in appropriate doses, the remaining received from 10 to 30 ml only. In neuroparalytic envenomation, even if ASV is not available, artificial ventilation using ambu bag or ventilator can reduce mortality (2). In this study only one patient was intubated from the 42 requiring artificial ventilation prior to admission. The remaining patients were treated by various modalities as mentioned above. Another important fact that comes to light is that the majority of the non-registered and registered medical practitioners still relied upon tourniquet or I&D.

These techniques instead of being beneficial are more harmful and cause serious damage (limb gangrene after tourniquet or cellulitis after I&D). Based on scientific data, they are no more recommended. Graduate doctors mainly resorted to ASV (though in inadequate doses in all cases) and tetanus toxoid, while MD doctors correctly managed and referred the patients for supportive care, though none of them administered tetanus toxoid. This fact highlights that since a lot of trust is put on these non-registered medical practitioners, and at times they are the only medical help available, adequate training of these personnel is essential. We also have to train our medical and paramedical staff more rigorously and strengthen our peripheral health services.

From the above data, it is worthwhile to mention that those patients who arrived at the hospital within 24 hours after the snakebite were mostly neuroparalytic and were referred when one or more symptoms manifested clinically. Those patients who arrived at the hospital after 24 hours were mainly presenting hemostatic abnormalities and were referred when they developed acute renal failure, which is a late manifestation. As it was already mentioned, only a handful of patients were managed correctly while the majority was treated by unscientific methods. Probably, treatment with ASV was not effective in neuroparalytic cases, since careful observation and, if required, ventilatory support could have been effective; but in those patients with acute renal failure, proper monitoring of simple clot retraction time and adequate doses of ASV could have prevented the complication. Considering the financial implications, those who were referred to the hospital within 24 hours had average hospital stay of 6.95 days with average cost of Rupees 3000, approximately eightfold in comparison to those admitted after 24 hours, who showed 13 days of hospital stay and average cost of Rupees 25000. This huge financial burden could have been avoided if these cases were properly managed in the periphery or referred to the hospital earlier.

The above data clearly shows that despite the advances in medical sciences, the improvement in transport facilities and the increase in education level, people still have a lot of faith in traditional healers. Where there is medical aid available, lack of trained medical and paramedical personnel along with life support measures further jeopardizes the situation, since only a minority of the victims received adequate doses of ASV and

life support measures. This adds to considerable morbidity and high treatment cost, which could be possibly avoided.

Most of the victims were from rural areas, approximately 3 to 5 hours away from this hospital, depending on the period of bite and the transport facilities available, but these patients arrived at the hospital after complications developed. This shows that a lot of precious time is wasted before proper treatment is instituted. The reasons include time spent by non-registered medical practitioners or inadequately trained health staffs as well as lack of transport and communication facilities, since most bites occur at night and most victims live in rural areas.

This is the first study of its kind to analyze in detail the types of treatment given and its implication to the victims. This study may not represent the country's data, since this hospital caters for the Northwest part of India and is a tertiary care center. Therefore what we experience in this institution represents the tip of the iceberg, the majority are still treated with unconventional methods and their fate remains unknown.

## **CONCLUSION**

Snakebite is an important medical emergency in some parts of the world. Despite the advances in medicine and the rational management of these victims with ASV as well as life support systems including artificial ventilation and dialysis, a lot of trust is still put in non-registered medical practitioners. Even where ASV is available, lack of trained health staff results in irrational treatment. All this results in wastage of valuable time before appropriate treatment starts, leading to increased morbidity, hospital stay and treatment costs.

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