

RETROSPECTIVE PREVALENCE OF SNAKEBITES FROM HOSPITAL KUALA LUMPUR (HKL) (1999-2003)

I Jamaiah¹, M Rohela¹, TK Ng², KBH Ch'ng¹, YS Teh¹, AL Nurulhuda¹
and N Suhaili¹

¹Department of Parasitology, Faculty of Medicine, University of Malaya, Kuala Lumpur;

²Director Office, Hospital Kuala Lumpur, Malaysia

Abstract. A hospital based retrospective study of the prevalence of snakebite cases at Hospital Kuala Lumpur was carried out over a five-year period from 1999 to 2003. A total of 126 snakebite cases were recorded. The highest admission for snakebites was recorded in 2001 (29 cases). The majority of cases were admitted for three days or less (79%). Most of the snakebite cases were reported in the 11-30 years age group (52%). The male:female ratio was 3:1. The majority of cases were Malaysians (80%, 101 cases). Of the non-Malaysians, Indonesians constituted the most (56%, 14 cases). Bites occurred most commonly on the lower limbs (49%), followed by upper limbs (45%) and on other parts of the body (6%). No fatal cases were detected and complications were scarce. In 60% (70 cases) the snake could not be identified. Of the four species of snakes that were identified, cobra (both suspected and confirmed) constituted the largest group (25%), followed by viper (10%), python (4%) and sea snake (1%). The most common clinical presentations were pain and swelling, 92% (116 cases). All patients were put on snakebite charts and their vital signs were monitored. Of the snakebite cases, 48% (61 cases) were treated with cloxacillin and 25% (32 cases) were given polyvalent snake antivenom.

INTRODUCTION

The incidence of venomous snakebites is low in most developed countries, but in regions of the world where people are engaged in manual agriculture, often with exposed lower extremities, attack rates are higher. About 30,000 to 40,000 persons die each year from venomous snakebites; incomplete reporting in disadvantaged regions probably makes this range an underestimate (Norris *et al*, 1998). Most snakes are harmless to human beings and may be considered as non-venomous.

In Malaysia, 17 of 105 strictly land snakes are venomous and are dangerous to man. These venomous snakes are comprised of two families, the Elapidae (nine species; examples include the cobras, kraits and coral snakes) and the Viperidae (eight species; examples include the Malayan pit viper, Temple pit viper and Sumatran

pit viper). All twenty-two species of sea snakes in Malaysia are venomous (Lim, 1990). Several studies of snakebites had been carried out in Peninsular Malaysia (Reid *et al*, 1963; Ambu and Liat, 1980; Lim, 1980; Muthusamy, 1988; Tan *et al*, 1990; Zulkifli *et al*, 1995; Jamaiah *et al*, 2004). In the majority of cases of snakebites admitted to hospitals in Malaysia, most of the snakes were not identified (Zulkifli *et al*, 1995; Jamaiah *et al*, 2004). Most cases of snakebites identified in Malaysia were due to the Malayan pit viper (*Agkistrodon rhodostoma*/Calloselasma rhodostoma/ular kapak bodoh) (Reid, 1963; Lim and Abu Bakar, 1970; Muthusamy, 1988; Lim, 1990). But Jamaiah *et al* (2004) and Tan *et al* (1990) reported that most of the cases of snakebites were due to the common cobras.

The Malayan pit viper is confined to the Kedah and Perlis States which are situated in the northern part of west Malaysia extending to southern Thailand (Reid, 1963; Lim and Abu Bakar, 1970; Lim, 1990; Tweedie, 1990). It feeds mainly on small mammals and lives on the ground, where it is very well concealed by a background of dead leaves. It is also very slug-

Correspondence: Ibrahim Jamaiah, Department of Parasitology, Faculty of Medicine, University of Malaya, 50503 Kuala Lumpur, Malaysia.
Tel: 603-7967 4752; Fax: 603-7967 4754
E-mail: jamaiah@ummc.edu.my

gish and has effective camouflage. These factors combine to increase the hazard of stepping on a snake, but death from the bite is unusual (Tweedie, 1990).

