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A study on epidemiological and clinical profile of victims of snake bite admitted to Teaching Hospital Jaffna, Sri Lanka

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Abstract

Snake bite is one of the major health, environmental and occupational hazard in Northern Province of Sri Lanka with significant morbidity and mortality. This study is a non-interventional prospective descriptive study. The objective was to study the snake bite victims admitted to Teaching hospital Jaffna over 6 months period and specifically to know about the demography, epidemiology and clinical profile as well as the response to treatment; side effect and outcome of snake bite. Among 132 snake bite victims, 56.1% (74 patients) were males and 43.9% (58) were females. Main age group affected was of 21- 30 years. Farming was the main occupational hazard and majority of the female victims were housewives. Day and night bites were equal and 85% (112) was outdoor bites. Valikamam area documented highest number of cases (57). 28.8% of snakebite victims were bitten by Saw-scaled viper, 16.6% by Russels, 6.1% by Krait, 3% by Cobra and 0.8% by hump nosed viper. Non venomous bites represents 20.5%. 32 patients (24.2%) were admitted with unidentified snake bite and couldn't differentiate them as they didn't bring the snakes and in the absence of systemic manifestations. All victims had local effects at site of bite. Haematological and nervous system effects were observed in >80% of Russell's victims. Saw-scaled viper had predominantly hematological effect. Krait bite showed neurological and gastro intestinal effects. Cobra bite lead to haematoloical and nervous system complications and the local effects were more severe. More than 80% of patients required 3 days of hospital stay and 5% of required Intensive Unit care. Tetanus toxoid was given to all. 55 patients received Anti snake venom (ASV) and 5 of them (9.1%) developed reactions to ASV. Outcome was one death due to Russell's viper envenomation, 56% no envenomation, 43% complete recovery and no residual disability.

Keywords: Clinical Profile, Epidemiology, Snake Bite, Sri Lanka, ASV.

Introduction

As the agriculture is the main occupation in Jaffna peninsula, snake bite is one of the major health, environmental and occupational hazard in Northern Province of Sri Lanka. The hospital statistics on snakebites is believed to be underestimated, because of the health seeking behavior of victims from traditional healers. It is also a common acute medical admission to emergency unit with significant morbidity and mortality due to the delay in seeking medical advice.

In Sri Lanka, there are six common species of poisonous snakes such Common krait (*Bungarus careuleus*), Ceylon krait (*Bungarus ceylonicus*), Cobra (*Naja naja*), Russell's viper (*Daboia russelii*), Saw-scaled viper (*Echis carinatus*) and Hump-nosed pit viper (*Hypnale hypnale*). There are wide ranges of clinical features to every species with some unifying features to each category. There is a polyvalent anti venom available for krait, cobra and both Russels and saw scaled viper bites.

Previous studies done in Northern Sri Lanka, reveal saw scaled viper bite predominates among them followed by Russell's viper.(1) There was a study done in Jaffna population during February 2009 to January 2010 on saw scaled viper bite.(2) In our descriptive study, we decided to include all snake bite victims during this six month period.

General objective was to study the all snake bite victims admitted to Teaching hospital Jaffna over a period of six months. Specifically, we decided to know the demographic, epidemiological and clinical profile as well as the treatment response; side effects and outcome of snake bite. At the end of the study, we were able to detect the epidemiology of each snake bites and the common clinical presentation and complications of snake envenomation in northern Sri Lanka. We were able to make health awareness about snake identification; snake bite prevention and first aid as well as were able to provide awareness about early identification of danger signs of envenomation among doctors during data collection.

Research design and Methods

It was a non-interventional prospective, descriptive study among snake bite victims admitted to Jaffna teaching hospital, where all snake bite victims were taken as sample. Data were processed by computer and analysed by statistical methods.

Consent was taken from patient or next of kin in case they are unable to do it and confidentiality of the information was maintained. Permission was taken from the Director/Teaching Hospital-Jaffna and Consultant in charge of the research places. Ethical clearance was obtained from Ethical Review Committee, Faculty of Medicine- University of Jaffna.

