Clinical profile and outcome of snake bite in children

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Abstract

Background: Snake bite is generally considered to be a rural problem and has been linked with environmental and occupational condition is a neglected public health problem. This study was conducted to ascertain clinical profile, complication and outcome of snake bite in pediatric population. Methods: Retrospective observational study was done in Paediatrics wards and Paediatric Intensive care unit of tertiary care institute. A medical record files of 200 patients of snakebite, between the periods of January 2013 to August 2018 were recovered from Medical Record and Statistics Section of Institute. Files were analyzed for demographic data; variables included site of bite, time of bite, type of primary treatment and treatment provider, and type of snake poison, common symptoms suggestive of hematotoxicity, myotoxicity and neurotoxicity. Results: Out of total 200 patients, 59.0% were male and most of snake bites were seen in age group of 6-12 years. All bites were nonprovocative and in 57.5% lower limb was the commonest site of bite. A 81.5% patient were primarily treated by medical personnel, 56.5% patients were received treatment within 1 hour of bite and hospitalized within 6 hours of bite. Cellulitis was commonest complication (39.0%) followed by vasculotoxicity (30%) and neuroparalysis in (27.5%), followed by respiratory paralysis in (19.0%), coagulation (17.0%). Renal replacement therapy was required in 6.5%, blood/blood product transfusion in 11% patients and case fatality rate was 11.5%. Conclusions: The most vulnerable to snake bites are boys aged more than 5 years. There is an urgent need to spread awareness among the community for avoidance of traditional treatment and any delay in medical intervention in snakebite incidents.

Keywords: Neglected public health problem, Snake envenomation, Snake bite

Introduction

Snakebite is one of the neglected tropical diseases that World Health Organization aimed to eradicate [1]. However, it has been excluded from WHO report of 2010 and 2013 on neglected tropical diseases. Currently, snakebite has been included along with other neglected non-tropical diseases such as strongyloidosis, scabies, mycetoma, etc [2,3]. The problem of snakebites has been persistently neglected by public health personnel, clinicians and policy makers even though its social and economic impact are wide spread [4].

Around 4.2 lakh cases of snake bite envenomation and 20,000 deaths have been reported globally, but the actual figures may be higher. Estimation did conservatively have revealed the death rate to be 0.297/lakh population ranging from 0.01 in North America region to 2.434 in Oceania region [5]. The regions mostly affected by snake bite are South Asia, South East Asia and sub Saharan Africa [1]. Envenomation in India is estimated to be at 81000/year, which is highest in the year in the world, followed by Srilanka, Vietnam and Brazil [1] In India, Uttar Pradesh, Andhra Pradesh and Bihar are the worst affected states with the majority of deaths being reported in Andhra Pradesh[6].

The increased mortality and morbidity in tropical countries is attributed to scarcity of anti-snake venoms, minimum access and poor quality of health care services [7]. People in countries like India prefer traditional healers rather than trained doctors, mainly because of ignorance and monetary issues as a result of which 77% of snake bite victims in rural areas die outside the health care setup[8]. Snake bites can cause
severe complications like shock systemic bleeding, respiratory muscles paralysis, acute renal failure and necrosis of tissues at the site of bite. Snakes from the family Viperidae and Elapidae are known to cause more severe consequences. Since complications of snakebite develop rapidly and irreversibly, medical interventions must be prompt and appropriate [9]. Even though deaths due to snake bite can be prevented, the mortality continues to be high because of lack of knowledge among doctors regarding the management of snake bite cases, this along with delay in conventional treatment, lack of anti-snake venom and lack of facilities of tracheal intubation and ventilation by bag-valve mask in neurotoxic cases have been major factors for death due to snake bites [10].

Unlike the other public health problems, which have received a lot of attention from both the policy makers and health care providers, snake bite has been grossly neglected by many. Hence, the current study was conducted with the objective of assessing the clinical and epidemiological profile of snake bite victims admitted to a tertiary care hospital in coastal part of South India.

