Original Research Article

Clinical, Epidemiological and Hematological Profile of Snake Bite in Children in Rural Teaching Hospital

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ABSTRACT

Introduction - Snake bite which is an important cause of death in rural patients in developing countries is a neglected public health problem. Snake bite is most common in school age children, adolescent and young adults. It accounts for 3% of all deaths in children of ages 5–14 years. Despite this it has only recently been officially recognized as a neglected tropical disease by the World Health Organization.

Materials & methods - Hospital based study during period of September 2010 to August 2012. All children < 15 years age group admitted with history of snake bite were evaluated at the time of admission with appropriate history, epidemiological data- sex of the victim, circumstance of bite, timing and site. The following hematological investigations were done – hemoglobin%, total count, differential count, platelet count, red blood cell morphology, bleeding time, clotting time, prothrombin time, activated plasma thromboplastin time, thrombin time and fibrin degradation products. Other investigations like urine analysis, serum electrolytes, serum creatinine, blood urea, ABG, ECG studies were done as per clinical suspicion.

Results - In this study out of 9833 admissions to pediatric intensive care unit, 118 were due to snake bite so the admission rate due to snake bite was 1.2%. Maximum number of snake bite cases was seen in the age group of 10-15 years (43.22%). Out of 118 cases, 75 were males ((63.55%) and 43 females (36.44%). Majority (98) of the cases presented with bite on lower limb (83%). This study showed higher incidence of snake bites during day time (77%).

The most common snake was viper (78.8%) followed by cobra (19.49%).

Conclusion - Snake bite cases contribute to 1.2% of pediatric intensive care unit admissions. Viperine bites were common (78.81%) than cobra bites. Snake bites were common among the age group 11-15 years (43.22%).hemorrhagic manifestations were the most common presenting symptoms.

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.

Key words: snake bite, viper, children, notifiable disease.

INTRODUCTION

Of all the animals known to man the poisonous snakes constitute a group of most intrinsically fascinating, awe inspiring and economically and ecologically important group of reptiles? They are curious creatures of nature and have countless superstitions about them.

There are about 216 species of snakes identifiable in India, of which 52 are known to be poisonous. The major families of poisonous snakes in India are Elapidae which includes common cobra (Najanaja), king cobra and common krait (bungaruscaerulus), viperidae includes Russell's viper, echiscarinatus (saw scaled or carpet viper) and pit viper and hydrophidae (sea snakes). [1]

Snake bite which is an important cause of death in rural patients in developing countries, is a neglected public health problem. [2] Snakebites represent a significant health issue worldwide, estimated to affect several million people each year and have been estimated to result in 95,000–150,000 deaths annually. [3,4] Snake bite is most common in school age children, adolescent and young adults. It accounts for 3% of all deaths in children of ages 5–14 years. [5] It is a recent inclusion to the list of neglected tropical diseases drawn up by the World Health Organization, and it could be the most neglected of all tropical diseases in the 21st century, according to a new analysis. [6] Recently the Government of India's Central Bureau of Health Intelligence reported only 985 snake bite deaths in 2010. Its incidence is usually underestimated because of lack of epidemiological data. In India the number of snake-bite fatalities has long been controversial. Estimates as low as 61,507 bites and 1,124 deaths in 2006 and 76,948 bites and 1,359 deaths in 2007 and as high as 50,000 deaths each year have been published. [7] The problems associated with snakebite are particularly acute in South Asia and India in particular, which is considered to have the highest incidence of snakebites and associated deaths in the world. [4,8,9] Community surveys are considered to be a vital means for obtaining reliable estimates of the true incidence and impact of snakebites.

Aims & objectives

It is an observational study, to study:
1. Epidemiological profile- age, sex, site of bite, time of dry and season, type of snake, time of presentation, first aid measures.
2. Clinical profile of snake bite envenomation
3. Hematological profile.

MATERIALS & METHODS

Hospital based study during period of September 2012 to August 2014

Inclusion criteria:

Children<15 years of age admitted consecutively with clinical features of snake bite envenomation.

Exclusion criteria:

1. Age> 15 years
2. Children with diagnosed bleeding/ coagulation disorder.
3. Pre-existing neurological illness.
4. Patients who received anti snake venom (ASV) before arriving to hospital.
5. Co-existent infections associated with bleeding manifestations.

