ORIGINAL PROF-1386

SNAKE BITE;
EXPERIENCE IN A FIELD HOSPITAL

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Article Citation:
Butt KZ, Anwar F, Rizwan M. Snake bite; experience in a Filed Hospital. Professional Med J Jun 2010;17(2): 263-268.

ABSTRACT.... Introduction: 15 percent of the snakes are poisonous and present a potential life threatening risk to human lives. **Objectives:** (1) To review the demographic, epidemiological, clinical and laboratory findings of 48 patients of snake bite treated in a field hospital. (2) To evaluate the treatment and outcome of these patients. **Design:** A retrospective study. **Setting**: Field hospital in rural Sindh. **Period:** From January 2002 to December 2003. **Material & Methods**: All patients diagnosed with snake bite had first aid treatment by a either a nursing staff close to the place of bite or by a quack and later on transferred to field hospital. The first aid treatment consisted of pain relief (injectable diclofenac, oral acetaminophen), application of bandage or tourniquet proximal to the bite, antihistamine (oral or injectable chlorpheniramine) anti- inflammatory (injection hydrocortisone) and immobilization of the affected limb with a splint. **Results:** We are treated 48 patients with snake bite. There were 45(94%) male patients and 3(6%) female patients. Age range was 18 to 56 years with a mean age of 29.8 years. 35(73%) patients suffered from snake bite between the months of May and September. The timing of the bite was also peculiar with 36(75%) patients bitten between 8pm and 8am whereas only 12(25%) patients during other times of the day. 38(79%) patients gave history of seeing the snake themselves and 10(21%) patients were not able to see the snake mainly because of darkness. **Conclusion** It should be remembered that not all snakes are poisonous and that they are more afraid of humans than we are of them. Psychological effects of the bite are at times more devastating than the clinical effects, therefore patient reassurance forms part of the treatment.

Key words: Snake bite, acetaminophen, venom, viper, krate

INTRODUCTION

Snakes are usually found in every part of the globe. However, the type of snake found in a particular area varies considerably. There are around 3000 different types of snake prevalent in different parts of the world. Out of these 3000 different types, only 15 percent of the snake are poisonous and present a potential life threatening risk to human lives[1]. Although the proportion of the poisonous snakes is very less but the fear of snakes causes great panic at time and makes clinical judgement and management more difficult and challenging. The morbidity and mortality from the snake bite varies considerably between developing and the developed countries. There is a lack of proper reporting system of snake bite related deaths in developing countries leading to inadequate epidemiological data. Lack of facilities at the local hospital, treatment by the local quacks, travelling time to a major hospital and transport issues compound the problem of effective management of snake bite patients thus adding to mortality and morbidity. It has been reported that in most developing countries, nearly 80% of individuals bitten by the snakes first consult traditional practitioners before visiting a medical centre[2]. This delay in seeking the medical advice and treatment leads to victim's death during transit to the hospital.

The purpose of this study was to review the demographic, epidemiological clinical and laboratory

Article received on: 16/07/2008
Accepted for Publication: 25/08/2008
Received after proof reading: 12/04/2010
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findings of 48 patients of snake bite treated in a field hospital and to evaluate the treatment and outcome of these patients.

MATERIAL AND METHODS

It is a retrospective study of all the patients treated for snake bite in one year from January 2002 to December 2003, in a field hospital in rural Sindh. All patients diagnosed with snake bite had first aid treatment by a either a nursing staff close to the place of bite or by a quack and later on transferred to field hospital. The first aid treatment consisted of pain relief (injectable diclofenac, oral acetaminophen), application of bandage or tourniquet proximal to the bite, antihistamine (oral or injectable chlorpheniramine), anti- inflammatory (injection hydrocortisone) and immobilization of the affected limb with a splint.

Within the hospital they were evaluated by a medical specialist. All patients had basic laboratory investigation including full blood count, urea electrolytes, liver function test, coagulation profile and electrocardiography (ECG). The severity of the reaction to the snakebite was classified according to the system described by Downey et al[1]. This classification is described in table I.

