ORIGINAL ARTICLE

Clinical Aspects of Green Pit Viper Bites in Bangladesh: A Study on 40 Patients

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Abstract

Background: Green pit viper bite is an important cause of morbidity in Bangladesh. The objective of this study was to investigate the characteristics and clinical presentations of green pit viper bite in Bangladesh.
Methods: This prospective observational study was done in the department of Medicine in Chittagong Medical College Hospital, Bangladesh. A total of 40 patients with history of green pit viper bite presented with local swelling and hematological abnormality were enrolled. Clinical and demographic features of patients were entered into a checklist. A careful assessment of grading of swelling and a 20 minute whole blood clotting test was done for every patient.
Results: Patients' age ranged from 10 to 65 years with majority in 11 to 40 years group. Most bites occurred during daytime while the patients were busy in plantation, gardening and cultivation. Most of the patients received one or more harmful traditional treatments such as multiple tight ligatures (90%). The most common clinical manifestation was local swelling found in 100% of patients followed by incoagulable blood (65%), lymphadenitis (62.5%) and fang marks (60%). All patients received supportive treatments and were rehabilitated.
Conclusion: Widely practiced traditional treatments must be discouraged and community education for the people should be arranged for first aid treatments and quick transfer to the nearest hospital. Young and working people should take precautions during agricultural activities. The national guideline for management of snakebite should be encouraged to practice everywhere in Bangladesh.

Keywords: Bangladesh; Snake Bite; Trimeresurus albolabris; Viperidae

INTRODUCTION

Snakebite is a potentially life threatening circumstance in rural areas of many tropical countries including Bangladesh (1). It is an important, however, neglected health problem in this country. Epidemiological aspects of snakebite and its clinical presentations has been described in different countries (2,3). Recently a countrywide survey revealed that approximately 700,000 snakebites occur in Bangladesh with around 6,000 deaths (4). Snake species are commonly divided into venomous and nonvenomous type but in clinical practice the snakes also fall into three categories: (a) commonly causes death or serious disability; (b) uncommonly bites but causes serious effects; (c) commonly bites but uncommonly causes serious effects (5).

There are approximately 82 species of snakes in Bangladesh, of which 28 species are venomous (6). The green snakebite is one of the common causes of venomous bites. It is one of commonest snakebites in the South East Asia (7). The scientific name of green pit vipers is *Ovophis (Trimeresurus)* with variable local names including green snake, bansh bora, gal tawa and sabuj bora. The green pit viper is distributed in Sylhet, Chittagong, Khulna, and Barishal divisions (8). Compared with other vipers, they are relatively long and thin with a triangular shaped head, and their dorsum is covered with many small scales. Among 30 species, white lipped green pit viper (*T. albalobris*), dark red, or dry tailed green pit viper (*T. erythrurus)* and Bamboo pit viper or common indian pit viper (*T. gramineus*) are common in Bangladesh (8).

The classic picture of green snake bite includes remarkable swelling, incoagulable blood, and absence of any features of neurotoxicity along with marked local effects. There is pain, tenderness and enlargement of regional lymph nodes and ecchymosis of overlying skin. The systemic effect is mainly mucosal bleeding. The venom of green pit viper has a thrombin-like effect and a platelet-aggregating activity, causing hypofibrinogenemia (8,9).

Green pit viper is a common offending snake in Bangladesh with serious and life threatening effects. The

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aim of this study was to investigate the characteristics and clinical presentations of green pit viper bite in Bangladesh.

METHODS

This prospective cross sectional observational study was conducted in the department of medicine of Chittagong Medical College Hospital between August 2000 and June 2001. A total of 40 patients following green pit viper bite with presence of local swelling and hematological abnormality were enrolled. Patients presented with neurological manifestations or without local swelling were excluded from the study. Any prior illness, limb swelling or injuries unrelated to snakebite event were also other criteria to exclude cases from the study.

Figure 1. 20 minute Whole Blood Clotting Test which shows incoagulable blood (copyright M. A. Faiz)

The offending snake was identified through patients' history and description of the snake, showing the picture of green pit viper to the victims, or through observation of corpse of the snake brought with the victim. After admission, a detailed history was taken and a thorough physical examination was done. Local examination was also done with attention to note fang marks, swelling, tenderness and blisters. Severity of local swelling was defined according to the highest level of swelling (Table 1). Five milliliter venous blood was obtained through aseptic measures and was sent immediately for bleeding time, clotting time, activated partial thromboplastin time and prothombin time (PT). Russell's viper venom time was not done due to unavailability. Along with routine investigations, 20 minute whole blood clotting test (20 min WBCT) was performed for all patients (Figure 1). In perspective of Bangladesh, incoagulable blood is diagnostic of a viper bite and rules out an elapid bite.