We included all the snake bite victims admitted to medical wards, Emergency unit and Intensive care unit with the exclusion criteria of "any other medical co morbidity that confuse clinical profile (E.g. Renal impairment, coagulopathy, etc.)" but we didn't have any patients with the similar problem.

Results

During this prospective descriptive study, there were 132 patients admitted with history of snake bite over 6 month period from May 20th to November 20th2015. Even though, we proposed exclusion criteria, there were not any patients excluded from the research. There were averagely 22 patients admitted to medical wards monthly during the research period.

Demography of the patient: Among 132 patients, 56.1% (74 patients) were males and 43.9% (58 patients) were females. Age distribution is given in Table 1 and most of the patients were in the age group of 21- 30

Table 1: Age Distribution

Age (Years)	Number	%
12- 20	17	12.9
21- 30	40	30.3
31- 40	23	17.4
41- 50	18	13.6
51- 60	19	14.4
61- 70	9	6.8
71- 80	6	4.5
Total	132	100

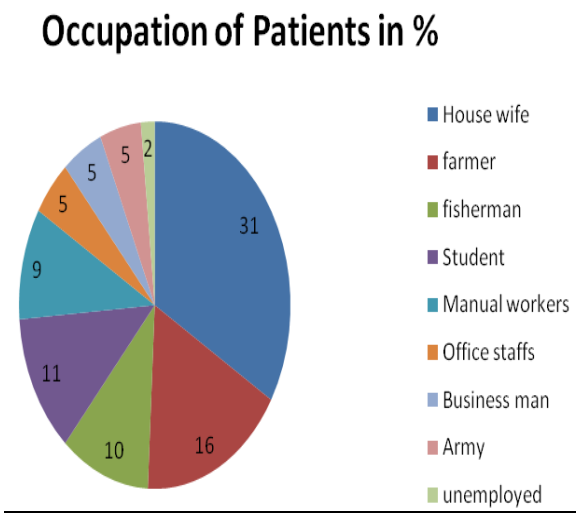

Fig. 1: Occupation of the patients

Most of the females were housewives (70.5%), Farmers were mostly affected (around 30%) among males by occupation.

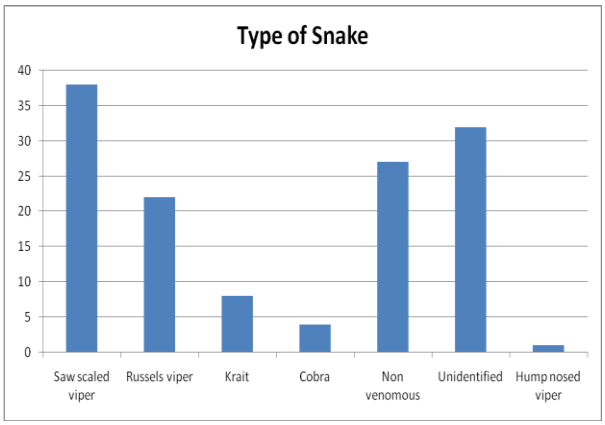

Fig. 2: Type of Snake

There were 28.8% of snakebite victims(38patients) were bitten by sawscaled viper, followed by 16.6% of Russels viper bites, 6.1% Krait and 3% Cobra bites. Non venomous snake bites represented 20.5% of snake bites. There were 24.2% of patients were admitted with unientified snake bite. Only one patient(0.8%) was bitten by hump nosed viper.