Ethical clearance and informed consent:

Before the commencement of the study, informed consent was taken from the parents of the study sample. Purpose of study was explained in local language (Telugu) and subjects who were willing to participate were included in the study and a written consent was obtained. Ethical clearance was obtained from ethical committee.

Sample size and design – 118 consecutive cases.

Method of examination:

Purpose of the study was explained to the subjects and informed consent was taken. All children < 15 years age group admitted with history of snake bite were evaluated at the time of admission with appropriate history, epidemiological data- sex of the victim, circumstance of bite, timing, site. The snake was identified if the

victim has brought the specimen or by the description of snake given by victim. If the victim has not seen the snake, the diagnosis of the biting species was done based on the clinical/laboratory abnormality. The following hematological investigations were done – hemoglobin%, total count, differential count, platelet count, red blood cell morphology, bleeding time, clotting time, prothrombin time, activated plasma thromboplastin time, thrombin time and fibrin degradation products. Other investigations like urine analysis, serum electrolytes, serum creatinine, blood urea, ABG, ECG studies were done as per clinical suspicion.

RESULTS

In this study out of 9833 admissions to pediatric intensive care unit, 118 were due to snake bite so the admission rate due to snake bite was 1.2%. Maximum number of snake bite cases was seen in the age group of 10-15 years (43.22%) (Table 1)

Table 1: Age wise distribution of snake bite cases

Age group	Number of cases	Percentage
<5	20	16.94
6-10	47	39.83
10-15	51	43.22

Out of 118 cases, 75 were males (63.55%) and 43 females (36.44%).Majority (98) of the cases presented with bite on lower limb (83%). This study showed higher incidence of snake bites during day time (77%). Fang marks were present in 69.7% of cases. The most common snake was viper (78.8%) followed by cobra (19.49%) (Table 2)

Table2: Distribution of cases based on biting species

Species	Number of cases	Percentage
Viper	93	78.81
Cobra	23	19.49
Krait	2	1.69

In this study maximum bites were seen during April to June (35.59%). Out of 118 cases, 19 cases (16.11%) consulted traditional health care practitioner, 62 cases (52.54%) reached primary health centre while 37 cases (31.35%) reached tertiary hospital. 67 (56.77%) out of 118 did not receive any first aid. (Table 3)

Table 3: Distribution of cases depending on first aid received after bite

Type of first aid	Number of cases	Percentage
Local incision	5	4.23
Tourniquet	12	10.16
Local incision + tourniquet	26	22.03
Local application/ingestion of herbal medicine	8	6.77
No local treatment	67	56.77

In this study local reactions observed were cellulitis (70.53%), bleeding (57.62%), regional lymph node enlargement (93.22%), tenderness (84.74%), compartment syndrome (2.54%), blistering (3.38%) and gangrene (5.08%)

In this study following hemorrhagic manifestations were seen: bleeding from injection site (47.54%), hematemesis (2.54%), hematuria (1.69%), bleeding gums (1.69%), epistaxis (0.84%) and haemoptysis (0.84%).

In this study, neurological involvement was seen in 21.18% of cases. Ptosis was the most common feature followed by altered sensorium .Vomiting and pain abdomen was observed in 32.2% and 11.86% of the cases respectively. Anemia in 45.76% of cases, arrhythmia in 0.84%, renal failure in 1.69% cases and leucocytosis in 61% cases. Hematological profile (Table 4)

Table 4: Hematological profile

Parameter	Number (n=118)	Percentage
Prolonged bleeding time	11	9.32%
Prolonged clotting time	67	56.77
Prolonged activated partial thromboplastin time	18	15.25
Prolonged thrombin time	18	15.25
Elevated fibrin degradation products	18	15.25

All the cases of snake bite were managed according to the National protocol. Hypersensitivity to anti snake venom was observed in 8 patients. Supportive treatment with blood transfusion was given in 6 cases. 1 patient died in the hospital due to respiratory paralysis.

DISCUSSION

In India no reliable statistics are available. It is evident that snake bite cases constitute a significant proportion of hospital admissions. To remedy the deficiency in reliable snake bite data, it is strongly recommended that snake bites should be made a specific notifiable disease.

