



LEARNER'S GUIDE FOR MANAGEMENT OF SNAKEBITE



Non Communicable Disease Control Programme
Directorate General of Health Services
Ministry of Health & Family Welfare



স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয়



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Learner's Guide for Management of Snakebite

A Training Manual for Doctors

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Message

I would like to express my great appreciation to the Non Communicable Disease Control (NCDC) Program, Directorate General of Health Services (DGHS) for developing this important training module on learner's Guide for Management of Snake Bite 2nd version.

Snake bite is one of the ancient and major public health problems in Bangladesh. Special training program for doctors, nurses, para-medics & other health workers will be organized country wide on snake bite management according to the guideline of this module.

I believe that 'Learner's Guide for Management of Snake Bite' will provide specific guidance and up to-date knowledge for proper treatment and prevention of Snake bite patients at all levels of medical care throughout the country and will be beneficiary for the patient and health care providers as well.

I wish this initiative of NCDC Program of Directorate (DGHS) every success.

A handwritten signature in black ink, appearing to read 'Abul Bashar'.

Prof. Dr. Abul Bashar Mohammade Khurshid Alam
Director General
Directorate General of Health Services (DGHS)



Message

Snake is a hazardous & deadly reptile but an important part of bio diversity. Snake bite has a significant medical impact due to morbidity & high mortality. 86% Victims go to “Ozhas” (Traditional healer/Snake charmer) and only 3% go to Doctors in Bangladesh. Death due to snake bite stands 1st among all deaths due to poisoning. So to reduce mortality and morbidity due to snake bite, the training and up gradation of the knowledge about snake bite is of utmost importance.

The aim of this training module on Management of Snake Bites is primarily to train Doctors, Nurses, Para-medics, Field staffs of health and family planning sectors at District and Upazilla level in Bangladesh. During preparation of this training module the related literatures on snake bite were consulted. This module will provide essential information on epidemiology of snake bite including medically important venomous snakes in Bangladesh, clinical aspects and management of snake bite in a stepwise manner.

The technical contribution of the participants of various workshops listed in Annexure are gratefully acknowledged. I sincerely hope that this training module will be useful to improve the management of snake bite patients at all level of health care facilities in our country.



Professor Dr. Mohammad Robed Amin

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Directorate General of Health Services

Preface

In 2017, the World Health Organization (WHO) had included snakebite envenomation in the list of the “neglected tropical diseases” in an attempt to bring more focus on the condition.

Snake bite is an important health problem particularly in rural areas of Bangladesh. The cases of snake bite until recently were being treated by traditional healers, ‘Ozhas’. The patients following venomous snake bite need quick treatment in hospital. Non-venomous bite needs appropriate first aid treatment and observation only. The aim of this training module on Management of Snake Bites is primarily to train doctors, medical students and other health professionals in Bangladesh. This module consists of Learner’s guide provide units on essential information on epidemiology of snake bite including medically important venomous snakes in Bangladesh, clinical aspects and management of snake bite in a step wise manner. Few pictures and case study are also included in this module. The Tutor’s guide has additional informations for facilitated learning of a topic.

During preparation of this training module the related literature on snake bite were consulted particularly to mention “WHO / SEARO Guidelines for the clinical management of snake bite in the Southeast Asian region” (edited by Professor David A. Warrell).

Learner's Guide for Management of Snakebite

A Training Manual or Module for Doctors

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A Training Manual for Doctors

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Learner's Guide for Management of Snakebite

A Training Manual for Doctors

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Learner's Guide for Management of Snakebite

A Training Manual for Doctors

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Abbreviation:

AAM	Advanced Airway Management
AV	Antivenom
BVM	Bag-Valve-Mask
CSR	Corporate social responsibility
CMCH	Chittagong Medical College Hospital
DGHS	Directorate General of Health Services
EAR	Expired Air Resuscitation
ET	Endotracheal Tube
FFP	Fresh frozen plasma
GCS	Glasgow Coma Scale
ICU	Intensive Care Unit
LMA	Laryngeal mask airway
NGO	Non government organizations
OPA	Insert an oropharyngeal airway
WBCT	Whole blood clotting test

Levels of evidence:

Recommendations are based largely on Systematic Review(S) observational studies (“O”), expert opinion (“E”) and, in some cases, comparative trials (“T”). Symbols for the evidence used as the basis of each recommendation (in order of level of evidence) are:

S: formal systematic reviews, such as Cochrane Reviews of which there is only one in the field of snakebites. These include more than one randomized controlled trial

T: comparative trials without formal systematic review

O: observational studies (e.g. surveillance or pharmacological data)

E: expert opinion/consensus.

CONTENTS

Objectives		Page No
Learning Unit- 1:	What you know about snakes, snakebite and its treatment in Bangladesh?	5
Learning Unit- 2:	Epidemiology of snakebite in Bangladesh	6
Learning unit- 3:	Approach to diagnosis of snakebite	11
Learning unit- 4:	The Management of Snakebite	17
Learning Unit- 5:	Practical guide to airway management and respiratory support	26
Learning Unit- 6:	Prevention of snakebite	32
	Case Study	35
	Picture Quiz	39
	Annexes	42

Objectives:

At the end of the training programme based on this guide trainees will be able to develop the skills & Competences that will enable them to:

1. Know the importance of snakebite and its epidemiology in Bangladesh.
2. Classify snakes, know snakes of medical importance in Bangladesh with their basics of identification.
3. Take a relevant history and conduct an appropriate physical examination for the diagnosis of snakebite with special emphasis on venomous snakebite considering syndromic approach.
4. Provide appropriate, urgent treatment and administer antivenom if indicated.
5. Provide respiratory support and other supportive treatment.
6. Contribute to creating awareness among the medical professionals and the community about appropriate first aid, effective scientific treatment and prevention of snakebite.

How this Learner's Guide will be taught during this training?

- Presentations like lectures will be minimum.
- Demonstrations will be used to illustrate some of the aspects of identification of venomous and nonvenomous snakes and different steps of diagnosis and management of snakebite.
- Small group discussion on specific topic will be led by a facilitator.
- Photography of snakes and some features of envenoming will be shown.

How evaluation will be done?

- Before training, pretest will be taken.
- After completion of training, post test will be taken.
- Structured feedback will be taken from the trainees for evaluation of impact of training program.