Epidemiology of Snake bite:

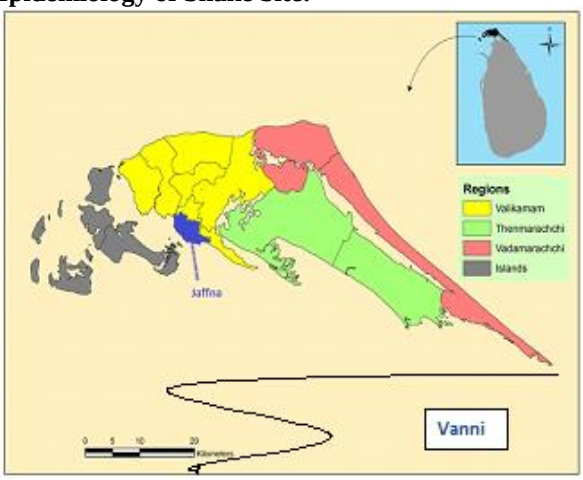

Fig. 3: Electoral divisions of Northern Sri Lanka

Among the 132 snake bite victims; there was an equal distribution of daytime and nighttime bite with 62 patients (50%) each. However there was a significant variation in indoor and outdoor bite, where outdoor predominated with 112 patients (85%), and indoor contributed only with 20 patients (15%).

Table 2: Area of Snake bite

Area/Snakes	Thenmaradchi	Vadamaradchi	Valikamam	Islands	Vanni	Jaffna	Total
Saw scaled	2	2	6	20	4	4	38
Russels	5	2	8	1	6	0	22
Krait	1	0	6	0	0	1	08
Cobra	0	0	4	0	0	0	04
Non venomous	0	0	18	4	5	0	27
Unidentified	2	0	14	5	0	11	32
Hump nosed	0	0	1	0	0	0	01
Total	10	4	57	30	10	21	132

Valikamam documented highest number of cases(57), where all variety of venomous and non venomous snake bites were noted. Islands were the second common area documented snake bites and saw scaled vipers were the major culprits in this area (more than 66% of cases). Hump nosed viper victim was admitted from Vallikamam area.

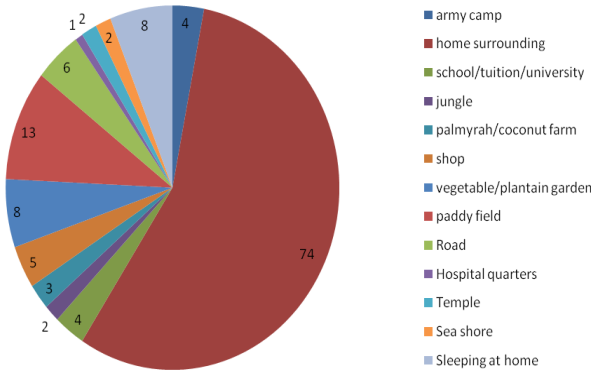

Fig. 4: Place of Bite

Most of the snake bites occurred in home surrounding as well as inside the home while sleeping. Female housewives are the main category affected in this regard. Paddy fields were the next common place of bite, followed by vegetable or plantain farms that is self explanatory for the reason that the farmers were the second common affected population.

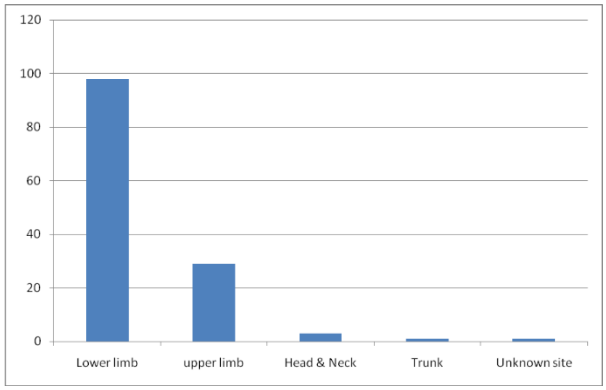

Fig. 5: Site of Bite

Lower limb was the predominant site of bite. The site of a Krait bite was not identified.