Chen *et al* (2000) reported that most venomous snakebites admitted to a general hospital in northern Taiwan were attributed to the green habu and Taiwan habu. Fayomi *et al* (2002) did a retrospective study of snakebites reported by the Ministry of Public Health from 1994-2000 in Benin and found that a total of 30,273 cases were reported during 7 years and the lethality was high (15%). Hon *et al* (2004) reviewed the pattern and characteristics of snakebites in children in rural Hong Kong. He reported seven snakebite cases in children; 86% of the victims were male and the majority of bites (86%) occurred on the extremities. Pierini *et al* (1996) reported that snakebite was an important cause of morbidity and death among forest-dwelling Amazonian Indians and rubber tappers in northwestern Brazil. Overall, 13% of a surveyed population had been bitten during their lifetime. Rudolph *et al* (1995) reported that majority of snakebite cases from southeastern Georgia were due to rattlesnake (30%) and an average of 6 snakebites were treated each year.

Snakebite is a rural problem (Zulkifli *et al*, 1995). The rapid and intense land development for housing projects and urbanization in Malaysia that is happening now, especially around Kuala Lumpur has resulted in more humans encroaching into the habitat of these creatures. This activity may lead to an increased risk of snakebites. Thus, this study was carried out to determine the prevalence of snake bites treated at Hospital Kuala Lumpur (HKL), which is located in an urban setting.

MATERIALS AND METHODS

All the cases of snakebites, both suspected and confirmed, admitted to Hospital Kuala Lumpur (HKL) from year 1999 to 2003 were analyzed. Data was obtained from Wisma Kayu, the medical records resource center for Hospital

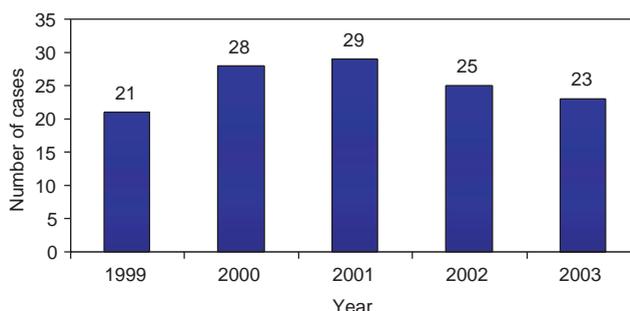


Fig 1—Distribution of snake bite cases per year at HKL from 1999 to 2003.

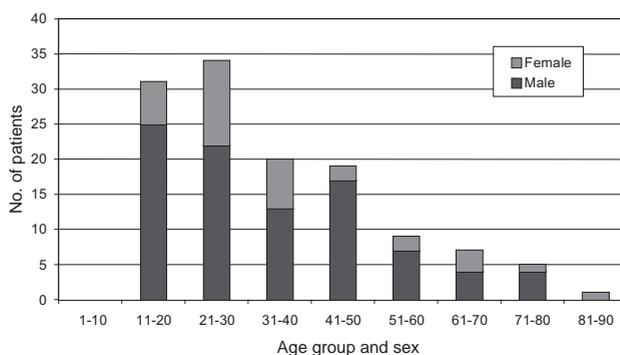


Fig 2—Snakebite cases in HKL according to age group and sex for the years 1999 to 2003.

Kuala Lumpur. A total of 126 case records were reviewed and analyzed.

RESULTS

As shown in Fig 1, the highest number of snakebite admissions was recorded in the year 2001 (29 cases), followed by 28 cases in 2000, 25 cases in 2002, 23 cases in 2003 and 21 cases in 1999. From 1999, the cases gradually increased and peaked in 2001. After that, the number of cases declined.

The majority of patients (79%) were admitted for 3 days or less. There were 6 patients admitted for more than a week. The longest hospital admission was 17 days. The duration of admission varied depending on the severity of the snakebite.

As seen in the bar chart in Fig 2, most of the snakebite cases were reported in the 11-30 years age group. They comprised 52% of the total snakebite cases. Above that age group, the number of cases dropped gradually. No snake-

Table 1
Clinical presentations of snakebite patients in HKL.