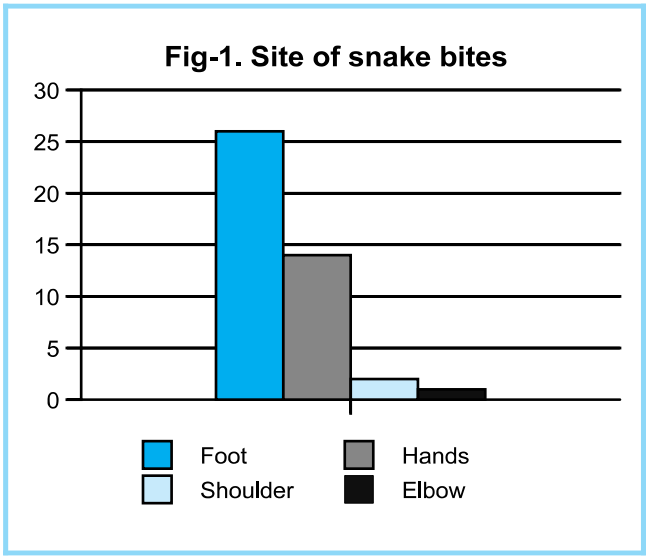
Table-I. Downey et al classification of severity of snakebite

Grade	Description
Grade 0	Swelling and erythema around the fang marks below 2.5 cms
Grade 1	Swelling and erythema around the fang marks between 2.5 to 15 cms but no systemic signs
Grade 2	Swelling and erythema around the fang marks between 15 to 40 cms and with mild systemic signs
Grade 3	Swelling and erythema around the fang marks greater than 40 cms with systemic signs
Grade 4	Severe systemic signs including coma and shock

The decision to give anti-snake venom was made by the same specialist depending on the clinical picture of the patient and deranged laboratory markers. The data was collected from the clinical case notes and recorded on proforma. Non-statistical analysis was done to present the data and results. We recorded the demographic data of the patients, initial presentation, first aid management, delay in arriving at the field hospital, signs and symptoms on arrival, laboratory markers, treatment given at the field hospital and outcome of treatment in terms of morbidity, mortality and hospital stay.

RESULTS

During January 2002 to December 2003 we treated 48 patients with snake bite. There were 45(94%) male patients and 3(6%) female patients. Age range was 18 to 56 years with a mean age of 29.8 years. 35(73%) patients suffered from snake bite between the months of May and September. The timing of the bite was also peculiar with 36(75%) patients bitten between 8pm and 8am whereas only 12(25%) patients during other times of the day. 38(79%) patients gave history of seeing the snake themselves and 10(21%) patients were not able to see the snake mainly because of darkness. Out of those 38 patients who saw the snake only 26(68%) were able to identify the snake. It was viper on 14 occasions and krate on 12 occasions. 43(90%) patients had definite identifiable fang marks whereas 5(10%) patients had no identifiable fang marks on arrival to the hospital. The location of the fang marks varied between foot and hand. 26(54%) patients had it on the foot, 14(30%) on the hands, 2(4%) on the shoulder and 1(2%) on the elbow (Fig 1).



The time of arrival to the hospital from the time of snake bite varied from 1 to 12 hours with a mean time of 5 hours and 33 minutes. This was dependent upon the distance of the patient from the hospital, the type of transport available and time of the bite.