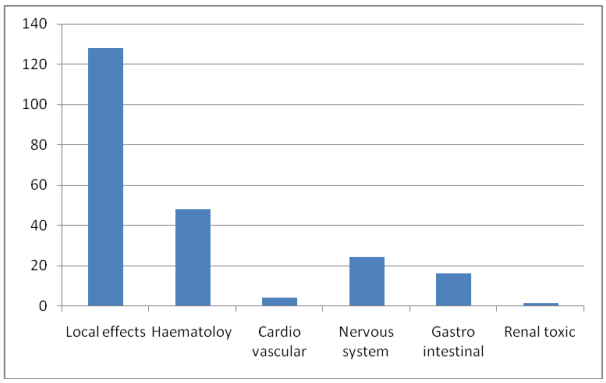

Fig. 6: Systemic effects of snake bite

WBCT >20 (Whole Blood Clotting time more than 20 minutes) with mucosal bleeding or high prothrombin time or low platelets was found in 26 sawscaled viper bites , 21 russels viper bites and 1 cobra bite altogether in 48 cases.

There were four patients with Russell's viper bite had cardiovascular toxic effect, where 3 of them had hypotension on admission and other patient from Valikamam area had diffuse T wave change in ECG with troponin I positivity.

Altogether 24 patients had neurological manifestations in the form of ptosis, opthalmoplegia, limb weakness or respiratory muscle weakness. Russell's viper, Krait and Cobra represented 18, 4 and 2 victims respectively.

Among the 16 patients with gastrointestinal effects, 10 Russell's viper victims, 3 Krait victims, 2 Sawscaled viper victims and 1 Cobra victim had either nausea, vomiting, diarrhea or abdominal pain.

Only one renal toxic case was noted due to Russels viper bite.

Local effects:

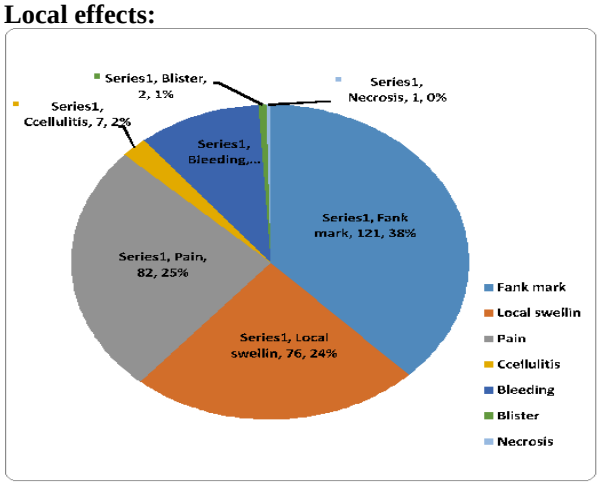

Fig. 7: Local effects

Fank mark was found in nearly all patients and most victims had swelling or pain.

Clinical profile of Snake bite:

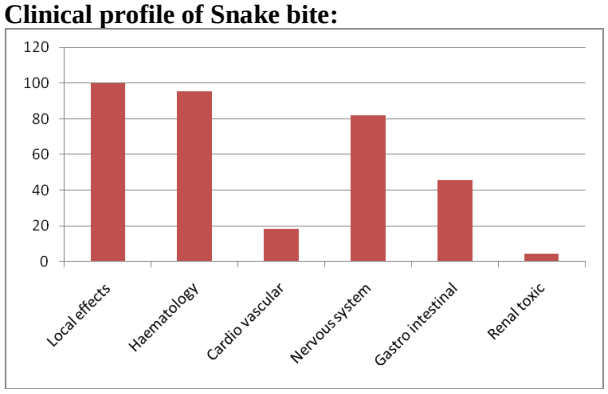

Fig. 8: Clinical profile of Russell's viper (22 cases)

Russels viper bite affects almost all systems. Effects on haematological and nervous system were observed in more than 80% of victims of Russell's viper bites.