Clinical presentation	No. of cases	Clinical presentation	No. of cases
Pain and swelling	116	Local necrosis	4
Numbness	40	Limited movement	3
Bleeding	24	Muscle stiffness	3
Shortness of breath	23	Joint pain	2
Giddiness	20	Hematuria	2
Tenderness	19	Fever	2
Redness	19	Tachycardia	2
Vomiting	14	Eye discomfort	2
Skin discoloration	13	Generalized weakness	2
Muscle pain	12	Abdominal pain	2
Nausea	9	Abnormal speech	1
Ptosis	9	Sympathetic hyperglycemia	1
Chest pain	8	Diplopia	1
Headache	7	Dysphagia	1
Loss of consciousness	4	Cyanosis	1
Blurring of vision	4	Stridor	1

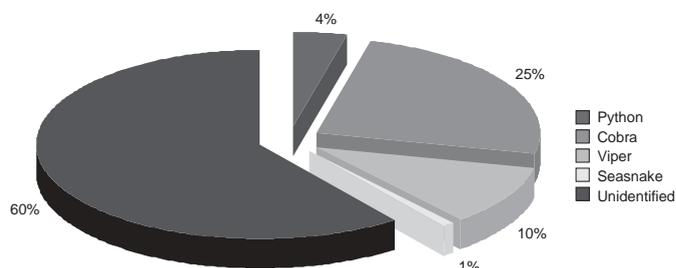


Fig 3—Snakebite cases in HKL according to snake species from year 1999 to 2003.

bite cases were reported in the 1-10 years age group. Out of a total of 126 cases, 92 male victims were documented compared with only 34 females. The male:female ratio was 3:1. The number of male victims was higher than females in each of the age groups, except in the 81-90 years age group where there was only one female victim.

The majority of snakebite victims (80%) were Malaysians. The remaining (20%) of the victims were foreigners. Of the foreigners, Indonesians constituted the largest number of cases, 14 (56%).

As seen in Fig 3, in the majority of cases,

the victims did not see or could not identify the snakes. Thus, 76 cases (60%) involved unidentified snake species. Of the four species of snakes that were identified, the cobra constituted the largest group (25%), followed by the viper, python and sea snake at 10, 4 and 1%, respectively. This study included "suspected" snakebites as most previous studies have done.

The commonest snakebite sites were the upper and lower limbs. There were 57 cases (45%) of bites on the upper limbs, referring to the hand, fingers, forearm, elbow and arm. Another 62 cases (49%) were on the lower limbs, referring to the ankle, toe, foot and leg, and 7 cases (6%) on other parts of the body, including the head, eye, back and shoulder.

The common clinical presentations of snakebites were pain and swelling in 116 (92%), numbness in 40 (32%), bleeding in 24 (19%), shortness of breath in 23 (18%), giddiness in 20 (16%), tenderness in 19 (15%), redness in 19 (15%), vomiting in 14 (11%), skin discoloration

in 13 (10%) and muscle pain in 12 (9%).

Most patients (48%) were given the antibiotic cloxacillin. Tetanus antitoxin was given in 43 cases (34%). There were 32 cases (25%) that were given polyvalent snake antivenom. All the patients were put on snakebite charts and vital signs were monitored. Steroid was administered to 25% of cases.

DISCUSSION

Overall, the incidence of snakebites treated at Hospital Kuala Lumpur (HKL) did not vary much from year 1999 to 2003. The cases ranged from 21 to 29. The highest admission rate was in the year 2001 (29 cases). However, these figures do not represent the actual number of snakebite admissions in Kuala Lumpur (KL). This is because snakebite figures from other hospitals in KL are not known. The cases at HKL included 'referred cases' from nearby clinics and hospitals. During this study, we found there were cases which were referred from Hospital Genting and Hospital Sungai Buloh, which are located outside KL.

The majority of patients in our study were discharged after a stay of about 3 days or less (79%). Most of them (40%) were admitted for 2 days. A similar trend was also reported from the study of snakebites in rural children in Hong Kong (Hon *et al*, 2004) and in Kelantan, Peninsular Malaysia by Zulkifli *et al* (1995). The duration of stay in hospital depended on the severity of the clinical manifestations. The results of laboratory diagnosis also determined the duration of hospital stay, in addition to the presence of complications, such as cellulites, which needed careful observation. Patients who had other pre-existing diseases, such as asthma, diabetes mellitus and cardiac problems, stayed longer in the hospital.