Learning Unit: 1

Snakes, snakebite & misconceptions about snakebite in Bangladesh

Learning objectives:

By the end of this unit, you should be able to:

- Realize the importance of snakebite and treatment seeking behavior of the victims.
- Snake bite situation in the community and available facilities in different level of health care setups.
- Know the misconception regarding management of snakebite prevailing in the community

1. Do you think that snakebite is an important public health problem in your working place?
2. Have you seen any snake bite case? If yes how many cases have you seen?
3. How many deaths are due to snake bite each year (roughly) at your place of work?
4. Do you believe that most cases of snakebite among the population you serve are brought to Health Complex/Hospitals? If not mention why?
5. Do many deaths occur at home without scientific treatment? If yes, state why?
6. What is your idea about venomous & non venomous snake bite?
7. Name some venomous snakes in our country.
8. Which clinical features of venomous snakebite are the most serious?
9. How snake bites are treated in the community?
10. What may be the harmful effects of any type of treatment?
11. What drugs are being used for treatment of venomous/poisonous snakes bite in your working place?
12. What antivenoms are available in your area?
13. Do you think that a scientific approach for diagnosis and treatment of snakebite is available in Bangladesh?
14. What do you think are the major constraints in your place of work to a satisfactory treatment of snakebite?
15. What are the essential logistics needed to manage the snakebite patient in a health care setting?

Learning Unit: 2

Epidemiology of snakebite in Bangladesh & Classification of medically important snakes of Bangladesh

Learning objectives:

By the end of this unit, you should be able to:

- Describe the epidemiology of snakebite in Bangladesh.
- Know the snakes of medical importance in Bangladesh with their identification.

Epidemiology of snakebite in Bangladesh:

According to a nationwide community-based epidemiological study of snakebite and its socioeconomic consequences in Bangladesh the incidence density of snakebite in rural Bangladesh (which is substantially higher than previously estimated) is 623.4/100,000 person years (95% C I 513.4 – 1595.3/100,000 person-years) with an estimated 6,041 death annually. The majority of the bite (71%) happened in the lower extremities. Eighty six percent of the victims receive some form of management within two hours of snakebite, although only three percent of the victims went directly to either a medical doctor or a hospital.

Most often the victim of snakebite is a poor, young and active individual. Biting occurs mostly when individuals are at work, engaged in activities such as cultivation, fishing, plantation, wood collection, or tending crops or gardens. Snakebite envenoming in Bangladesh is thus an occupational health hazard of the rural poor people who suffer bites while engaged in physical work, most often during cultivation. However, bites were fairly common when the victims were walking on rural foot paths or while sleeping on the floor. Children have a high risk of dying or suffering permanent disability from snakebite envenoming. During the monsoon, snakebite occurrences increase as snakes leave their shelter due to rainfall. Most of the houses in countryside of Bangladesh are not brick-built and the snakes sometimes live in the holes of the muddy floors.

Moreover, most of the houses have homestead bush, which offers an ideal habitat for snakes. As a result, events of snakebite are also common when people are at home. To go to the toilet and for other domestic purposes, people often come out of their houses, without light and become victims. Village people store grains including paddy, rice in their bedroom, and keep the poultry in the same dwelling house, which also provides shelter to the snakes, increasing the risk of snakebite.

Due to its geographical location and climatic conditions, Bangladesh is a disaster-prone country. Based on records of the surveillance system of the Directorate General of Health Services (DGHS), Bangladesh, snakebite envenoming was identified as a leading cause of mortality in several flood disasters, second only to drowning.

Snakes of Bangladesh:

Historically the snake fauna of Bangladesh is under collected and understudied, and mostly restricted to species identification and distribution. A literature review from 1852–2018 identifies 100 species of which the venomous ones are 16 species are sea snakes, 3 cobras (including 1 king cobra), 5 kraits, 2 coral snakes, 6 green pit vipers and 1 species of true viper (Russell's viper). (Source: Prof Farid Ahsan, personal communication).

Medically important snakes of Bangladesh can be placed into five groups:

Group I: Cobra ('Zoura')	1. <i>Naja kaouthia</i>, monocellate cobra, ' . Distributed in all administrative divisions of Bangladesh. 2. <i>Naja naja</i>, binocellate cobra, spectackled cobra, gokhra, gokhur, khaiya gokhra, gohma/ goma. Distributed in all administrative divisions of Bangladesh, but more common in west of the Jamuna river 3. <i>Ophiophagus hannah</i>, king cobra, raj gokhra, sankhochur, padmo gokhra, phanos. Distributed in Sylhet, Chattogram, Khulna and Barishal divisions. Not common.
Group II: Krait – Different species are available	1. <i>Bungarus niger</i>- Black krait, kalu keutey 2. <i>Bungarus wali</i>- Wall's krait 3. <i>Bungarus caeruleus</i>, common krait, kalas, maicha-alad. Common krait is not common in Bangladesh (common in India) 4. <i>Bungarus fasciatus</i>, banded krait, sankhini, shakini, mama-bhagna. 5. <i>Bungarus lividus</i> Distributed in all administrative divisions of Bangladesh. Predominantly these snakes are seen in Chattogram, Dhaka and northern part of Bangladesh.
Group III: Russell's Viper	1. <i>Daboia</i> (= <i>Daboia russelii</i>, Russell's viper, 'Chandrabora') Distributed mainly in Rajshahi and Khulna division and recently found in <u>Chattogram division, Faridpur, Shariatpur, Chandpur, Patuakhali</u>
Group IV: Green Pit Viper	1. <i>Ovophis</i> (= <i>Trimeresurus</i>) spp., green pit vipers, green snakes, bansh-bora, sabuj-bora, gal tawa. Distributed in Sylhet, Chattogram, Khulna and Barishal Divisions.
Group V: Sea Snakes	1. <i>Enhydrina schistosa</i>, hooknosed sea snake, samudrik shap. Distributed in sea and coastal saline water of Bangladesh. 2. <i>Hydrophis</i> spp., <i>Microcephalis</i> spp., <i>Laticauda</i> spp., sea snakes, samudrik sha Distributed in sea and coastal saline water of Bangladesh.

Medically important venomous snakes of Bangladesh:

Name	Name	Distribution
	Scientific Name: <i>Naja kaouthia</i> English Name: Monocellate Cobra Bangla Name: পদ্মা গোখরা	Distributed in all administrative divisions of Bangladesh.
	Scientific Name: <i>Naja naja</i> English Name: Binocellate Cobra Spectackled cobra Bangla Name: খইয়া গোখরা	Distributed in all administrative divisions of Bangladesh, but more common in west of the Jamuna river
	Scientific Name: <i>Ophiophagus hannah</i> English Name: King Cobra Bangla Name: রাজ গোখরা, শঙ্খচূড়	Distributed in Sylhet, Chattogram, Khulna divisions. Not common.
	Scientific Name: <i>Bungarus fasciatus</i> English Name: Banded Krait Bangla Name: শঙ্খিনী, শাঁকিনী	Distributed in all administrative divisions of Bangladesh.
	Scientific Name: <i>Bungarus niger</i> English Name: Greater Black Krait Bangla Name: কাল কেউটে	Distributed in Sylhet and Chattogram divisions as well as northern part of the country.
	Scientific Name: <i>Bungarus lividus</i> English Name: Lesser Black Krait Bangla Name: ছোট কাল কেউটে	Distributed in Rangpur, Dinajpur, Khulna and Chattogram divisions of Bangladesh.

