

Epidemiological study of snakebites cases admitted to two township hospitals of Ayeyawady Division

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Snakebite is endemic in rice growing divisions of Myanmar including Ayeyawady Division. The average case fatality rate (CFR) of poisonous snakebite of the whole country is 7.43%. Ayeyawady Division has the highest case fatality rate (CFR) in the country. In order to determine the morbidity, mortality and the causes of high CFR of snakebite in Ayeyawady Division, a retrospective analysis of case notes of snakebite victims admitted to Mawlamyainggyun and Einme hospitals of Ayeyawady Division for the last 6 years (2001-2006) was carried out. Total number of snakebite cases in Mawlamyainggyun was 129 and that of Einme 48. Majority of the victims were male and bitten on lower limbs. Russell's viper bite accounted for 33.3% and cobra 10-17%. Majority (79-87.5%) of Russell's viper bite cases had systemic envenoming at admission and 44-75% of them had systemic complications. The CFR of poisonous snakebites of Mawlamyainggyun was 26.2% (17/65) and that of Einme 45.45% (10/22). The CFR of Russell's viper bite was 66% if the victims arrived hospitals within 6 hr after the bites and it increases with delay in arrival time. A long hour of travel [9.30 hrs (Mawlamyainggyun) and 8.29 hrs (Einme) (median)] to get to the hospitals leading to development of systemic envenoming and complications were contributing factors in causing high CFR. Since other contributing factors like use of protective wears and effective first aid measure, prehospital antivenom and means of transportation of the victims were not available in the record, a prospective study of snakebite cases admitted to township hospitals is needed to answer the pressing questions.

INTRODUCTION

Snakebite is endemic in rice growing divisions of Myanmar which includes Ayeyawady Division. It has a moderate snakebite morbidity 889 bites/year (ranged 744-995 bites/year) and has the highest case fatality rate (CFR) 17.75% of the country. Ninety-two percent of (24/26) townships of Ayeyawady Division have the case fatality rate ranging from (11-40%) throughout past 8 years (1998-2005) [1]. The high CFR of snakebite in Ayeyawady Division raises a concern among health care providers and the possible factors contributing to it need to be sought. This study aimed to determine the morbidity and CFR of two

townships (Einme and Mawlamyainggyun) of Ayeyawady Division and possible causes contributing towards the high CFR.

MATERIALS AND METHODS

Two townships, Einme and Mawlamyainggyun of Ayeyawady Division, which have the CFR of 40.5% and 26.2% respectively identified from an earlier epidemiological study of poisonous snakebite cases of Myanmar [1] were selected for the study. The case notes of snakebite cases admitted to the respective hospitals for the period of 2001-2006 were requested from respective hospitals through the divisional health authority. Retrospective analysis of data

from the case notes of snakebite cases were coded, entered and analysed in Epi Info version 6.04d.

RESULTS

Yearly incidence, CFR and trend of poisonous and total snakebites of two townships are shown in the Table 1 & 2. Data from earlier epidemiological study of poisonous snakebites from the Department of Health Planning [1] were included for comparison.

Table 1. Comparison of two data sources for case fatality rate among snakebite cases admitted to Mawlamyainggyun Hospital from (2001-2006)

Year	DHP		Current study	
	PSB		PSB	
	CFR (%)		CFR (%)	
2001	1/10	10	7/13	53.8
2002	0/32		0/5	
2003	6/10	60	7/1	14.2
2004	9/18	50	3/17	17.6
2005	17/29	58.6	4/14	28.6
2006	3/29	10.3	2/9	22.2

DHP= Department of Health Planning

PSB = Poisonous Snake Bite

CFR = Case Fatality Rate

Table 2. Comparison of two data sources for case fatality rate among snakebite cases admitted to Einme Hospital from (2002-2006)

Year	DHP		Current study	
	PSB		PSB	
	CFR (%)		CFR (%)	
2002	0/6		1/2	50
2003	4/11	36.4	1/3	33.3
2004	3/6	50	4/7	57
2005			1/4	25
2006	1/19	5.26	3/6	50

Demography

Majority of snakebite occurred in age groups from 11 to 50 year, accounting for 83.5% (n=41) in Einme, and 86% (n=129) in Mawlamyainggyun, 7% under 10 years and between 51-80 years in both townships.

