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Original Research Article

Profile of neurotoxic snakebite in children in a tertiary care centre of eastern India

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ABSTRACT

Objective and Design: Snakebite is a common hazard in Indian paediatric population. The objectives of our study was to find out the incidence of neurotoxic snakebite, to evaluate the clinical profile of neurotoxic snake bites along with outcome after treatment.
Material and Methods: A hospital based study including all cases of neurotoxic snakebite below 14 years admitted to department of paediatrics, M.K.C.G M.C.H, Berhampur. Patients were diagnosed by clinical history along with signs and symptoms of envenomation and history of Snakebite during the study period from OCT 2014- SEP 2018. Management was done according to the WHO criteria. The various features and complications encountered during the case management were noted down in the format designed for study.
Study Setting: Dept. of paediatrics M.K.C.G M.C.H, Berhampur, Ganjam
Results: Total numbers of enrolled cases were 113. Out of them highest incidence of bites were seen in September (15.3%). Males and age group of 10-14 years were mostly attacked. Most frequent site of bite was leg. Most common identified snake was krait (6 0.7%). Commonest time of hospitalisation is 3-6 hrs after the bite. Ptosis was the most common manifestation. 30.3% of admitted children were having abnormal CRT whereas 7% were having abnormal BT/CT. 38.7% were treated with ASV and 22% by neostigmine with atropine. 23% patients were having complications with local gangrene being the most frequent one. 3.9% children died in my study most of them were in 10-14 age group. Maximum deaths are due to cobra bite.
Conclusion: Early hospitalisation, abstinence from age old local practices, judicious use of ASV, aggressive management by neostigmine and atropine in diagnosed cases of neurotoxic snakebite and extensive treatment of severe complications by the WHO guidelines can lead to decreased mortality. Keeping the cost benefit ratio and burden of snakebite in mind the ASV should be used when indicated.

1. Introduction

Snakebite is predominantly an occupational hazard in the rural tropics. In developing countries where this condition is more common the majority of the victims are initially treated by professional snake healers, snake charmers and religious men. Various studies have shown that India, to have most envenomations in the world i.e. 81,000 and 11000 deaths annually.[1] Snake bite is responsible for 2.8 to 5.3 percent of the mortality of the total hospital admissions in different states of India as compared to 20 deaths per year in United States of America or even lower mortality of one death every 3 to 5 years in Europe.[2] Our state Odisha adds a significant number to the snake bite group due to its geographical, economic, social and ecological status.[3] According to a study done by Dr. B. N. Mohapatra the annual incidence in the state of Orissa has been quoted as between 25,000 and 60,000 with an annually mortality between 400 and 900.[1,4] Children because of their smaller body mass for venom distribution are more likely to have a serious systemic reaction to envenomation.[5]

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The family of Elapidae consists of major neurotoxic snakes**.**The four genera contained in the family are *Naja (cobra*), *Bungarus (Krait)*, *Calliophis (coral snake*), *Ophiophagus (king cobra).* Neurotoxins of elapid venom cause neuromuscular blocks of non-depolarizing type similar to that of curare.[6] According to the mechanism by which they block the neuromuscular transmission neurotoxins in elapid venoms fall into two groups. The first group is comprised of cobra toxin, alpha bungarotoxin and probably neurotoxin as seen in most other elapid and sea snake venoms. They produce anti-depolarizing neuromuscular blocks by acting on the post-junction membrane of the motor end plate similar to D-Tubocurarin.[7] They depress the end plate potential without affecting the terminal nerve spike, resting membrane potential and action potential of the muscle. The objectives of this study was to find out the incidence and presentations of neurotoxic snakebite And study the morbidity and mortality pattern.

2. Materials and Method

Hospital based prospective study during period of October 2015 to September 2018. (2years). Children <14 years of age admitted with suspicions of neurotoxic snake bite were included. Clinical features like acute onset ptosis, opthalmoplegia, bulbar palsy, fatigue, respiratory distress after alleged case of snake bite were included in the cohort. Non-neurotoxic bites were excluded. 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 (odiya) or hindi and subjects who were willing to participate were included in the study and a written consent was obtained. Ethical clearance was obtained from institutional ethical committee.

3. Results

1. Total patients included in the group were 113. Total snake bite cases admitted were 560. The neurotoxic bite consists of 20% of the whole cohort.
2. The annual incidence of neurotoxic bite was 37.3.
3. 14 patients (12.3%) were from less than 5 year group. 35 patients were from 5-9 year group (31%). 64 patients were from 10 years or above (64%). Mean age was 9.1 years.
4. Peak incidence of snakebite in September consisting 15.3% of all the admissions. And lowest incidence was seen in December having 3.3% of total admissions.
5. In this study males comprise 65.5%male and female 34.4%.
6. Maximum numbers of bites were seen in legs (42.8%) followed by feet (28.3%). More bite seen in inferior extremity (80.1%).
7. The time of bite is maximally day time having 63.5% of total envenomation. The provoked bites were more common comprising 68.9% of all the bites.
8. In this study 79.8% people used binding above the bite site as local treatment. Local application of plant extract was seen in 51.6% of people and 18.9 % people cut the wound site. Local magicians treated 54.4% of patients. The patients were taken to local hospitals in 55.1% of cases.
9. Ptosis was the commonest symptom, which was seen in 94% bites. It was followed by respiratory distress (76%). 17.6 % patients presented with unconsciousness. 17.6% patients presented in respiratory failure, and were admitted in intensive care unit. (Table-1).
10. Anti - snake venom (ASV) along with atropine and neostigmine therapy, was the treatment used in all the patients. Reaction to ASV was seen in 10.6% of patients. Allergic rash was the commonest reaction encountered. 64.5% patients improved from the neurological features of snake bite in 4 days of atropine and neostigmine therapy. Mean duration of atropine /neostigmine therapy was 2.6 days. 18% of patients needed repeat ASV dose for delay in disappearance of symptoms. Mean duration of hospitalization was 3.5 days.
11. Total death toll was 8. Respiratory failure was the primary cause of death (6 patients). 2 patients died due to shock.