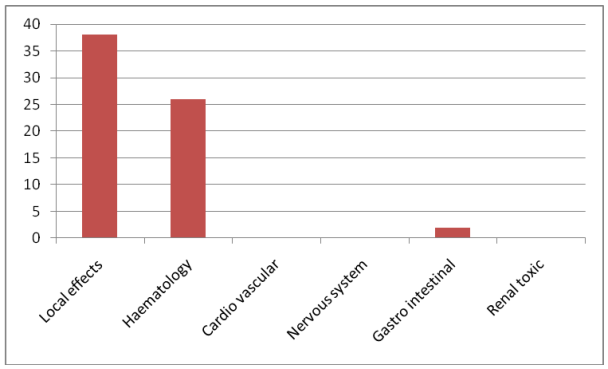

Fig. 9: Clinical profile of Saw scaled viper (38 cases)

Saw scaled viper had predominant haematological effects with prolonged WBCT >20 min next to the local bite site symptoms.

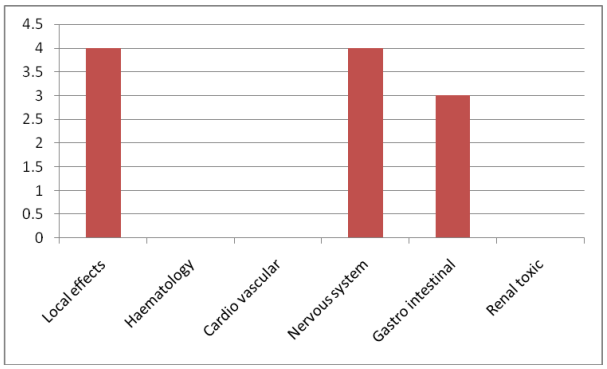

Fig. 10: Clinical profile of Krait (08 cases)

Local effects were pain or fank mark, but no swelling or cellulitis in Krait bite was noted. They showed neurological and gastro intestinal signs and symptoms.

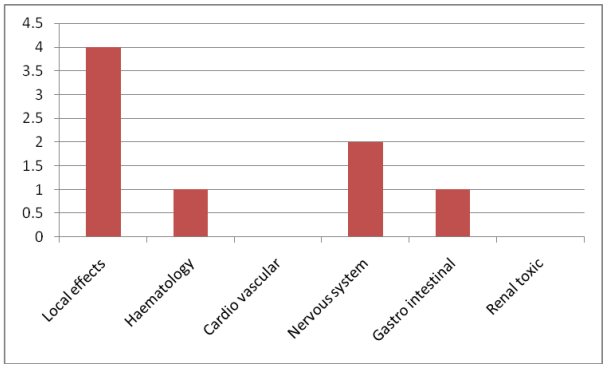

Fig. 11: Clinical profile of Cobra (04 cases)

Cobra bite lead to haematoloical and nervous system complications and the local effects were more severe in the form of cellulitis, blisters or necrosis.

Hump nosed viper (1 case): Surprisingly we encountered a hump nosed viper bite, but there were no envenomation signs and symptoms were present.

Non venomous snakes (27 cases): There were 27 non venomous snake bites during the 6 month period. Local effects with fank mark, pain or swelling were noted in some cases but no other systemic symptoms encountered.

Unidentified snakes (32 cases): There were 32 patients admitted with unidentified snake bite with only local effects with no systemic symptoms. It was not possible to differentiate these bites whether due to non-venomous or venomous snake bite in the absence of clinical manifestations.

State on admission: Around 95.5% (126 patients) were haemodynamically stable while on admission and 4.5% (6 patients) were found collapsed state. 5 Russell's viper victims were found unstable due to either hypotension or

respiratory failure or both and 1 Krait bite victim arrested due to respiratory muscle weakness.