All patients of green pit viper bite were treated conservatively. Blood transfusion was given when active uncontrollable bleeding was observed. Snake antivenom for green pit viper is not available in Bangladesh. Hence, actually no patient received any antivenom. The data including age, gender, location of bite and clinical manifestations were entered into a checklist. Data were analyzed by Epi Info software version 6 (CDC, Atlanta, GA, USA). Results are expressed as frequency and percentage.

RESULTS

Demographic features

During the study period a total of 161 snakebite patients were admitted to Chittagong Medical College Hospital, out of which 73 cases were venomous bites. Among these venomous bites, 40 cases that the offending snake was green pit viper were included. The age of patients ranged from 10 to 60 years old. Most of the patients were between 10-40 years of age (70%) with a male to female ratio of 1.6:1 (Table 2).

Characteristics of the event

Regarding location of the event, all bites occurred outdoors. When time of bite was considered, most bites had occurred during day time with peak incidence between 9 to 12 a.m. (20 bites). Most of the patients were bitten by the green snakes during farming (57.5%) and 27.5% patients were bitten while walking. A total of 38 patients (95%) could see the snake, which out of them 37 patients gave the typical description and only one patient brought the dead snake. Almost all patients received some local pre-hospital treatments which out of them 36 (90%) cases received multiple tight tourniquets over the bitten limb (Figure 2). The bite site was mostly (70%) in the upper limbs (Table 2).

Clinical manifestations

On local examination, no fang marks could be detected in 16 cases. Among the patients with visible fang marks, 16 patients presented with two fang marks and inter-fang distance ranged from 3 to 15 mm. Six patients had multiple fang marks and 2 patients presented with only one fang mark. Blister and necrosis was present in 27.5% and 12.5%

Table 1. Severity grading of swelling in snakebite

Grade	Definition
I	Swelling is confined to the joint/joints adjacent to the wound
II	Swelling extends beyond the first adjacent joint/joints but not beyond the second
III	Swelling extends beyond the second joint but not the third
IV	Swelling extends beyond the third joint adjacent the wound

cases, respectively. In 62.5% of cases, adjacent lymph nodes were palpable (Table 2).

All patients who were bitten by green pit viper in this study, presented with local swelling, of which 32.5% presented with grade I and 45% with grade II swelling (Table 1). There were no features of systemic bleeding in the patients. Only 1 patient presented with subconjunctival hemorrhage. Most of the patients (55%) presented with incoagulable blood on admission, being evidenced by positive 20 WBCT. Four patients presented with negative WBCT on admission although became positive later on. Regarding laboratory investigations, 50% of patients had neutrophilic leukocytosis. Thrombocytopenia was present in 15% and prolonged PT was present in 7.5% of patients.

Table 2. Demographic and clinical features of patients (n = 40)

	No. (%)
Age groups (years)	
5-10	1 (2.5)
11-20	9 (22.5)
21-30	12 (30)
31-40	7 (17.5)
41-50	6 (15)
51-60	4 (10)
>60	1 (2.5)
Location of bite	
Upper limb	28 (70)
Lower limb	8 (20)
Trunk	2 (5)
Head and neck	2 (5)
Local manifestations of the affected limb	
Swelling	40 (100)
Lymphadenitis	25 (62.5)
Fang marks	24 (60)
Blister	11 (27.5)
Evidence of local necrosis	5 (12.5)
Hemorrhagic blister	2 (5)
Normal temperature	10 (25)
Warmth of the limb	28 (70)
Coldness of the limb	2 (5)
Grading of local swelling	
Grade I	13 (32.5)
Grade II	18 (45)
Grade III	7 (17.5)
Grade IV	2 (5)
Systemic Manifestations	
Incoagulable blood (increased WBCT)	26 (65)
Neutrophilia	20 (50)
Thrombocytopenia	6 (15)
Prolonged PT	3 (7.5)

Treatments and outcomes

For all patients, the bitten limb was immobilized. Antibiotics were administered for 39 patients. Thirty-two patients received tetanus prophylaxis and surgical wound care was done for 3 patients. Blood transfusion was required for one patient only. All patients survived after treatment in hospital. Full recovery was achieved in 39 patients. Only one patient suffered from sequel of massive swelling and necrosis. Discharge from hospital was possible within three days for most victims except three subjects who required hospitalization for more than 7 days. Seven patients came for follow up after 14 days and they were completely recovered with no residual sequel.

DISCUSSION

Snakebite is an important medical emergency in Bangladesh and Asia Pacific region (6,10). Green pit viper is an important cause of snakebite morbidity (6,7). Clinical presentations include local effects and hemorrhagic diathesis (7). All patients in this study presented with swelling which most of them had grade I of swelling. .These are very much consistent with other studies in Bangladesh and Thailand where 100% of patients were presented with local swelling mostly grade I and grade II (9,11). More than half of the patients in this study presented with the regional lymphadenitis which were tender and firm. The mechanism of this complication can be explained by the venom injected at the subcutaneous tissue stimulating the immune system (5).