Table 1: (clinical symptoms)

Clinical features	**percentage**
ptosis	94%
Respiratory distress	76%
pain abdomen	42%
vomiting	28%
diplopia	21%
dyspnea	18%
dysphagia	18%
unconsciousness	18%

4. Discussions

Snake bite can virtually occur at any paediatric age group. In the present study, age group of 10 to 14 years constituted maximum patients in the cohort. In a study done by Kulkarni et al observed that the maximum incidence was in the age group of 11-15 years contributing 40.4% of total cases.[2] As the age group of 6-15 years, i.e. school going children constitute around 85.5% of total cases, it is ideal to incorporate topics regarding the prevention, first aid and benefits of anti snake venom treatment into the academic syllabus. In this study the maximum admissions seen in the September month. The epidemiology curve

shows rise in incidence of envenomations in march and it will peak in September again fall in October. The study goes in hand with study done by B.Mohapatra et al and D.Koirala et al.[4,8] But it contrasts to the study by kulkarni et al.[2] Gender difference in the incidence of snake bite has long beenrecognized being unfavourable to the male sex. Similar trend observed in B. Mohapatra study.[1] The gender difference could be due to several reasons like work in the fields and outside. It is limited in females.

54.4% were treated by local magicians. This is a very bad practice in rural odisha. The magical healers occupy a great place in the tribal psychology. Even educated people believe sometimes. In some families the dominant grandmother commands the parents to take the child to magicians. In tribal areas of Odisha availability of allopathic doctors are very rare. This leads to rampant practice by the magicians.

Ptosis (94.6%) was the most common feature followed by dysphagia (52.2%), unconsciousness (20.3%), irritability (15.93%), opthalmoplegia (3.38%). Kulkarni et al, observed neurological involvement in 12.5% cases, with common symptom being ptosis and drowsiness.[4] The increased incidence of central nervous system symptoms compared to previous study may be due to delay in presentation to the hospital or increase in the quantity of venom injected, more incidence of krait and cobra bite in local population. Elapid bite envenomati on produces a clinical syndrome characterized by abdominal pain, vomiting, negligible local signs and descending paralysis starting as soon as 30 minutes after bite or sometimes as late as 4 hours.[9] Mitrakul et al[10] in their study observed that the characteristic systemic signs of elapid bite were those resulting from the neuromuscular effects of the venom and included ptosis, frothy saliva, slurred speech, respiratory failure, and paralysis of the skeletal muscles. These episodes occurred within 8 hours in 94% of the cases, and at the latest 19 hours following the bite.[10] Most patients are unable to identify the snake because of ignorance or poor visibility in darkness. Many times children are unable to know that they were bitten. In kuchcha house, people sleeping on floor are more prone to get bitten. Pain abdomen, the cardinal symptom of Krait bite, can precede neurological symptoms by several hours and at times may be the only presenting complaint particularly in the early morning hours. The most important manifestation in cases of elapid envenoming is the sudden development of respiratory paralysis. This emphasises the importance of anticipation of this complication and timely intervention. A bitten individual with minimal neuroparalytic signs and symptoms should be kept in semi prone position to avoid aspiration, or an endotracheal tube should be inserted to prevent aspiration. Development of respiratory distress causing respiratory paralysis was observed in 76% o f patients in the present study while Ariaratnam et al[9] and Adhisivam et al[11] in their studies reported 64% and 50% of their cases requiring mechanical ventilation respectively. 8 patient died on total in this study. Maximum died due to respiratory failure. All of them presented to hospital after 6 hours of initiation of symptoms.

5. Conclusions

Snakebite is a major cause of hospitalization in children of tropical countries like India. Adolescent and pre-adolescent male children are more affected. Rainy season brings maximum attacks. Conventional treatments like binding, local application of herbs, cut, mantras by magicians cause unnecessary delay in hospitalization. Ptosis was the most common symptom in neurotoxic snake bite. Symptoms of neurotoxic snake bites in children which can be of help in early diagnosis and management of neurotoxic envenomation in which there is no history of snake bite or the snake is not seen, brought in, or correctly identified. Neurotoxic snake bite must be kept as an important differential diagnosis in a child presenting in emergency in early morning hours with abdominal pain, vomiting, ptosis and descending paralysis even in the absence of any history of snake bite or visible bite marks. Early treatment by ASV is the most appropriate treatment. Neostigmine and atropine are to be given very aggressively to counteract the neurotoxic features. Respiratory failure is primary cause of death. Early treatment provides better prognosis.

6. Conflict of interest

None

7. Source of funding

None

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