Materials and Methods

Study design: The series of snake bite cases were studied retrospectively at our tertiary care & referral hospital that provide care to underprivileged, socioeconomically deprived population.

Study period: the study is conducted over a period of 5 years (January 2013 to August 2018)

Sample size: medical record files of 200 patients were taken statistical section of institute.

Study place: pediatric wards and pediatric Intensive Care Units at Maharajah’s Institute of medical sciences, Nellimarla, Andhra Pradesh.

Inclusion criteria: Demographic data collected.

The analysed variables included site of bite, time of bite, type of primary treatment and treatment provider, type of snake poison, whether cases had been directly admitted to this hospital or referred from other health centers, time interval between snakebite, common symptoms suggestive of hematotoxicity, myotoxicity and neurotoxicity, local symptoms including fang marks, condition of wound and initiation of treatment.

Exclusion Criteria: Case where the patients were discharge against medical advised were excluded. Cases of unknown bite in the absence of fang marks or any other symptoms not suggestive of venomous snake bites were also excluded.

Samples collected: Routine and specific investigations were done, these includes complete hemogram, platelet count, peripheral smear, renal function tests, liver function test, urine examination (protein, blood, haemoglobin, myoglobin), BT, CT. Specific investigation includes serum electrolytes, prothrombin time, activated prothrombin time, and electrocardiogram in some patients.

Ethical Committee Approval: As required by the government of ANDHRA PRADESH, all snake bites are classified as medico-legal cases, whose records were kept separately in medical record section. After retrieving the registration number, the medical records were obtained from the medical case files from the Medical Record Section and Statistical Service of the institute. Information collected to conform to pre-established protocol after approval from institutional ethical committee. We reviewed all the relevant data needed for our analysis.

All patients were treated as per WHO protocol [11]. A detailed systematic and local examination was carried out in all patients. Neostigmine along with atropine was administered to patients with neuroparalysis till reversal of neurotoxic manifestation. Patients were studied for complications at hospital stay. Blood/ Platelet transfusion, ventilatory support and dialysis were carried when indicated. The patients developing severe cellulitis were treated with appropriate antibiotics and anti-inflammatory agents.

Statistical Analysis: The data regarding the numerical variable were summarized thorough average, median and deviation pattern. Comparisons of categorical data were carried out using Pearson’s chi square or Fischer’s exact test were appropriate. P value less than 0.05 was taken statistically, significant.

Results

In this series total of 200 patients were registered for the study. Among them, 118 (59%) were male and 83 (41.50%) females. Most of the bites were seen in children of age group of 6-12 years age group, 133 patients (66.50%). Patients were from rural area are 130 (65%) and 128 (68%) from lower socioeconomic class. In 84% patients, toilets facilities were available and 49% were from areas facing problem of night time electric load shedding (Table 1).
Most of the snake bite cases were seen during the period of June to September.

All bites were non provocative and in 57.5% of population in night times. Lower limb 115 (57.5%) was the commonest site of bites followed by upper limb but unusual site like head and trunk was not observed in our study. A 81.5% patients were primarily treated by medical personnel. 56.5% patients were received treatment within 1 hour of bite and hospitalized within 6 hours of bite. A 39.0% patients received Anti snake venom and 90% tetanus toxoida as primary treatment.

There was various mode of clinical presentation of patients suggestive of either vasculotoxic or neuromotor nature of bite (Table 2). Local edema and cellulitis were observed in 39.0% patients. Bleeding from local sites, hematuria was present in vasculotoxic bites. Among the neuromotoric bites, 25 (12.5%) patients were admitted with altered consciousness. 18 (9.0%) and 13 (6.5%) patients developed diplopia and ptosis in 8 hours of bites respectively and 38 (19.0%) patients developed respiratory failures for which ventilatory support was provided.
Table-2: Clinical profile of Snake bite patients.