	Scientific Name: <i>Bungarus walli</i> English Name: Wall's Krait Bangla Name: ওয়ালস কেউটে	Distributed in Rangpur, Dinajpur, Khulna divisions of Bangladesh as well as Tangail and Mymensingh districts of Dhaka division.
	Scientific Name: <i>Bungarus caeruleus</i> English Name: Common Krait Bangla Name: কাল কেউটে	Distributed in all administrative divisions of Bangladesh.
	Scientific Name: <i>Trimeresurus erythrurus</i> English Name: Spot-tailed Pit Viper Bangla Name: সবুজবোড়া, গালটাওয়া	Distributed in Sylhet, Chattogram, Khulna and Barishal Divisions.
	Scientific Name: <i>Trimeresurus albolabris</i> English Name: White-lipped Pit Viper Bangla Name: সবুজবোড়া, গালটাওয়া	Distributed in Sylhet, Chattogram, Khulna and Barishal Divisions.
	Scientific Name: <i>Daboia russelii</i> English Name: Russell's Viper Bangla Name: চন্দ্রবোড়া	Distributed mainly in Rajshahi and Khulna division and recently found in Barishal and Chattogram divisions. Specially in the floodplain of Padma and Jamuna river.
	Scientific Name: <i>Enhydryna schistosa</i> English Name: Hook-nosed Sea Snake Bangla Name: সামুদ্রিক সাপ	Distributed in sea and coastal saline water of Bangladesh

	Scientific Name: <i>Hydrophis</i> spp., <i>Microcephalis</i> spp., <i>Laticauda</i> spp., English Name: Sea Snake Bangla Name: সামুদ্রিক সাপ	Distributed in sea and coastal saline water of Bangladesh
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Figure 8: Sea snake (Hydrophidae spp) (Copyright Md. Mizanur Rahman)

Learning unit 3

Approach to diagnosis of snakebite

Learning Objectives:

By the end of this unit, you should be able to:

- Define what is venomous snakebite
- Record a complete history from the patient / attendant
- Conduct a physical examination of the patient looking for significant signs of envenoming.
- Establish the diagnosis of venomous snake bite using syndromic approach.

What is venomous snakebite?

A bite by a venomous snake which produces specific symptoms and signs or a syndrome is considered as a venomous snakebite. It is important to note that a bite by venomous snake may not always produce features of envenoming: 50% of bites by Russell's vipers, 30% of bites by cobras do not result in any symptoms or signs of envenoming.

A bite by a non venomous snake does not produce the specific features due to venom. But the care giver should be cautious about the psychological impact and effect of various commonly practiced local treatment (e.g. by 'Ozhas') of snakebite. A victim may develop some features due to anxiety or apprehension after bite by a venomous as well as non venomous snake.

Most snakebite in the community are non venomous. Snakebite clinic of CMCH and RMCH found 85% and 78% of the admitted cases respectively, were non venomous in nature.

During taking history from a patient/an attendant the surroundings/circumstances and time of bite may give some clues to diagnosis.

There is considerable overlap of clinical features caused by venoms of different species of snake, for example neurotoxicity is a classical feature of Elapidae snakes (like cobra and krait) but similar presentation may happen following sea snake bite or following Russel's viper bite (in unusual cases as happened in Sri Lanka; doctors can look features with open mind).

The syndromes of snakebite may be considered in species identification and management in the absence of identification of species from brought snake (dead or alive) or by immunodiagnosis.

The history:

- Site of bite, circumstance of bite, time of bite, how did it happen?
- **Non-specific symptoms:** Headache, nausea, vomiting, abdominal pain, loss of consciousness, difficulty in vision, convulsions.

- **Neurological symptoms:** Heaviness of eye lids (ptosis), weakness of neck muscle (Broken neck sign) difficulty in swallowing, dribbling of saliva, nasal regurgitation, nasal voice, difficulty in moving jaw, tongue & eyes, muscle weakness, difficulty in respiration, extreme generalized weakness.
- **Haematological symptoms:** Spontaneous bleeding from gum, vomiting of blood, coughing up of blood, presence of blood in urine, persistent bleeding from bite site, inflicted wound site, blood spot on skin if any, excessive per vaginal bleeding.
- **Others:** Severe muscle pain, dark coloured urine, scanty urine volume, collapse.
- **Any important medical problem:** History of allergy, bronchial asthma, kidney disease, heart disease, bleeding disorders, neurological diseases, limb swelling etc.
- **In female:** Whether the victim is pregnant or not.
- **History of Pre hospital treatment:**
For example
 - Home treatment
 - Treatment from traditional healers ('ohza')
 - Application of tourniquet

The physical examination:

- 1) Rapid clinical assessment especially monitoring of vital signs (**Pulse, Respiration, Temperature, Blood Pressure**).
- 2) **Systemic signs of envenoming:**

Neurotoxic sign:

Ptosis (partial or complete) usually symmetrical and progressive, diplopia, external ophthalmoplegia
loss of gag reflex/palatal palsy (bulbar palsy),
dysphonia/nasal voice,
bilateral facial paralysis, inability to open the mouth or protrude the tongue,
paralysis of chest muscles and diaphragm (shallow breathing),
'broken neck sign', weak grip, diminished tendon reflexes.

Signs of haematological abnormalities:

Persistent bleeding from bite site, venepuncture site and or inflicted wound if any, multiple bruises or large blood collection, haemorrhagic blisters, bleeding from gingival sulci, haemoptysis, haematemeses, haematuria, epistaxis, per vaginal bleeding.

Signs of renal failure:

Scanty or no urine output, dark coloured urine, hypotension, clinical uraemic syndrome (Nausea, vomiting, hiccups, fetor, drowsiness, coma, flapping tremor, muscle twitching, convulsions, pericardial friction rub, signs of fluid overload).

Clinical uraemic syndrome:

Nausea, vomiting, hiccups, fetor, drowsiness, coma, flapping tremor, muscle twitching, convulsions, pericardial friction rub, signs of fluid overload.

Signs of myotoxicity:

Muscle tenderness, weakness, respiratory failure, black urine, renal failure

Signs of cardiovascular toxicity:

Hypotension, shock

Signs of local envenomation:

Swelling, tenderness, bleeding, ulceration, necrosis, at the sight of bite with local lymph node enlargement

Psychological features:

Snakebite is also known to cause significant psychological morbidity in the form of acute stress reaction and anxiety immediately and depression and post traumatic stress disorder as a sequel.



Figure 9: Hemorrhagic blister (Features of local envenoming *Copyright: M A Faiz*)



Figure 10: Ptosis (Neurotoxic snake bite *Copyright: M A Faiz*)



Figure 11: “Broken neck” sign (Neurotoxic snake bite) Copyright: M A Faiz)

Local examination:

Bite mark

- Classic fang and teeth mark rarely occur and if present indicate venomous snake bite (but you should not waste time to find out fang mark).
- Snakes may bite through clothing
- Scratches, usually indicates nonvenomous snake bite but may rarely found in krait bite.

