ORIGINAL PROF-510

SNAKE BITE ;
DEMOGRAPHIC FEATURES, MANIFESTATIONS, COMPLICATIONS AND TREATMENT

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ABSTRACT

OBJECTIVES: To find out demographic features, manifestations, complications and effects of treatment in victims of snake bite in Multan region. **DESIGN:** Prospective observational study. PERIOD: 1986 to 1996 **MATERIAL AND METHODS:** All the patients coming to the Nishtar Hospital Multan with history of snake bite between 1986 and 1996 were included in the study. Their demographic features and manifestations of snake bite were recorded. In addition to general measures, antivenom if indicated was given and its effects noted. **RESULTS:** A total of 134 patients of snake bite, 103 males and 31 females, with age ranging from 1-84 years (mean 25 years) were studied. Snake was seen in 54% cases, 60% patients were bitten during the dark, 52% patients were bitten on the foot, 79% patients received first aid, either cut or bandage. Local pain and swelling, nausea, vomiting, fever and spontaneous bleeding were common manifestations, 49.7% patients required local treatment, 2.2% patients required respiratory support. Antivenom was given to 62.6% patients, 2.2% patients showed severe anaphylactic reactions and antivenom was withheld. Average dose of antivenom given was 60 ml. 1.4% had toe amputation and 2.2% patients died. **CONCLUSION:** Spontaneous bleeding is the most common manifestation of snake bite in this area. Antivenom can be successfully given to a large majority of victims if reactions are treated and effects of antivenoming can be life saving. **KEY WORDS:** Snake bite, Antivenom

INTRODUCTION

In the tropical developing areas of world, snake bite is an important cause of life threatening or debilitating accidents specially in agricultural workers. The true incidence is difficult to assess because snake bite is largely a problem of remote rural areas where the victims resort to traditional herbalists rather than try to reach the hospital. In colonial era there were more than 20, 000 deaths each year from snake bite in India and recently more than 1000 deaths were recorded in one year in Maharashtra state alone[1]. In sub-Saharn West Africa carpet viper causes hundreds of deaths each year, in certain geographical foci incidence is as high as 500/100,000 population per year with 12% mortality[2].

This study was conducted to find out risk factors, manifestations, complications and effects of treatment in our locality.

MATERIAL AND METHODS

All the patients coming to the Nishtar Hospital with history of snake bite were included in the study. The study period extended from 1986 to 1996. Patients were admitted to the same Medial Unit irrespective of the day or time of arrival. Detailed history included time and place of bite, time between snake bite and appearance of first symptom and local treatment. Symptoms of envenoming were included in the proforma and inquired about. During examination local and systemic manifestations of snake envenoming were looked for and recorded. Patient was re-evaluated to look for appearance of new features or any change in the existing one.

Anti tetanus serum (ATS) and tetanus toxoid (TT) was given as required. Management consisted of general measures for local manifestations (including pain killers, dressing antibiotics or surgical interventions) and systemic manifestations (including fluids, transfusions and respiratory support as required), and antivenom therapy. This polyvalent antivenom was prepared by National Institute of Health Islamabad and made available through the hospital pharmacy free of cost. Indications of antivenom therapy included: Local manifestations

- Serve degree of edema involving half of the bitten limb
- Rapidly spreading edema (more than 30 cm per hour)
- Local necrosis or blisters
- Bite at head or neck
- Systemic manifestations
- Spontaneous bleeding
- Neurological deficit
- Altered conscious level
- Hypotension
- Evidence of hemolysis
- Acute renal failure

Each patient was tested for sensitivity. Initially five vials (50ml) were added to 500ml of IV fluid and infused slowly (5-10 drops per minutes) while patient was monitored closely. If patient tolerated it well, speed of infusion was increased and antivenom was given in about 2-3 hours. If patient developed reaction, he was given antihistamine with or without steroids and infusion was continued at slower rate. Sometimes it took upto 6-8 hours. Antihistamines/steroids were repeated if required. In patients developing severe reaction like anaphylactic shock, antivenom was withheld. Antivenom was repeated after 12 hours if required.