| Variables                  | Patients (N=200) | Percent |
|----------------------------|------------------|---------|
| **Time of bite**           |                  |         |
| Day                        | 85               | 42.5    |
| Night                      | 115              | 57.5    |
| **Site of bite**           |                  |         |
| Upper limb                 | 85               | 42.5    |
| Lower limb                 | 115              | 57.5    |
| **Primary Treatment Provider** |                |         |
| Medical Person             | 163              | 81.5    |
| Paramedical Staff          | 38               | 19.0    |
| Quack/Tantric              | 8                | 4.0     |
| **Type of primary treatment** |                |         |
| Tourniquet applicant       | 3                | 1.5     |
| ASV                        | 78               | 39.0    |
| Tetanus toxoid             | 180              | 90.0    |
| Primary treatment <1hr of bite | 113          | 56.5    |
| Primary treatment >1hr of bite | 88            | 44.0    |
| Admission <6hrs of bite    | 130              | 65.0    |
| Admission >6hrs of bite    | 70               | 35.0    |
| Local Edema                | 78               | 39.0    |
| Pain                       | 88               | 44.0    |
| Diplopia                   | 18               | 9.0     |
| Altered consciousness      | 25               | 12.5    |
| Ptosis                     | 13               | 6.5     |
| Respiratory Distress       | 38               | 19.0    |
| Local site bleeding        | 25               | 12.5    |
| Hematuria                  | 13               | 6.5     |

Table-3: Complications of Snake bite envenomation.

| Complications         | N=200 | Percent |
|-----------------------|-------|---------|
| Vasculotoxicity       | 60    | 30.0    |
| Neuroparalysis        | 55    | 27.5    |
| Cellulitis            | 78    | 39.0    |
| Hypotension           | 15    | 7.5     |
| Respiratory paralysis | 38    | 19.0    |
| Acute renal failure   | 13    | 6.5     |
| Coagulation           | 35    | 17.5    |
| Death                 | 23    | 11.5    |

Cellulitis was commonest complication (39.0%) followed by vasculotoxicity (30%) and neuroparalysis in (27.5%), followed by respiratory paralysis in (19.0%), coagulation (17.0%). Renal replacement therapy was required in 6.5% (Table 3). In our study, 23 deaths with case fatality reported to hospital more than 6 hours after bite and was primarily treated by Quack and other persons and most of cases died within ten hours of hospitalization.

**Discussion**

Snake bite is an environmental hazard and life-threatening emergency associated with significant morbidity and mortality in children. In India, no reliable statistics are available. To remedy the deficiency in reliable snake bite data, it is strongly recommended that snake bites should be made a specific notifiable disease. We bring a result of retrospectively collected data on clinical profile of snake bites in children from central
Most of the envenomous bites developed local and systemic complication. Vasculotoxic bites resulting into local edema, cellulitis and bleeding from local site were observed in 39% cases. Coagulation failure (17.5%), hypotension (7.5%), acute renal failure (6.5%) and these patient required blood/blood product transfusion and renal support. Among neurotoxic bite, pain at local site (44.0%) altered consciousness (12.5%) and respiratory distress (19.0%), ptopsis (6.5%), diplopia (9.0%) were noted. Similar types of complications were reported by Gautam P et al, Adhisivam B et al (22-23). Amongst 23 deaths in present study, 14 were vasculotoxic bite and 9 neurotoxic bite cases. All patients were hospitalized after 6 hrs of bite and received primary treatment from paramedical or quack.

Conclusion

1. We conclude that the most vulnerable to snake bites are boy aged more than 5 years. Mortalityafter snake bite is preventable if the victim receives timely treatment.
2. Delay in seeking medical aid and ignorance among primary care physicians about the correct treatment of snake bite is also responsible for the morbidity and mortality.
3. Our study concludes that there is an urgent need to spread awareness among the community for avoidance of traditional treatment and to prevent delay in medical intervention in snake bite incidents.

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