Clinical features

In Mawlamyainggyun, 79% (34/43) of Russell's viper bite presented with systemic

envenoming on admission of which 44.2% (19/34) had systemic complications, such as shock (n=5), renal failure (n=4), haematuria (n=1), haematemesis (n=1), haemoptysis (n=1), haematuria and malena (n=1), renal failure with haematemesis and malena (n=2), shock with renal failure (n=1), shock with haematemesis (n=1) or haematuria (n=1) or haemoptysis (n=1). In Einme, 87.5% (14/16) of Russell's viper bite cases had systemic envenoming on admission of which 75% (12/16) developed systemic complications such as renal failure (n=6), shock (n=2), renal failure with shock (n=1) and haemorrhagic manifestations (n=2). Cobra bite cases presented with ptosis, blurring of vision and dysarthria.

Species of snake

Russell's viper bite accounted for 33.3% (43/129) in Mawlamyainggyun and 33.3% (16/48) in Einme, cobra bite 17% (22/129) in Mawlamyainggyun, and 10.4% (5/48) in Einme, Green snake 2% (1/48) in Einme, unknown bites 49.6% (64/129) in Mawlamyainggyun and 54.1% (26/48) in Einme.

Time bite and admission

Median time taken for snake bite patients to get to Einme Hospital was 5.82 hrs (0.15-72 hrs) (n=27) and that of poisonous snake bites 8.29 hrs (1.05-72 hrs) (n=12). Majority 78.6% (22/28) of the victims reached the hospital within 6 hrs after the bite, 10.7% (3/28) between 7-12 hrs, 7.14% (2/28) between 13-24 hrs and 3.5% (1/28) between 30-72 hrs after the bite. In Mawlamyainggyun, it took 8.9 hrs (15 min-72 hrs) (n=75) for the victims to reach hospital and 9.3 hr (0.30-72 hrs) (n= 48) for poisonous snake bites. The majority 62.6% (47/75) of the victims arrived at the hospital within 6 hr after the bite, 17.3% (13/75) between 7-12 hrs, 13.3% (10/75) between 13-34 hrs and 6.6% (5/75) between 30-72 hrs after the bite. Due to incomplete case records, all data could not be retrieved.

Clinical outcome

In Mawlamyainggyun, six (4 Russell's viper bites and 2 cobra bites) died at the hospital

while undergoing treatment. Majority 66.6% (4/6) Russell's viper bite admitted to the hospital within 6 hrs after the bite were fatal, 75% (3/4) in between 7-12 hrs, 75% (3/4) in between 13-24 hrs, 100% (2/2) at 72 hrs after the bite. Six systemic envenomed Russell's viper bite cases with complications, such as, shock, who did not seek further treatment at the hospital were believed to be fatal. Four systemic envenomed Russell's viper bite cases with complication, renal failure or shock were referred to Yangon General Hospital and their outcomes were not known. For cobra bite, 2/4 cases admitted to hospital within 6 hrs after the bite died, none in between 7-12 hrs (n=4) and 13-24 hrs (n=2) after the bite. Two cobra bite cases, one admitted on 4.45 hrs after the bite given 40 ml antivenom died on admission and another 3 hrs after the bite, given 30 ml antivenom died 3 hrs after admission.

In Einme, two cobra bite cases admitted to hospital, within 2 hrs after the bite in one and biting time not recorded in another, given 20 ml of cobra antivenom died at hospital following respiratory arrest. No deaths due to Russell's viper bites were on the record. Eight systemic envenomed Russell's viper bite cases with complications: shock or renal failure victims who did not seek further treatment at the hospital were assumed to be fatal. They were 4/6 Russell's viper bites admitted to hospital within 6 hrs after the bite, 2/2 in between 13 to 19 hrs, and 1/1, in 72 hrs after the bite. No record on time of admission was noted in one case.

Antivenom usage in Russell's viper bites

In Mawlamyainggyun, data on antivenom usage in 42/129 Russell's viper bite were available for analysis. 10 ml (n=20), 20ml (n=5), 30 ml (n=2), 40 ml (n=22), 60 ml (n=1) 80 ml (n=8), 110ml (n=1) and 140 ml (n=1). In Einme, information on the usage of antivenom was only available for 14/48 Russell's viper bite cases: 20 ml (n=1), 40 ml (n=4), 80 ml (n=7), 100 ml (n=1) and 200 ml (n=1).

Antivenom usage in cobra bite

In Mawlamyainggyun: cobra antivenom was given at variable doses: 20 ml (n=4), 30 ml (n=4), 40 ml (n=12), 50 ml (n=1) and 80 ml (40+40 ml) in one. In Einme, cobra bites were given 20 ml (n=2) and 40 ml antivenom (n=2) and none in one.