RESULTS

A total of 134 patients of snake bite were admitted to the Nishtar Hospital Multan between 1986 and 1996. Seventy-two cases (53.7%) out of 134 were from Multan while 22 cases (16.4%) from

Muzaffargarh, 16 cases (12%) from DG Khan and 24 cases (17.9%) from Khanewal, Toba Tek Singh and Vehari. In these 103 (77%) were males and 31 (23%) were females with age ranging from 1-84 years (mean 25 years). Age distribution is shown in Table 1. Mean time interval between bite and presentation was 18.23 hours and the mean time between bite and first symptom was 35 minutes. Fang marks were seen in 107 patients. Thirty-three (25%) cases were bitten before sunrise and 47 (35%) cases were bitten after sunset while 54 (40%) cases were bitten during day light. Snake was killed in 27 (20%) cases, seen but not killed in 46 (34%) cases and was not seen in 61 (46%) cases. Commonest site of bite was feet (Table-2).

One hundred and six (79%) patients received first aid before coming to the hospital; 38 (28.4%) were given out at the site of bite, out of these 37 had infections; 68 (50.7%) were bandaged above the site of bite and out of these 52 had swelling and 18 had evidence of local ischemia.

Table - 1. Age distribution of snake victims

Age (in decade)	Number	%age
1-10	12	9
11-20	31	23.1
21-30	48	35.8
31-40	20	15
41-50	12	9
51-60	8	5.9
>60	3	2.2
Total	134	100

Table -2 Site of Bite

Site	Number	%age
Right Foot	37	27.6
Left foot	33	24.6
Right Hand	14	10.4
Left Hand	10	7.5
Right ankle	6	4.5
Right leg	3	2.2
Right arm	3	2.2
Face	1	0.8
Fang mark not seen	27	20.2
Total	**134**	**100**

Pain and swelling at the site of bite were common local manifestations while mausea, vomiting fever and spontaneous bleeding were common systemic manifestations (Table 3, 4).

Twenty seven (20.1%) patients had anemia, 19(14.2%) patients had hematuria and 67 (50%) patients had prolonged clotting time (>8.min).

Local treatment in the form of dressing, elevation of limb and debridement was given to 53 (39.7%) patients. ATS & ATT were given to 98, (73.38%) patients, blood transfusions to 8 (6%) and antibiotics to 72 (53.7%) patients. Three patients (2.2%) required respiratory support.

Antivenom was given to 84 (62.6%) patients after checking sensitivity. There was no reaction in 12 (8.9%), minor reaction in 35 (26.1%) and significant reaction in 34 (25.4%) patients. Three (2.2%) patients developed severe anaphylactic reaction and antivenom was withheld. Minor

reaction was treated with antihistamines alone while significant reaction was treated with antihistamine and steriods. Antivenom was continued but at a slower speed. Adrenaline was given to only those patients who developed anaphylactic reaction. Average dose of antivenom given was 60 ml. Sixty-two (46.3%) patients were given 50ml in a single dose, 14 (10.4%) patients were given 80-100 ml in two doses and 8 (5.9%) patients were given more than 100 ml in three doses. Duration of infusion was 2-3 hours in patients who had no or minor reaction and 4-6 hours in patients who developed significant reaction. There was no difference in

Table-3 Local and systemic symptoms (N=134)

Symptom	Number	%age
Local		
pain at the site of bite	122	91
Redness and swelling	101	75
Bleeding	51	38
Systemic		
Nausea and vomiting	58	43.3
Fever	43	32
Bleeding gum	33	24.6
Headache	28	20.9
Bleeding nose	16	11.9
Hematuria	14	10.4
Dysphagia	13	9.7
Abdominal pain	11	8.2
Dysphonia	11	8.2
Dysarthria	11	8.2
Dyspnea	10	7.5

Table-4 Local and systemic signs and complications (N=134)

Sign	Number	%age
Local		
Swelling	89	66.4
Bleeding	36	26.9
Ischemic/necrosis	19	14.2
Blisters	5	3.7
Celluloids	1	.74
Systemic		
Tachycardia	42	31.3
Tachypnea	38	28.3
Fever	34	25.4
Abnormal bleeding	31	23.1
Hypotension	5	3.7
Multipal cranial nerve plasies	4	2.98
Jaundice	3	2.2
Loss of consciousness	3	2.2
Respiratory muscle	3	2.2
Paralysis requiring assisted		
ventilation		
Convulsion	2	1.4
Acute tubular necrosis	1	.74
Complications		
Gangrene	2	1.4
Foot/limb amputation	nil	nil
Toe amputation	2	1.4
Anaphylactic shock	3	2.2
Mortality	3	2.2

incidence or severity of reaction between first and second or third dose.

DISCUSSION

There are five families of venomous snakes comprising more than 200 species of potential medical importance. Their venom contain many different compounds principally polypeptide toxins, toxic enzymes and other proteins. Toxins of different species differ toxicologically and immunologically resulting in diversity of clinical manifestations and complications.