Identification of the offending snake from fang mark is impossible:

Local swelling and tissue damage:

- First sign of envenoming
- Exceptions are kraits and sometime with cobras
- Blisters, necrosis

SYNDROMIC APPROACH:

The patient may present with cluster of symptoms and signs. In many cases, confirmed identification of the offending snake may not be possible. Based on circumstances and chronology of appearance and group of symptoms and signs syndromes are categorized:

Syndrome 1:

Local envenoming (swelling etc.) with bleeding/clotting disturbances = Viperidae (all species)

Syndrome 2:

Local envenoming (swelling etc.) with bleeding/clotting disturbances, shock or acute kidney injury with/without neurotoxicity = Russell's viper

Syndrome 3:

Local envenoming (swelling, blisters etc.) with neurotoxicity = cobra or king cobra

Syndrome 4:

Neurotoxicity with minimal or no local envenoming

Bitten on land or while sleeping on the ground = krait

Bitten in the sea, estuary and some freshwater lakes = sea snake

Syndrome 5:

Neurotoxicity with dark brown urine and acute kidney injury (no bleeding/clotting disturbances):

Bitten on land or while sleeping indoors = krait (*B. niger*)

Bitten in sea, estuary and some freshwater lakes = sea snake

Important Note:

- Features of envenoming may be present at time of presentation or may develop simultaneously or evolve over time.
- Significant local swelling (not due to ligature) without bleeding/clotting disturbance should be suspected for Pit Viper (in most cases) or Cobra.
- If the description, circumstance and/or additional clinical feature (for example a bite on a digit or swelling threatening vascular supply) strongly suggest a bite by Cobra then treatment with AV may be considered.

Investigations/laboratory tests

1. 20 minute Whole Blood Clotting Test (20WBCT)
2. Snakebite screening tests: full blood count, urine for macroscopy (Fig. 12) and RME, blood urea, S. electrolytes, S. creatinine, creatinine kinase, ECG, coagulation screen.
3. Specific tests for detection of venom is not available in Bangladesh.



Copyright Prof Julian White (from Davidson's Principles and Practice of Medicine, Elsevier)

Figure 12: Examination of urine in naked eye (left- blood, right- myoglobin)

Procedure to do 20 WBCT

- Place a 2/3 ml of freshly sampled venous blood in a small dry glass tube
- Leave undisturbed for 20 minutes at ambient temperature, in erect position.
- Then tip the tube once
- If the blood is still liquid (unclothed) and runs out, the patient has hypofibrinogenaemia and “incoagulable blood” as a result of venom induced consumption coagulopathy.
- In perspective of Bangladesh, incoagulable blood is diagnostic of a viper bite and rules out an elapid bite.
- **Warning:** If the tube used for the test is not made of ordinary glass, or if it has been used before and cleaned with detergent, its wall may not stimulate clotting of the blood sample in the usual way and test will be invalid. If there is any doubt repeat the test in duplicate, including a “Control” (blood from a healthy person)
- It is not indicated in identified kobra or krait bite

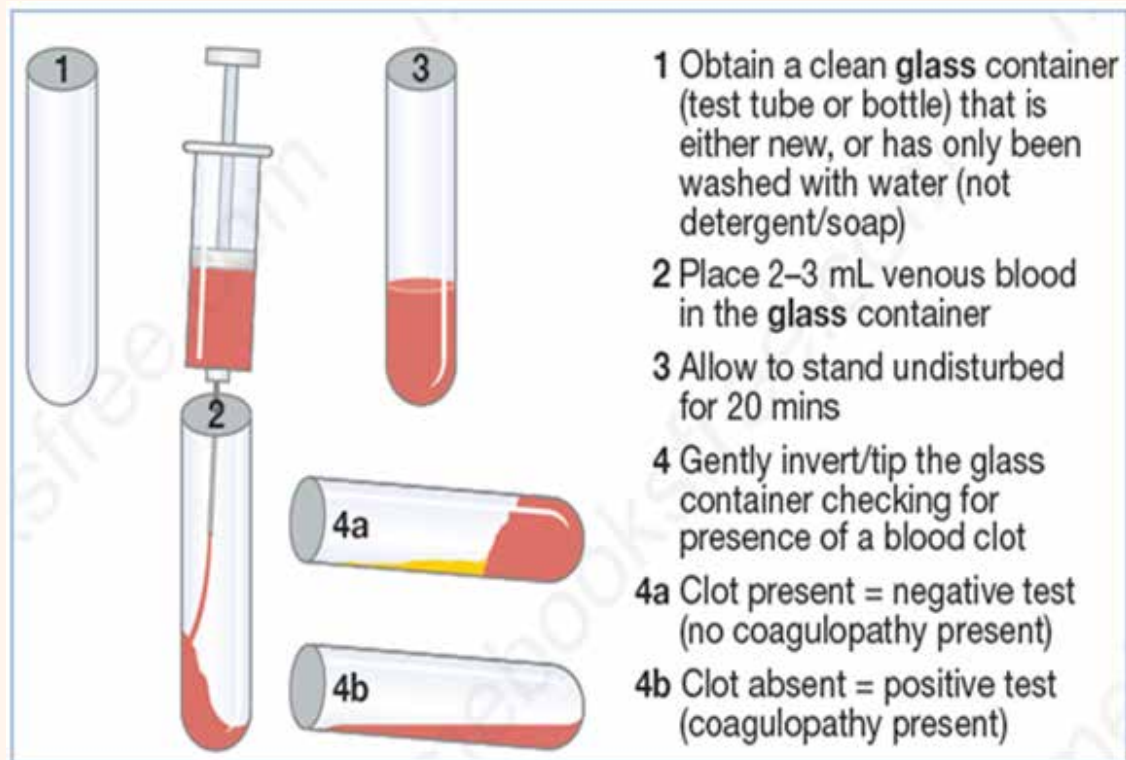


Figure 13: Twenty-minute whole-blood clotting test (20WBCT)

Copyright Prof Julian White (from Davidson's Principles and Practice of Medicine, Elsevier)

Learning unit 4: Management of Snake bite

Learning objectives:

By the end of this unit, you should be able to:

- Provide and teach appropriate first aid treatment
- Provide appropriate urgent treatments
- Antivenom administration
- Identify and manage antivenom reactions

Pre hospital Management (Bengla version is provided in Annex):

1. First aid:

Effective first-aid treatment should be carried out immediately or very soon after the snake bite; before the patient reaches hospital. It can be performed by the snakebite victim or by anyone present who has skill to provide first aid.

Incorrect first aid may cause more harm than good.

Aims of first aid:

1. Attempt to slow down spread of venom that may have been introduced into the tissues.
2. Control dangerous early symptoms of envenoming.
3. Prevent mortality and complications before reaching hospital.
4. Not to harm the snakebite victim.