In this study, most of the cases reported were in the 11-30 years age group (52%). In a study in Kelantan, the highest incidence was in the age group of 10-19 years, comprising 25% of the total admissions (Zulkifli *et al*, 1995). Another study in north Malaya showed the highest snakebite incidence in the 20-29 years age group for central Kedah and 10-19 years for Penang

(Reid, 1963). In our study the male:female ratio was 3:1, in comparison to a study in Kelantan which showed a ratio of 1.5:1.0 (Zulkifli *et al*, 1995). Reid *et al* (1963) also reported similar findings in both central Kedah and Penang, where the risk to males was twice that of females. Jamaiah *et al* (2004), Muthusamy (1988), Silveira and Nishioka Sde (1995), Plowman *et al* (1995), Chippaux (2002) and Hon *et al* (2004) also reported similar findings.

In this study the majority of snakebite victims (80%) were Malaysians. The remaining 20% of the victims were from Indonesia, Thailand, India, Singapore, Myanmar, Germany, Great Britain and Chechnya. Indonesians, who worked mostly as construction workers and house maids, comprised the largest proportion of victims from foreign countries (56%).

In most of the snakebite cases (60%) in this study, snakes were not identified. Of the four species of snakes that were identified, the cobra was the most common (25%), followed by viper, python and sea snake at 10, 4 and 1%, respectively. This study also included "suspected" snakebites, as most previous studies have done. Tan *et al* (1990), Trishnananda (1979) and Jamaiah *et al* (2004) also reported similar findings. But Reid *et al* (1963), Lim and Abu Bakar (1970), Muthusamy (1988), Tweedie (1990), and Zulkifli *et al* (1995) reported that the most common snakebite cases were due to the Malayan pit viper.

The most common snakebite sites in this study were the lower limbs in 62 cases (49%), the upper limbs in 57 cases (45%) and in only 7 cases involved other body parts (6%). Reid *et al* (1963), Hon *et al* (2004) and Zulkifli *et al* (1995) also reported similar findings. The most common body parts bitten were the hands and fingers in 50 cases (40%). Plowman *et al* (1995) reported that two-thirds of the snakebite cases occurred in the upper limbs.

The common clinical presentations observed in this study were pain and swelling (92%), followed by numbness at the site of bite (32%). Besides these two, other features included bleeding (19%), shortness of breath (18%), giddiness (16%), redness (15%) and tenderness (15%). Plowman *et al* (1995) and Tan *et*

al (1990) also reported similar findings.

One hundred and fifteen (91%) of the 126 total snakebite cases presented with no complications. Seven (6%) had cellulitis and 2 (2%) gangrene cases were reported. There was 1 (1%) case each of fasciitis and allergy to antivenom.

According to Reid *et al* (1963), the general mortality rate was 1.57% in the Penang series and 0.87% in the Kedah series. In our study and that of Zulkifli *et al* (1995) there were no reported fatalities. This may be attributed to advances in medical treatment and improvement in patient management.

Generally, a snakebite can be recognized by the presence of fang marks. These resemble puncture wounds and are usually two, but can vary in number from one to six. There is also immediate pain and rapid swelling. The field diagnosis of snake bite involves seeing punctures where the fangs penetrate the tissues, severe pain at the site of the bite, edema, ecchymosis (pinpoint bruises), nausea, weakness, severe hypotension and shock.

Diagnosis includes a full blood count (FBC). The test may be done rapidly and repeatedly to detect any abnormalities. A tendency toward bleeding in these patients can be monitored by disseminated intravascular coagulation (DIC) screening, which involves assessing the prothrombin time (PT) and partial thromboplastin time (PTT). In some cases, patients will have to undergo cardiac monitoring when the signs and symptoms of cardiac involvement are detected. Cardiac enzyme levels should be recorded and an electrocardiogram (ECG) should be carried out on the patient. Hung *et al* (2003) have developed an enzyme-linked immunosorbent assay (ELISA) to detect the presence of Taiwan cobra venom in the serum of cobra snakebite victims. They found that serum concentrations of the venom in the bitten patients correlated well with the severity of local tissue destruction. Specific antivenom administered soon after snakebite was effective in neutralizing the circulating venom as revealed by ELISA.

Most patients (48%) in our study were given cloxacillin. Tetanus antitoxin was given in 43 cases (34%) following cloxacillin. Other antibi-

otics, such as penicillin, Zinacef and Cefobid were also given to treat the patients. Thirty-two cases (25%) were given polyvalent snake antivenom, which is the current treatment available for systemic snakebite poisoning. In Kelantan, only 3.9% of cases were given antivenom (Tan *et al*, 1990).