In Pakistan there are 40 species of poisonous ground snakes and 19 species of poisonous sea snakes. Commonly encountered ground snakes are Cobra (common cobra, king cobra), Kraits (common kraits, banded kraits) and Vipers (Russell viper and saw scaled viper).

A small number of snakes are killed and brought to the hospital, hence species diagnosis remains presumptive. In this study in 54% cases snake was seen and in only 20% cases it was killed but even then it was not brought to the hospital.

The snakes have been divided into three families depending upon effects of their venom; neurotoxic (Elapidae eg, cobras, kraits, coral snakes), myotoxic (Hydrophidae eg, sea snake) and cytolytic plus hemotoxic and vasculotoxic (Viperidae eg, vipers, adders). Recently due to the development of specific and sensitive immunodiagnostic techniques for the diagnosis of species a number of exceptions to this generalization have been found[3].

Young age and darkness were important risk factors as young individuals tend to take more risk and perform tasks in agricultural fields in the dark[4]. Feet were the most common site of bite (52%) followed by right hand (10%) as expected[4]. Definite fang mark was identified in 80% cases.

Spontaneous bleeding (usually from gums or site of bite) was the most common systemic manifestation seen in 38%. It was reported in 35% cases in Papua. New Ghuinea[3].

Neurological manifestations (cranial nerve palsies, generalized paralysis) were seen in less than 10% cases; only 3 patients required respiratory support. Loss of consciousness and convulsions were seen in 3 (2.2%) and 2 (1.4%) cases respectively. Neurological manifestations are less common in our area compared with reports from other places[3]. It means bite from snake with neurotoxic venoms (Elapidae) are less common in this area. There was no case of late neurological manifestations as reported by other workers[5].

More than 75% cases did get first aid, bandage above the site of bite being the most common. Patients who had local incision or tight bandage developed more severe local problems. First aid treatment of snake bite has been subjecct of dogmatism with little clinical investigation. Immobilization of the bitten limb with a splint or sling is the only first aid measure recommended. Traditional first aid methods like incisions, suction, tourniquets and electric shocks should be avoided. Tourniquets can delay the systemic spread of venom from the site of bite but ischemic damage which can result from prolonged application has discouraged their use. Crepe bandage and splinting of the bitten limb also can delay systemic absorption of venom but it should only be used if there is no local effects of the venom. Application of high voltage, low current DC electric shock has not been evaluated in any clinical trial and is potentially dangerous.

The only effective antidote to venom is hyper-immune immunoglobulin (antivenom) raised in animals such as horses. There was time when antivenom was considered more dangerous than effect of venom itself. However, there is now

compelling evidence that antivenom can reverse both systemic and local effects of venom.

Antivenom was required in 84 (62.6%) cases. These included 11 cases who had no fang marks. So absence of fang marks doesn't mean patient will not develop toxic manifestations of envenoming. Antivenom was continued even in those patients with significant reaction. It was only withheld from patients who developed anaphylactic reaction. Antivenom being foreign protein, minor reactions are common but antivenom therapy in required dose can be successfully given to the majority of the patients provided each patient is closely monitored for reactions and necessary steps are taken to control these reactions. Initial dose of 50ml should be repeated if manifestations persist.

Newer antivenom are being prepared and tried which are either more effective or have lesser incidence of reactions [6,7,8]. Pretreatment with antihistamines and steriods has no effect on incidence of reaction[9]. Addition of immunoglobulin to antivenom may eliminate the need to repeat antivenom in ptients with coagulopathy[10].

Local and hematological manifestations generally responded very well. Two cases developed gangrene which required amputation of toe despite timely antivenom therapy. This kind of failure has been reported by the other workers too[11]. Three patients died of severe shock and uncontrolled bleeding from mucoous membrane, two of these were those who developed anaphylactic reaction and could not be given antivenom.

Neurological complications seemed to take their own course. Lalloo et al[3] reported that antivenom corrected bleeding tendency but had no effect on neurological complications although early therapy decreased incidence and severity of neurotoxicity.

CONCLUSION

Following conclusions are drawn from this observational study.

- Young age and walking about, around the sunset are important risk factors.
- Spontaneous bleeding is the most common manifestation of snake bite in this area.
- First aid treatment other than immobilization and splinting should be discouraged.
- Antivenom in adequate dose can be successfully given to a large majority of victims if reactions are closely observed and treated.
- Effects of envenoming can be controlled if patients is given specific treatment.

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A picture is a poem without words

Horace