In this study, 15% of patients had thrombocytopenia which was lower than snakebite victims in northeast Iran (10). Moreover, most of our patients (65%) presented with incoagulable blood. This is consistent with the study by Hutton et al. who found development of incoagulable blood in more than half of the patients (7). The 20 min WBCT is simple method to help the diagnosis of green pit viper bite easier. Green snake bite mostly causes hemorrhagic diathesis and lacks neurotoxic effects, and thus it can be easily differentiated from elapidae bites in Bangladesh. The pathogenesis of hemorrhage is rather multifaceted. It results from vessel wall damage exacerbated by venom coagulants or anti-coagulants and thrombocytopenia (12,13). In fact, the green pit viper bite is a model of combined coagulopathy (14). In this study, among the laboratory examinations, the commonest abnormal finding during the first few days post-bite was mild to moderate leucocytosis with neutrophilia (50% of patients). The study by Mitrakul also showed similar findings (9).

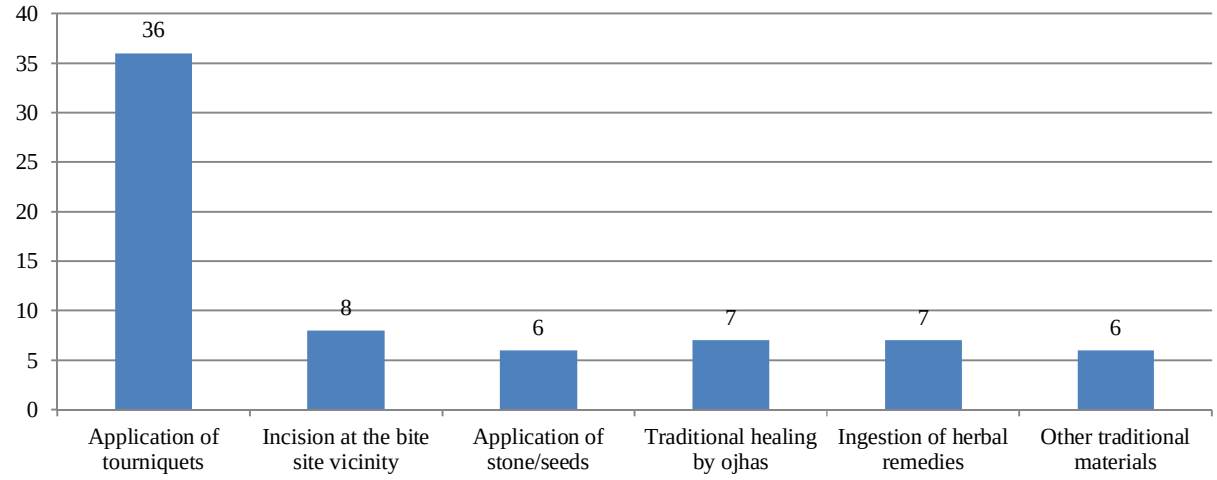

Figure 2. Pre-hospital interventions

In the current study, it was observed that most of the patients were between 10 to 40 years old, which is consistent with the studies done in Thailand and Bangladesh (15-17). This indicates that young and active individuals of the society are mostly bitten by the snakes. The people in the village are very much exposed to this threat due to their working environment and playing habits. Male predominance in the study is also similar to the studies by Dadpour et al. and Faiz et al. which is suggestive of the special risk of outside activity especially during cultivating and harvesting seasons (10,17).

In this study, most of the cases were initially treated by some traditional methods mainly by the 'ojhas'. This may be due to common beliefs that direct most people to seek traditional healing at the first step (6). All patients received multiple tight tourniquets within a few minutes after bite. This indicates that general population of our country use tourniquets inappropriately even in harmful ways by fastening multiple (rather than single) very tight ligatures with harmful materials. Incision in the bite area is dangerous particularly in pit viper bite due to a possible coagulation abnormality (12,13). Making incisions near the bite site which can be followed by uncontrollable local hemorrhage is currently opposed anywhere due to its deleterious effects including gangrene, infection and hemorrhage (1,5). However, this intervention was done for one-third of cases in this study with one patient who became moderately anemic due to excessive hemorrhage. Therefore, these unscientific traditional methods should be strongly discouraged because they cause more harms than benefit.

CONCLUSION

This study gives an idea about the classical presentation of green pit viper bite in Bangladesh which is similar to other reports of neighboring countries. Since snakebite is an occupational problem, it has therefore important implications for the nation and economy of the country. Young and working people should take some precautions during agricultural activities. Moreover, the widely practiced traditional treatments for snakebite must be discouraged and public education should be arranged to train ideal emergency treatments and quick transfer of patients to the nearest healthcare facility. A 20 min WBCT should be practiced in every healthcare facility for each snakebite victim. The national guideline for management of snakebite should be encouraged to practice everywhere in Bangladesh.

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