Antivenom should not be given routinely in all cases of snakebite because it is expensive and can cause adverse effects, even fatal ones. Early management of cases could have prevented death. Our study showed that general management was given to all cases, which included snakebite charts and vital signs monitoring. Other tests such as ECG and chest X ray were carried out in some patients with severe clinical manifestations.

ACKNOWLEDGEMENTS

We would like to express our gratitude to the staff of Wisma Kayu, Hospital Kuala Lumpur for providing us with the snakebite medical records, and for their cooperation and support.

REFERENCES

- Ambu S, Liat LB. A study of snake bites in Peninsular Malaysia with special reference to Perlis and Kedah from 1979-1983. *Trop Biomed* 1980; 5: 65-70.
- Chen JC, Liaw SJ, Bullard MJ, Chiu TF. Treatment of poisonous snakebites in northern Taiwan. *J Formos Med Assoc* 2000; 99: 135-9.
- Chippaux JP. Epidemiology of snakebites in the Republic of Ivory Coast. *Bull Soc Pathol Exot* 2002; 95: 167-71.
- Fayomi B, Massougbodli A, Chobli M. Epidemiological data on snakebite cases reported in Benin from 1994 to 2000. *Bull Soc Pathol Exot* 2002; 95: 178-80.
- Hon KL, Kwok LW, Leung TF. Snakebites in children in the densely populated city of Hong Kong: a 10-year survey. *Acta Paediatr* 2004; 93: 270-2.
- Hung DZ, Liao MY, Lin-Shiau SY. The clinical significance of venom detection in patients of cobra snakebite. *Toxicon* 2003; 41: 409-15.
- Jamaiah I, Rohela M, Roshalina R, Undan RC. Prevalence of snake bites in Kangar District Hospital, Perlis, West Malaysia: A retrospective study (Jan

- 1999-Dec 2000). *Southeast Asian J Trop Med Hyg* 2004; 35: 962-5.
- Lim BL. Venomous land snakes of Malaysia. Snakes of medical importance (Asia-Pacific Region). Venom And Toxin Research Group, National University of Singapore 1990: 387-417.
- Lim BL, Abu Bakar I. Bites and stings by venomous animals with special reference to snakes bites in West Malaysia. *Med J Malaya* 1970; 25: 128-41.
- Lim TW. Epidemiology of snake bites in Malaysia. *The Snake* 1980; 12: 119-24.
- Muthusamy E. Snake bite: Experience in Bukit Mertajam District Hospital, Pulau Pinang. *Singapore Med J* 1988; 29: 383-6.
- Norris RL, Oslund S, Auerbach PS. Disorders caused by reptile bites and marine animal envenomations. Harrison's principles of internal medicine. 14th ed. New York: The McGraw-Hill, 1998; 2: 2544-6.
- Pierini SV, Warrel DA, de Paulo A, Theakston RD. High incidence of bites and stings by snakes and other animals among rubber tappers and Amazonian Indians of the Jurua Valley, Acre State, Brazil. *Toxicon* 1996; 34: 225-36.
- Plowman DM, Reynolds TL, Joyce SM. Poisonous snakebite in Utah. *West J Med* 1995; 163: 547-51.
- Reid HA, Thean PC, Martin WJ. Epidemiology of snake bite in North Malaya. *Br Med J* 1963; 1: 992-7.
- Rudolph R, Neal GE, William JS, McMahan AP. Snake-bite treatment at a southeastern regional referral center. *Am Surg* 1995; 61: 767-72.
- Silveira PV, Nishioka Sde A. Venomous snakebite without clinical envenoming ('dry-bite'). A neglected problem in Brazil. *Trop Geogr Med* 1995; 47: 82-5.
- Tan KK, Choo KE, Ariffin WA. Snake bite in Kelantanese children: A five year experience. *Toxicon* 1990; 28: 225-30.
- Trishnananda M. Incidence, clinical manifestation and general management of snakebites. *Southeast Asian J Trop Med Public Health* 1979; 10: 248-50.
- Tweedie MWF. Poisonous animals of Malaysia. Singapore: Graham Brash, 1990: 6-24.
- Zulkifli A, Hashim MH, Khairul Anuar A. Snake bites in Kelantan, Peninsular Malaysia. *Trop Biomed* 1995; 12: 1-4.