Recommended first aid methods

1. Reassurance: Reassurance has prime importance to stabilize the victims. They should be advised not to get panicked and be told that majority of snakes are non-venomous; moreover, venomous snakes sometimes fail to inject enough venom effectively during bites.
2. Immobilization: Make sure that bitten limb (hand or leg) is immobile and the victim must be kept still. Advise:

- **Bite in lower limb: "Sit down, do not walk".**
- **Bite in upper limb: "Do not move the limb".**

- **Immobilize the bitten limb with a splint or sling as practiced in fracture of long bones. Ideal is to provide pressure immobilization. (O)**

Pressure immobilization method: We can give pressure by simple crepe bandage or by any long strips of clothes (like *Gamcha* or *Urna*). The bandage is wrapped firmly around the entire bitten limbs, starting distally around the fingers or toes, and moving proximally, to include a rigid splint. The bandage is bound as tightly as for a sprained ankle, but not so tightly that the peripheral pulse (Radial, posterior tibial, dorsalis pedis) is occluded or that a finger cannot easily be slipped between its layers.

Ideally, compression bandages should not be released until the patient is under medical care in hospital, resuscitation facilities are available and antivenom treatment has been started.

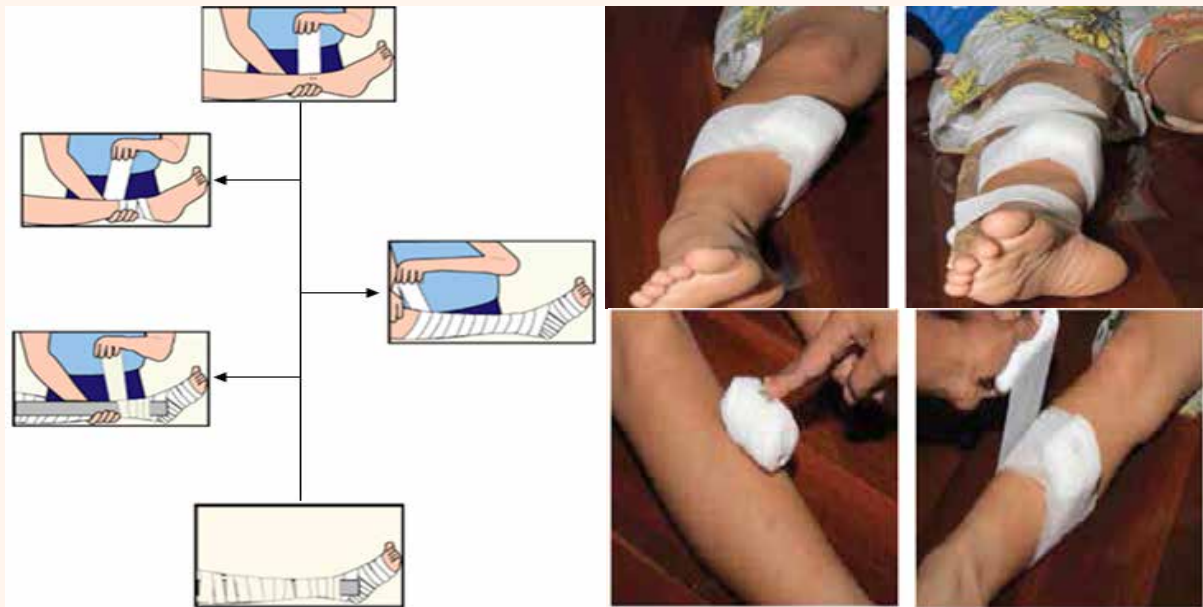


Figure 14: Pressure immobilization technique, Copyright: Dr David J Williams

3. Wash the bitten area: gently with soap and water, or wipe with a wet cloth and cover with bandage.
4. Remove as early as possible all rings, bangles, anklets, cords or clothing, 'Tabij', 'Taga' etc, which may cause constriction if swelling occur.
5. Place the patient in the lateral recumbent position.
6. If non-breathing, insert an oral airway or perform rescue breathing if necessary.
7. If the snake is killed somehow, bring it to hospital. Be careful and do not handle snakes bare handedly as they might pretend to be dead. Do not waste time for catching or killing the snake.
8. **Quick transport:** Seek help to get the patient rapidly transferred to a hospital by motorbike or ambulance or other motorized vehicles. (O)

DON'Ts in Snakebite

1. Do not apply tourniquets/ligature in the bitten limb.
2. Do not cut or prick with needles or use any topical cream.
3. Do not waste time unnecessarily seeking treatment provided by traditional healers (Ozhas).
4. Do not provide anything by mouth if the victim has difficulty in swallowing/talking, vomiting, nasal voice or excessive salivation.
5. Do not cauterize by using chemicals.
6. Do not apply herbal medicines, stones, seeds, saliva, potassium permanganate solution or cow-dung and mud.
7. Do not apply alcohol.
8. Do not give household products like oil, ghee, pepper to induce vomiting.
9. Do not give aspirin or other NSAID to relieve pain.
10. Do not panic and be tempted to do anything detrimental to the victim.
11. Do not delay in reaching health facility.

Note: There is no scientific proof of benefit (evidence) of application of tourniquet.

In case tourniquet has already been applied they should not be released until the patient is under medical care in hospital, medical staff and resuscitation facilities are available and antivenom (if indicated) has been started.

Antivenom Therapy

Indications for antivenom [level of evidence O,E]

Antivenom treatment is recommended if and when a patient with proven or suspected snake-bite develops one or more of the following signs:

Indications of Anti Venom therapy		
Systemic signs	Clinical	Laboratory
Haemostatic	Spontaneous systemic bleeding	20WBCT Prothrombin time, Thrombocytopenia (<100 X 10 ⁹ /litre or 100 000/cu mm)
Neurotoxic signs	Ptosis, external ophthalmoplegia, paralysis etc	
Cardiovascular abnormalities	Hypotension, shock, cardiac arrhythmia	Abnormal ECG
Acute kidney injury (renal failure)	Oliguria/anuria	Rising S. creatinine / urea
Haemoglobin-/myoglobin-uria	Dark brown urine, muscle aches and pains(feature of generalized rhabdomyolysis)	Urine dipsticks, Hyperkalemia Low Hemoglobin/ Haematocrit
Local envenoming	1. Local swelling involving more than half of the bitten limb (in the absence of a tourniquet) within 48 hours of the bite. 2. Swelling after bites on the digits (toes and especially fingers). 3. Rapid extension of swelling (for example, beyond the wrist or ankle within a few hours of bite on the hands or feet). 4. Development of an enlarged tender lymph node draining the bitten limb	

It is never too late to give AV provided the indications are present:

Only if features of **systemic** envenoming are present for bites of snakes mentioned in the above box

Do not give antivenom for local envenoming alone, except for Cobra and Russell's viper bites when indicated

Commence antivenom therapy immediately if indicated for the bites of:	Currently available antivenom is not recommended for the bites of:
Cobra	Green pit viper
Krait	Sea Snake
Russell's viper	

AV Therapy:

- Commence AV as soon as systemic envenoming is detected.
- Dose: 100 ml (10 amp/vials) of polyvalent AV mixed with 100 ml of normal saline should be infused intravenously over one hour.
- Start infusion at a lower rate, monitor for 10-15 minutes.