Table-II. Clinical signs and symptoms of snakebite

Symptoms (n=48)		Signs (n=48)	
Pain	48(100%)	Tachycardia	18(37.5%
Swelling	48(100%)	Hypotension	8(16.6%)
Ecchymosis	30 (62.5%)	Fever	4 (8.3%)
Bleeding gums	4(8.3%)	Enlarged regional lymph nodes	1(2%)
Haematuria	3 (6.2%)	Regional thrombophelibitis	1(2%)
Haemoptysis	2(4.1%)	Tissue necrosis	-
Fainting/ Dizziness	11 (22.9%)	Haemorrhagic blisters	-
Nausea/ Vomiting	19 (39.5%)	Reduced range of motion of the affected limb	12(25%)
Parasthesia	1(2%)	Cardiac failure	-
Blurring of vision	-	Respiratory failure	-
Convulsions	-	Focal / generalised paralysis	-

The wound was washed thoroughly with antiseptic solution and normal saline and covered with a sterile dressing on arrival to the hospital. The affected extremity was immobilized. Bed rest was commenced and patients were kept warm. After initial examination patients were monitored and their vital signs, size of local swelling, development of systemic symptoms and signs, toxicity including coagulopathy were noted. Strict fluid and electrolyte balance was maintained and urinary output was recorded. Analgesics, anti-emetics, anti-allergics and sedatives were used depending upon the clinical signs and symptoms of the patients. Antibiotics were administered in all patients in order to prevent secondary bacterial infection of the wound. A combination of penicillin and metronidazole was used and the route of administration was dictated by the size and state of the wound and presence or absence of systemic signs of infection. Prophylaxis of tetanus toxoid intramuscularly was given to all patients. Intravenous anti-snake venom was given to 16(33%) patients. Each patient was given a minimum dose of 50 mls of anti-snake venom in 500 mls of normal saline infused over 1-2 hours duration at a time. The maximum number of infusions given were 3 making up to 150 mls of anti-snake venom in a single patient. The shortest time interval from snake bite to administration of anti-snake venom was 90 minutes and the longest time was 8 hours and 30 minutes. The average time of anti-snake venom administration since the snake bite was 5 hours and 17 minutes. The clinical signs and symptoms of the patients are summarised in Table II and their laboratory investigations are explained in Table III.

Mild to moderate renal impairment was treated with strict fluid balance and observation without the need for dialysis. Platelets, clotting factors and fresh frozen plasma were not required for clotting disturbances. One patient developed urticarial rash from the anti-snake venom and was successfully treated with antihistamines. All patients were successfully treated with the above treatment protocols and recovered completely. There was no mortality and residual morbidity from the snake bite in our series. Duration of hospital stay varied from 2 to

12 days with an average hospital stay of 5 days.

Table-III. Summary of laboratory investigations in snakebite patients	
Laboratory markers	N=48
Leucocytosis	33 (68.7%)
Neutrophilia	32.66.6%)
Thrombocytopenia	10 (20.8%)
Increased bleeding tim	1(2.0%) It was 8 minutes 30 seconds
Increased clotting time	(16.6%) Average clotting time 21 minutes
Raised APPT	11 (22.9%)
Raised INR	4(8.3%)
Raised D-dimers	6 (12.5%)
Decreased fibrinogen	3 (6.2%)
Raised bilirubin	5 (10.4%)
Raised urea	14 (29.1%)
Raised creatinine	7 (14.5%)
Raised CPK	5(104%)
Myoglobinuria	4(8.3%)
Proteinuria	3(6.2%)

DISCUSSION

Approximately 15 species of snake of medical importance are prevalent in India and Pakistan. These are all members of the Elapidae or Viperidae families[3]. Snake bite is a medical emergency requiring immediate medical treatment. Prompt treatment can reduce morbidity and mortality associated with this distressing condition.

The signs and symptoms vary from local tissue damage to more severe symptoms such as haemolysis, renal failure, septicaemia, extensive haemorrhages, respiratory paralysis, coma and death. Russell in 1980 pointed out that fang marks by the snakes are variable and at times difficult to distinguish from bites of rats, mice, cats and even lizards. They may also be confused with scorpion bites and scratches by thorns. Local inflammatory changes accompany all these marks and make the clinical diagnosis more difficult[4].

Although snake bite is common in all age groups but literature has identified the vulnerable population. There is male sex predominance and 90% of males are within the age group of 11-50 years. This suggests that the risk of snake bite is associated mainly with outdoor activities[5]. The age range in our study was between 18-60 years with 94% males.