Length of Hospital Stay:

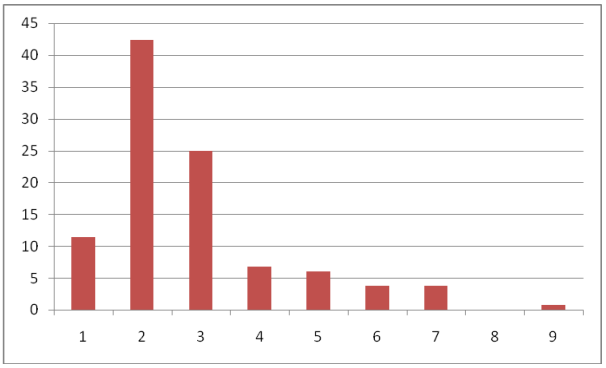

Fig. 12: Length of Stay in Hospital

More than 80 percentage of patients required maximum 3 days of hospital stay. Most of them had nonvenomous bite or no envenomation or non-severe envenomation.

Management given:

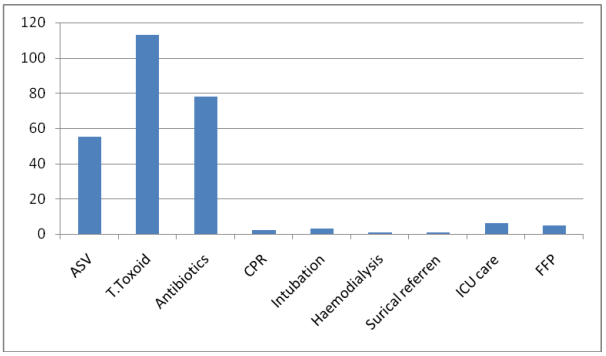

Fig. 13: Management details

Almost all snakebite victims were given with Tetanus toxoid except a small number of victims who had been immunized already with T.toxoids during the routine immunization schedule or for another reason.

Around 5% of snakebite victims required ICU care.

4 victims with Russels viper and a victim with Cobra bite were given plasma for correction of coaulation profile. A Cobra bite victim was referred to surgical team for management of cellulitis ans blisters.

Number of ASV vials used

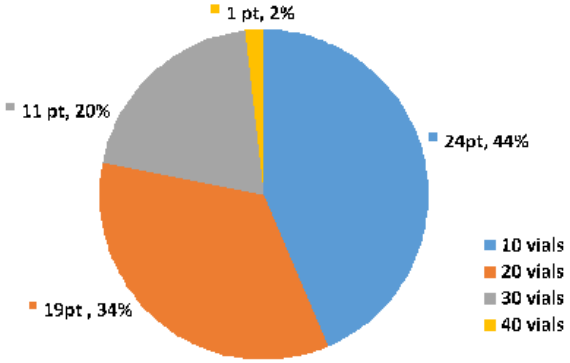

Fig. 14: ASV details

26 Saw scaled viper bites, 21 Russels viper bites, 5 Krait bites and 3 Cobra bites were trated with Anti snake venom (ASV).

ASV side effects: 55 patients were managed with ASV and 5 of them (9.1%) developed reactions to ASV. 3 patients had itching and a patient had urticarial. Bronchospasm was noted in one. The incidence of reaction could be underestimated and the severity of reactions may be masked due to the routine practice of premedication with Adrenaline IM administration.

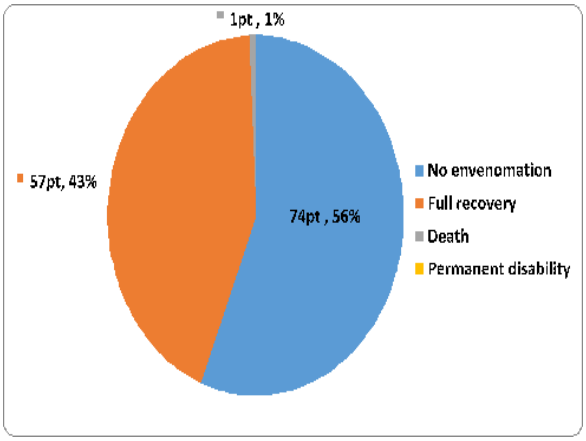

Fig. 15: Overall Outcomes

There was one death due to Russell's viper envenomation with bleeding leading to intra cranial hemorrhages. 56% of patients had no envenomation and 43% of victims recovered completely. There were no cases noted with residual disability.