Adult and children should receive same dose of AV.

Before initiating AV, prophylactic subcutaneous adrenaline (dose - adult 0.25 ml of 0.1% solution and in children 0.005 mg/kg) should be given to the victim (T).

Adrenaline is available in market as 0.1% (1 in 1000) solution, 1 ampoule containing 1 ml.

Draw adrenaline in an Insulin syringe (100 unit) upto mark 25 (for adult). Then administer this Subcutaneously (in case of premedication). How to give S/C injection? (https://www.youtube.com/watch?v=XoGpnJ2_tS/C2A)

In case of treatment of Anaphylaxis, draw 0.5 ml of Adrenaline (for adult) in a 3 ml syringe and administer intramuscularly. How to give I/M injection? (<https://www.youtube.com/watch?v=pF5MJIw9pt4>)

CAUTION: Have Adrenaline (+Inj Hydrocortisone, Inj Anti histamine) available at bedside

Observe the patient carefully during the time of administration of antivenom and upto 3 hours for signs of anaphylaxis.

Monitor:

Pulse, blood pressure and respiration and observe for the appearance of an urticaria or rash.

Criteria for repeating the initial dose of antivenom: Some patients may require additional vials/ doses of antivenom

a) Persisting or deteriorating signs of systemic envenoming e.g.

If no improvement or deterioration of neurotoxic features (Cobra or Krait) 1-2 hours after completion of antivenom.

b) Persistence or recurrence of blood incoagulability after 6 hours of antivenom treatment.
The endpoint of AV therapy is reversal of coagulopathy as determined by serial performance of the 20WBCT.

- In viper bites, monitor the efficacy of AV by repeatedly performing the 20WBCT at the bedside.
- Initially at the start of AV therapy. Repeat in 6 hours: if the blood does not clot in 20 minutes, repeat AV infusion and perform 20WBCT 6 hours later.
- Continue the cycle till the blood clots
- Do not continue AV administration for persistent neurotoxicity, provided the coagulopathy has been reversed
- For known or suspected Krait bite do not repeat AV after 2/3 doses even if there is persistent neurotoxicity

Management of Special Problems

Respiratory Failure:

A major problem following krait and cobra bites. Neuroparalysis thus produced leads to acute type II respiratory failure, which is the most important cause of morbidity and mortality. Features may appear within 8 hours (in 94% of patients) and at the latest 19 hours following the bite.

The neurological symptoms (respiratory paralysis, flaccid paralysis) may be dramatic in onset.

Airway problem: chance of aspiration increases when dysphonia/nasal voice, facial paralysis, inability to open the mouth, protrude the tongue, loss of gag reflex/palatal palsy (bulbar palsy), pooling of secretions in the pharynx, failure of the cough reflex is present.

Breathing & ventilation problem:

Low respiratory rate, shallow (low tidal volume) breathing, agonal (gasping) breaths, central cyanosis, no breathing is discernable within 10 seconds,

Management:

- Patients with respiratory paralysis require ventilatory assistance in addition to administration of antivenom.
- Do not provide anything by mouth if the victim has difficulty in swallowing or has vomiting or nasal voice.
- Clear the airway by suction (careful low-pressure suction to avoid bleeding).
- Give oxygen (nasal prongs, face mask).
- Perform a chin-lift or jaw-thrust maneuver.
- Insert an oropharyngeal airway.
- Ventilate with a bag-mask device (Ambu) with oxygen.
- Establish a definitive airway: cuffed endotracheal intubation.
- If ET fails, insert laryngeal mask airway (LMA)
- Attach a pulse oximeter to the patient.
- Place the patient to mechanical ventilation in an intensive care unit.
- If mechanical ventilation is not available continue ventilation with Ambu bag or Bain circuit with endotracheal tube.

Patients should be given injection neostigmine IM (0.02 mg/kg for adults, 0.04 mg/kg for children) and injection atropine IV (dose- 0.6 mg for adults, 50 ug/kg for children) four hourly (O). Atropine to be given before neostigmine. **In resource limited setting, where respiratory support is not available, patients can be maintained on neostigmine and atropine four hourly.**

Transfer:

- Quickly transfer the victim to the nearest hospital having AV and ICU facility with a referral note and priorly inform the referral center about the patient's condition.
- During transfer if needed ventilate the patient using Ambu bag / Bain circuit with oxygen during transportation or portable ventilator and accompany the patient.



Figure 15: Evacuation of a snake bite victim showing early signs of paralysis by a village-based motorcycle volunteer. The victim is supported between the driver and a pillion passenger. (Copyright Dr Sanjib Sharma)

Avoid- narcotics and other respiratory depressants (benzodiazepam or dormicum, clonazepam)

Note: Endotracheal intubation is necessary for airway protection and prevention of aspiration in patient with bulbar involvement. In most of these cases, the lungs are not diseased therefore timely institution of mechanical ventilation is usually without complications. Timely institution can prevent aspiration and hypoxic injury to brain.

Acute Kidney Injury, AKI (Acute Renal Failure)

A major problem following Russell's viper bites

Features of renal failure:

Scanty or no urine output, dark coloured urine.

Clinical uremic syndrome: nausea, vomiting, hiccups, fetor, drowsiness, coma, flapping tremor, muscle twitching, convulsions, pericardial friction rub, signs of fluid overload.

Prevention and treatment

- a. Early use of AV
- b. Correct hypovolemia with intravenous fluid and optimization of blood pressure (by fluid and vasopressor)
- c. Ensure adequate urine output hourly (at least 0.5ml/kg/hr.) with an indwelling catheter and maintain accurate fluid balance charts.
- d. Continue adequate intravenous fluids.
- e. Use intravenous furosemide if needed.
- f. Correct metabolic acidosis with a slow intravenous infusion of 50-100 mmol of sodium bicarbonate, check and repeat ABG.

- g. If rhabdomyolysis is suspected, 200 ml of 20% mannitol may be infused intravenously over 20 minutes, but this must not be repeated as there is a danger of inducing dangerous fluid and electrolyte imbalance.
- h. Correct hyperkalemia: hyperkalaemia is a silent killer in the recovery phase of Russell's viper bite.
- i. Dialysis: dialysis is indicated in oliguria or anuria with rising blood urea or creatinine, fluid overload leading to pulmonary oedema, metabolic acidosis in addition to hyperkalaemia.