The clinical features produced due to snake bite vary considerably and depends on many factors such as: nature of the snake, location, number and depths of bites, amount of venom injected, age and physical status of the person and sensitivity to the venom injected[6].

Majority of our cases occurred during the months of May and September. The temperature during these months in the rural Sindh is very high and people have the tendency of sleeping under the sky without any protection against the snakes. High temperature also compels the snakes to come out of their shelter. This is strengthened by the fact that more than 70% of snake bite cases were during the night.

The average time interval from snake bite to arrival in the hospital was 5 hours and 33 minutes which is relatively long when compared to other published series. Frangides et al in their experience of 147 cases of snake venom poisoning reported a time interval between snakebite and hospital admission of 40.95±24.06 minutes[7]. The relatively short interval is due to the availability of quick transport, awareness of getting immediate medical treatment and proximity and easy accessibility of the hospital with resources to deal with snake bite cases. Although the fear of impending death from snake bite and urgency to get medical treatment was very high among the patients and relatives but the lack of proper roads, absence of proper transport and long distances from the hospital contributed to delay in seeking the proper medical treatment.

The barriers to effective management of the snake bite in rural areas are local myths that are centuries old and are hard to change. Suctioning of the snake bite wound with mouth is still practised among the natives but there is no evidence in literature to suggest that it is an effective treatment modality[8,9]. Tourniquets proximal to the wounds are believed to reduce snake venom absorption into the circulation and delay the onset of systemic effects of the poisoning. Contrary to the belief, tourniquets in literature have shown to promote local tissue necrosis by trapping venom in local tissues through an intense inflammatory response[10].

Despite widespread availability and use of anti-snake venom, there is no evidence in the literature to suggest its ideal dose. Thomas and Jacob in a randomized controlled trial demonstrated that there was no statistically significant difference in the time taken for the clotting disorders to become normal when half of the conventional dose was used[11]. The suggested route of administration of anti-snake venom is intravenous. It is never injected into the fingers and toes. Some authors advocate that 1/3 dose to be injected at the local site to reduce the absorption of the venom.

The argument against this is that the absorption of the venom starts immediately after the bite. Moreover the systemic administration of the anti-snake venom helps to neutralize the local effects of the venom as well. Although it is recommended to use anti-snake venom as soon as possible after the bite, but there is no recommended upper limit to its administration. Best results are obtained within 4 hour of administration. Reid et al have shown that anti-snake venom administration could be effective even 6 to 7 days after the bite[12]. The average time of anti-snake venom administration in our study was 5 hours and 17 minutes which is slightly higher than the 4 hour mark. Hypersensitivity reactions with anti-snake venom can occur, even if the test dose is negative, in 3% of the cases. These reactions can be life threatening if not recognised and treated promptly. Conventional treatment of hypersensitivity reactions is with adrenaline, anti-histamines and corticosteroids.

The outcome of snake bite and treatment by anti-snake venom is influenced by many host and environmental factors. Patients with face or trunk bites have a worse prognosis when compared to limbs. If the bite is directly into the blood stream, the development of the symptoms is very quick and often lethal. Children are more prone to rapid deterioration because of larger amount of venom injected compared to their body mass. Protective clothing, apart from protecting against the bite, helps to minimize the effects of venom by decreasing the amount injected during the bite. Victims who develop local wound infection behave poorly as compared to those with clean local wound and therefore broad spectrum antibiotics are recommended in every case of snake bite. First aid given at the site of snake bite and the time taken from the bite to the administration of anti-snake venom are the most important environmental indicators of outcome after a snake bite.

CONCLUSION

In conclusion, it should be remembered that all snakes are not poisonous and that they are more afraid of humans than we are of them. Psychological effects of the bite are at times more devastating than the clinical effects, therefore patient reassurance forms part of the treatment. Avoiding a snake is the best approach, but once bitten the patient should be treated as a medical emergency. Early evacuation to the nearest hospital capable of dealing with snake bite is recommended.

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