Antivenom usage in unknown bites

Among unknown bites, cobra antivenom was given to four cases, 3 suspected cobra bites; 10 ml in one, and 40 ml in two and 40+40 ml in one suspected krait bite in Mawlamyainggyun. However, only one unknown bite was given Russell's viper antivenom (40 ml) in Einme, otherwise the majority of unknown bites were not given antivenom.

DISCUSSION

The study indicated that the morbidity of snakebite in two study townships was not high but the case fatality rates were. The trend of snakebite observed in this study is in agreement with the report from the Department of Health Planning [1]. However, there is a discrepancy in numbers of bite and fatal cases. The demographic data of the snakebite victims are the same as that observed in snakebite cases in other townships [2]. The majority of the victims were male, age ranged between 11-50 years and bitten on lower limbs. The incidence of Russell's viper bite in two townships was low (33%) and that of cobra bite was high (10-17%) compared to the incidence of Russell's viper (60%) and cobra 6% in study of snakebites in six township hospitals [2]. It was likely to be that the pattern of snakebite reflects the occupation of the local residents.

Time taken to transport the victims from site of bite to hospital was twice longer than that of snakebite cases taken in other townships of Ayeyawady: Yaekyi (4.55 hrs) and Danuphyu (4.45 hrs). Long hours of time taken to transport the victims in the absence of effective first aid contributed to high

incidence of systemic envenoming (79 and 87%) compared to Yaekyi (76%) and Danuphyu (58%) (average 43%) and development of systemic complications (44-75%) compared to Yaegyí 54% and Danuphyu 67% (average 42%) [2].

Antivenom usage

Antivenom usage in Russell's viper and cobra bites in the two townships was in agreement with the guidelines [3]: majority of Russell's viper bites were given 40 ml and 80 ml with the exception of four, given 100 ml and 200 ml in Einme and 110 ml and 140 ml in Mawlamyainggyun. A wide dose ranged from 10 ml to 80 ml were given in cobra bite cases in Mawlamyainggyun, however, the majority were given 40 ml antivenom. Majority of unknown bites were not given antivenom except a few cases. Since antivenom is expensive to produce the use of large dose of antivenom should be justified. It is emphasized that specific antivenom should be given to specific bite and cobra antivenom was not helpful in treating other neurotoxic bites [4] like suspected krait bite given 40+40 ml of cobra antivenom.

It is highly likely that contributing causes of high case fatality rate of Russell's viper bites in the two townships were long hours of time taken to transport the victims to the hospitals and development of systemic envenoming and complications on arrival at the hospitals. Moreover, CFR increases with delay in arrival time. Because of incomplete documentation, other contributing factors could not be retrieved from the hospital records. It is suggested that Medical Officers looking after the snakebite victims should be trained to keep full documentation of patients for references and it is their responsibility to upgrade and maintain their medical skills.

It is emphasized that use of correct effective first aid [5], administration of prehospital antivenom [6], avoid wasting valuable time after the bite and correct and speedy transportation of the victim to the health

center will delay on set of envenoming and help in bringing down the case fatality rate.

It is speculated that timely introduction of assisted ventilatory support to the fatal cobra bites in the hospital could have saved the lives of the victims since reversion of neurotoxic symptoms after antivenom takes time. It has been documented that many lives of neurotoxic envenomed victims have been saved by artificial ventilation even in the absence of specific antivenom [7]. Many lives of cobra bite victims who developed respiratory arrest on the way to hospitals could have been saved by artificial ventilation which could be provided by the relatives/health workers who accompanied the victim to the hospital (personal communication).

It is suggested that Medical Officers looking after the snakebite victims in township hospitals should be trained to insert endotracheal tube [8] and provide mechanical ventilation to the neurotoxic envenomed victims who develop respiratory difficulty or arrest. Moreover, this valuable life saving message of providing firstaid to neurotoxic envenomed victims who develops respiratory arrest on the way to hospital should be promoted among health-care providers and in community.

It is surprising to learn that there were no records of death due to Russell's viper bite in past 6 years in Einme hospitals. Since there is no cold storage facility in the district hospitals, patients in terminal illness care usually taken home and mortality rate of disease in district hospital will be grossly underestimated. However, in our analysis of the cases, all the terminal cases were regarded as fatal cases.

In conclusion, high case fatality rate in the two study townships was documented. Long hours of transportation of patients to hospital plus development of systemic envenoming and complications at admission are contributing causes for high case fatality rate. Because of incomplete documentation, a well designed prospective hospital based

study of snake bite will provide more information on answering the pressing questions.

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