Avoid: K⁺ containing fruits like coconut water, banana and fruit juice, NSAIDs, heparin.

Monitor: Urine R/M/E, ECG and CPK, serum transaminases, blood urea and serum creatinine daily. Serum electrolytes, especially potassium, should be estimated 6 hourly in case of sea snakebite. Urine should be examined for microscopic hematuria and active sediments.

Myoglobinaemia: Severe myalgia is suggestive of myotoxicity (rhabdomyolysis) of venom. In severe myotoxicity myoglobin appears in urine giving it a red colour. In mild cases urine may look normal and should be examined in laboratory for myoglobinuria. Myoglobin could damage renal tubules leading to acute renal failure.

Haematological abnormality

Haematological symptoms: Spontaneous bleeding from gum, vomiting of blood, haemoptysis, haematuria, persistent bleeding from bite site, venipuncture site and inflicted wound if any.

Signs of haematological abnormalities: Persistent bleeding from bite site, venipuncture site and or inflicted wound if any, multiple bruise or large haematoma, haemorrhagic blisters, bleeding from gingival sulci, haemoptysis, haematemesis, hematuria, epistaxis

Management:

1. Strict bed rest to avoid even minor trauma;
2. Transfusion of clotting factors and platelets; ideally, fresh frozen plasma (FFP) and cryoprecipitate with platelet concentrates/platelet aphaeresis or, if these are not available, fresh whole blood.
3. Intramuscular injections should be avoided.

Detect coagulopathy in viper bites by performing the 20WBCT 2 hourly during the first 6 hours and then 6 hourly.

Coagulation profile should be checked 6 hourly (especially for viper bites). Platelet count should be estimated twice daily.

CAUTION: Delay the release of tight bands, bandages and ligatures: if the patient has already applied these, they should not be released until the patient is under medical care in hospital, medical staff and resuscitation facilities are available and antivenom treatment (if indicated) has been started.

Learning Unit: 5

Practical guide to airway management and respiratory support

By the end of this unit, you should be able to:

- a. Position the venomous snake bite victim
- b. Maintain the airway
- c. Support the breathing

Positioning the patient to protect airway patency

If breathing is present and adequate, put the victim in the *recovery position* (Fig 16) and keep checking for breathing every 2 minutes.

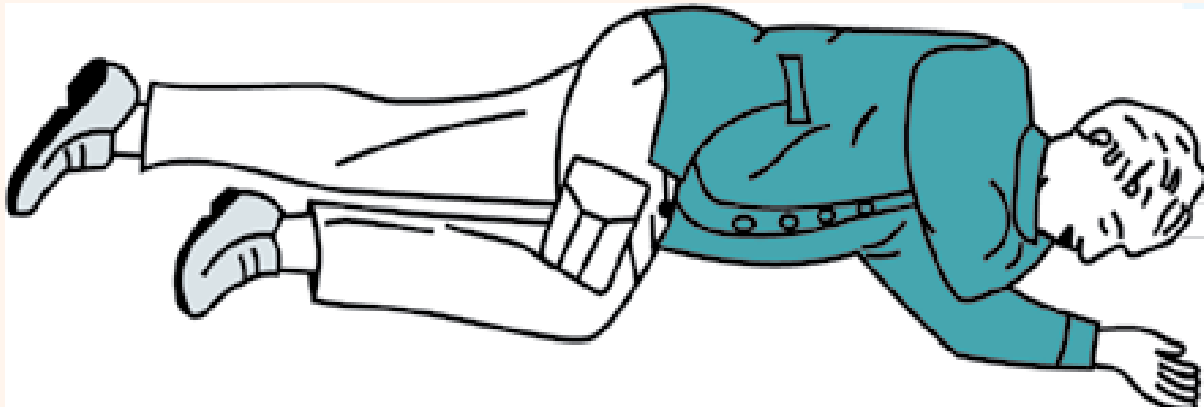


Figure 16: The recovery position

- This position and a chin-up tilt can be maintained using pillows, sand bags or an assistant, often the patient's relative.
- The recovery position is especially important in envenomed patients because vomiting is such a common early symptom, oral bleeding is common if there is a bleeding disorder, there may be hypersalivation
- Patients with neurotoxicity cannot cough or swallow, they are at increased risk of inhaling any of these secretions and fluids, When the patient is placed in the correct recovery position, these fluids will drain harmlessly from their mouth.
- The recovery position will also help to stop the tongue from falling back and blocking the airway.

If breathing stops at any time, make the victim supine, go through the airway opening manoeuvres and then provide breathing artificially, if required. Technique is described below.

Skill development:

Airway management & respiratory support, discussed in this unit are basic skills. These techniques must be practiced frequently, under supervision to maintain baseline level of competency.

Management of Snake bites in suspected respiratory emergency:

Snakebite victim (Cobra and Krait) might develop acute progressive respiratory paralysis. Prevention of hypoxemia requires a protected, unobstructed airway and adequate ventilation, which take priority over management of all other conditions. Therefore, assessment and reassessment of airway patency and adequacy of ventilation are critical. Management consists of rapid primary survey and resuscitations of vital function prioritized with ABCDE sequences.

ABCDE consists of following sequences.

A – Airway maintenance
B – Breathing & ventilation
C - Circulation
D – Disability
E – Expose the patient
 (Only AB are discussed here)

AIRWAY Assessment and MANAGEMENT

To assess airway patency, “taking patient “provides that the airway is patent at least for the moment. Patients with altered level of consciousness are at particular risk of tongue fall back and airway compromise. Observe the patient for obtundation or agitation, cyanosis, hypoxemia by pulse oximetry. Listen for abnormal sounds like noisy breathing, snoring, gurgling, and crowing sounds (stridor) can be associated with airway obstruction.

Basic Airway Management.**Opening and maintaining the airway:**

The first step is to open the airway by this manoeuvre,

1. **Head tilt–chin lift** manoeuvre: This is accomplished by lifting the chin upward while tilting the forehead back. The goal is to create a straighter path from the nose to the trachea.
2. **Jaw thrust** manoeuvre: helps to lift the tongue forward and open the airway.



Figure 17: Head-tilt, chin-lift (left) and jaw-thrust manoeuvres (right)

Airway suctioning:

- Remove any foreign material by suction, using a suitable suction catheter (no longer than 10 seconds) or by using forceps. Use of a gloved finger is discouraged as this may push the material or object further down the airway and may put the rescuer at risk of being bitten.

Oropharyngeal airway (OPA) insertion:

- Insert an oropharyngeal airway (OPA), measured to suit the patient (from the corner of the mouth to the angle of the jaw), being sure to avoid causing trauma to the lips and mouth, especially if there is evidence of bleeding.