Snake bite can virtually occur at any pediatric age group. Older children in rural areas are given responsibility of carrying out outdoor activities like grass cutting, cattle grazing and firewood collection etc. thus making them an exposed age group for snake bite as seen in our study. In this study, 43.22% of the total cases belonged to age group 11-15 years. The youngest patient recorded was 5 month old baby bitten at home. This is in accordance with the study conducted by Kulkarni et al who reported the maximum incidence in the age group 11-15 years contributing to 40.4% of total cases. [10] The higher incidence in this age group could be due to child labour, children of farmers going to fields with their parents to help.

In this study maximum snake bites were seen in males (63.55%) compared to females (36.44%) which is in accordance with Kulkarni et al where males constituted 68.4% compared to females (31.59%) [10] In this study the most common snake was viper (78.81%) followed by cobra (19.49%) and krait (1.69%). This was similar to Kulkarni et al study where viperine bites were common (38.23%) [10]

Snake bites are usually encountered in the lower limb, around the ankle. In this study, 83% of cases were bitten on the lower limb. Similar observations were made in studies done by Kulkarni et al and Virmani et al who reported 79.9% and 80.6% respectively. [10,11]

Purely unintentional bites are more likely to occur in the lower extremities because the victim unintentionally startles the snakes and the lower limbs are more amenable for the bite. Hence, protective clothing like wearing trousers and shoes can be advised to children to minimize the risk.

In this study the higher incidence of bites occurred during day time (77.11%) and maximum during April to June (35.59%) which was in contrast to the study conducted by Virmani et al who reported maximum bites during July to August (52.6%). [11]

In this study, 16.11% consulted traditional health practitioner, 52.4% reached primary health centre while 31.35% reached tertiary hospital. Sloan et al in a study of health care seeking behavior of 50 cases of snake bite among South African sub district patients found that 62.5% consulted traditional health practitioner. [12] An interesting observation in this study was that 52.4% of the cases of snake bite presenting to primary health centre are eventually referred to tertiary hospital. These referrals result in delay of initiation of treatment. To decrease the morbidity and mortality due to snake bite, medical officers should be well trained in handling cases of snake bite and primary health centre's should have adequate supply of anti snake venom.

In this study 56.77% cases received no first aid measures while in Kulkarni et al study 88% of cases did not receive first aid measures. [10]

Common local reactions observed were regional lymph node enlargement (93.22%), cellulitis (70.53%), bleeding (57.62%) similar findings were found in Kulkarni et al study. [10]

In this study hemorrhagic manifestation were seen in 55.05% of cases while Kulkarni et al and Saini et al reported in 55.9% and 84% cases respectively. [10,13] neurological involvement was seen in 21.18% cases while Kulkarni et al reported in 12.5% cases. [10] Gastro intestinal symptoms observed in 32.2% cases while Saini et al reported in 16% cases. [14] Renal failure reported in 1.69% cases similar observation made by Kulkarni et al who reported in 1.4% cases. [10]

Hematological profile

Anemia was observed in 45.76% cases while Saini et al reported in 40% cases. [14] Leucocytosis reported in 61% cases and thrombocytopenia in 5.93% cases. These findings were similar to observations made by Saini. [13]

Bleeding time was prolonged in 9.32% cases similar observations made by Saini (12%). [14]

Coagulation profile: clotting time was prolonged in 56.77% cases. Similar disturbances were observed by Kulkarni et al (58.6%). [10]

Prothrombin time, activated partial thromboplastin time, thrombin time were prolonged in 15.25% cases. Fibrin degradation products were elevated in 15.25% cases indicating fibrinolysis.

Outcome can be fatal in patients presenting late so awareness amongst masses is important regarding the seriousness and early treatment. Early diagnosis, appropriate treatment and close monitoring of children for development of complications and its prompt management can be life saving.

CONCLUSION

Snake bite cases contribute to 1.2% of pediatric intensive care unit admissions. Viperine bites were common (78.81%) than cobra bites. Snake bites were common among the age group 11-15 years (43.22%).

Hemorrhagic manifestations were the most common presenting symptoms.

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.

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