Discussion

This prospective study was conducted among snake bite victims admitted to Teaching Hospital Jaffna over a period of 6 months from 20th May 2015 to 19th November 2015. There were 132 patients admitted with history of snake bite. Among them 56.1% were males and 43.9% were females. Most of the patients were in the age group of 21- 30. It reflects the fact that the productive age group is vulnerable to deadly snake bites. Surprisingly non-

working housewives were the main group of victims of snake bite. Apart from that, Farming was the main occupational hazard identified among the snake bite victims. The study was done in 2009, revealed similar pattern in occupation and the median age group was 34 years and similar pattern was noted in India also.[1,8]

Saw scaled viper bite identified as the commonest snake envenomation (28.8%) and it was mostly observed in the suburb Islands of peninsula. A similar out come was noted in a study of the 304 snake bite admissions to the Jaffna Hospital in 2009, 217 (71.4%) were bitten by venomous snake or showed envenomation signs. Among venomous snakes. 99 (45.6%) were saw-scaled viper bites and among total bites 32.6% were sawscaled viper bites.[1,2] But the epidemiology was totally different in Anuradhapura, where among venomous bites, 53% was due to Russel's viper and 22% was Hump-nosed viper.[2] In that study, no hump- nosed viper bites identified in Jaffna.[2]

Non venomous snake bites represented 20.5% of snake bites. There were 24.2% of patients were admitted with unientified snake bite. It is important to note that as 2 welleqipped base hospitals in Vadamarachchi (Point Pedro) and Thenmaradchi (Chavakachcheri) cater the patients with snake bite of that area the incidence from that area could have been underestimated. Incidence of bites at day and night were equally distributed, considerable number were outdoor bites (112 patients - 85%), and indoor contributed only 15%. Cobra bite victims were found only from Valikamam area.

Russell's viper envenomation lead to all systemic effects but saw scaled had hematological effects, Krait showed neurological and gastro intestinal effects and Cobra had severe local effects and neurological and hematological effects. There was a case series reported with 48 SSV bites from the Northern Province of Sri Lanka. The majority (65%) of victims had evidence of local envenoming at the site of the bite; however, 71% had coagulopathy.[4] We encountered only one Hump nosed viper bite without any evidence of envenomation. There was a study in 114 Hypnale spp. bites from July 2008 to July 2010 in six Sri Lankan hospitals. Pain and fang marks were present in all patients, 101 had local swelling and only 16 (14%) developed extensive local swelling. Systemic symptoms occurred in 18 patients; four patients had an abnormal 20 min WBCT and one patient developed an acute kidney injury that required haemodialysis.[7,8]

More than 80 percentage of patients required maximum of 3 days hospital stay. Around 5% of snakebite victims required ICU care.55 patients were managed with ASV and 5 of them (9.1%) developed reactions to ASV but the incidence of reaction could be underestimated due to the routine practice of premedication with Adrenaline IM administration.

The outcome of snake bite is fairly good in our study, there was one case death, when compare to previous studies in Sri Lanka during 2010- 2011 period, showed similar pattern of around 1% mortality in Jaffna and Anuradhapura.[2]56% of patients had no envenomation and 43% of victims recovered fully. There were no cases noted with residual disability. Several studies in India showed high number of deaths (4-6%).[8,9,10]

Acknowledgement

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Conclusion

Saw scaled viper bite was the predominant venomous snake bite in Jaffna peninsula; however there were significant nonvenomous bites were encountered. The common age group was 21 to 30 years and the majority of victims were house wife, followed by farmers. The clinical profile showed similar pattern with previous studies. More than 80% of them were able to discharge from hospital within 3 days of hospital admission. There was good out come without any residual disability among victims, however one case death was noted due to coagulopathy and intracranial bleeds.

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