Figure 18A: OPA- size identification



Figure 18B: OPA –Insertion

Oro-tracheal Intubation Video link (NEJM): <https://youtu.be/t6q9Bys7QDk>

Nasopharyngeal airway (NPA) insertion:

While nasopharyngeal airway (NPA) devices are better tolerated by semi-conscious patients, who may still have a gag reflex, or in those who have trismus, they are more likely to cause nasal bleeding, and so are not preferred. If there is no bleeding disorder, a NPA may be used instead of, or in addition to, an OPA.

Airway Management with advanced airway devices:

Endotracheal intubation is the common method for advanced and definitive airway management.

Example of advanced airway devices:

1. Supra-glottic devices (**Laryngeal mask airways (LMA)**, i-gel)
2. Infra-glottic devices /definitive airway- Endotracheal tube (ET)

Indication:

- To maintain (keep open) the airway over long periods;
- To protect the airway (prevent the inhalation/pulmonary aspiration of saliva, vomit or blood);
- To ventilate a paralyzed patient (such as after a bite by a snake with neurotoxic venom);
- To allow high concentrations of oxygen (up to 100%) to be delivered;
- To remove, and control the concentration of, carbon dioxide in the blood.

Supraglottic devices:

1. Laryngeal mask airways:

They do not require special equipment to insert them, and even medically untrained people can be taught to insert them successfully after minimal (as little as one hour's) tuition, making them potentially ideal in a low-skill setting. However, aspiration risk is higher.

If the patient has evidence of respiratory paralysis, give oxygen by Ambu bagging with mask or through laryngeal mask airway (LMA) or ET tube. Make arrangements for transfer to a higher facility.

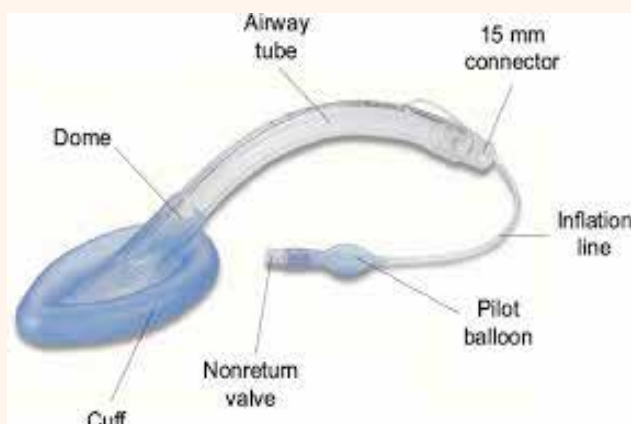


Figure 19A: LMA



Figure 19B: Ambu bagging through LMA

LMA (laryngeal mask Airway) video link (NEJM): https://youtu.be/9J90LYYd_Vs

2. i-gel : Another supra-glottic airway is i-gel: This can be used as an alternative of LMA.

Endotracheal intubation:

Typically, a cuffed tube for adults and an uncuffed tube for children is used, though the use of cuffed (low pressure, high volume) tubes for children is becoming more acceptable. However, they require a laryngoscope for visualization of the laryngeal structures. Essentially an endotracheal tube is inserted under laryngoscopic vision between the vocal cords.

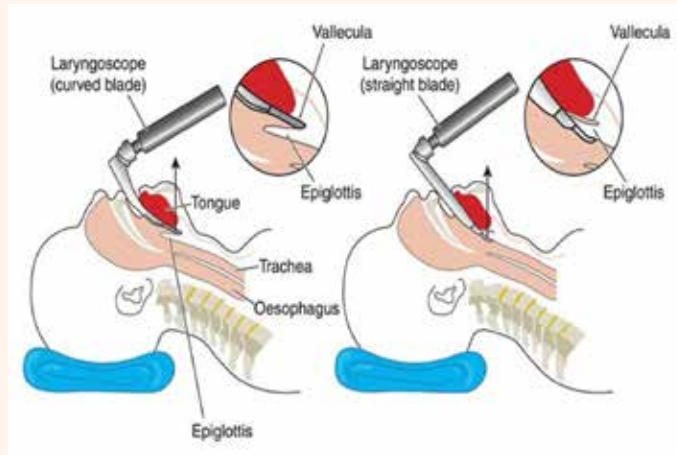


Figure 20: Insertion of an endotracheal tube

Caution: Surgical airway devices (tracheostomy) are discouraged and are rarely necessary as because these patients rarely require ventilation beyond a week, once the correct type and dose of antivenom has been given. Many patients with venom-induced bleeding disorders will bleed excessively from any such intervention.

B – BREATHING (Assessing breathing) & Ventilation:

Look for chest to rise and fall, listen for air escaping during exhalation. If oxygen is available, it should be administered by any available means (nasal prongs/catheters, mask, bag-valve-mask etc.).

Bag-mask/Bag-mask-valve ventilation:

In a health care center, a commonly used method for providing initial respiratory assistance is with a bag-mask/Bag-Valve-Mask (BVM)



Figure 21: Bag-valve-mask ventilation

- The rescuer positions him/herself at the victim's head end. Holding the bag with one hand, he/she places the mask on the victim's face with the apex of the mask on the bridge of the nose and its base on the groove over the chin.
- With the other hand, he/she seals the mask around the victim's nose and mouth, tilts (extends) the victim's head, lifts the jaw forward and gives breaths at approximately the normal respiratory rate for the patient by squeezing the bag. Simultaneously look for visible chest rise.
- If chest movement is inadequate, a correctly-sized OPA should be inserted. This will usually assist with air flow in and out of the lungs.
- Bag-mask ventilation is short- term respiratory support and the bag may have to be replaced with a ventilator.
- Note: However, many snakebite patients around the developing world have been kept alive for days, or week, using simply an OPA and a BVM, or with an ETT and a BVM, using relatives to squeeze the bag.

Invasive Ventilation:

This includes the use of supra-glottic (short term) or infra-glottic devices (definitive airway) to open the airway and assist in ventilation.

Other important aspects of the care of a ventilated patient include:

- Adequate hydration, monitoring of renal function and of fluid balance;
- Nutrition (in addition to the minimal nutrition contained in normal IV fluids);
- Physiotherapy (including chest physiotherapy, regular turning to prevent pressure sores and lung collapse, and maintenance of the range of motion of paralyzed, immobile joints and muscles, as well as limbs where significant cytotoxicity and tissue damage has occurred).
- Safe and effective weaning from ventilation

Transportation:

- In case of progressive neuro-paralysis – transfer the patient with life support or with Ambu bag and modified Bain circuit, in ambulance to a hospital where facility of a ventilator is available.

Learning Unit: 6

Prevention of snakebite (bengla version is provided in annex)

Learning objectives:

- By the end of this unit, you should be able to
- Know how to avoid snake bite
- Know the prevention strategy for community education

Prevention of Snakebite is most important. It is the best way to reduce the morbidity and mortality due to snakebite. Snakebite is an environmental, occupational and climatic hazard in rural and occasionally urban area of Bangladesh. Snakes have adapted to a wide range of habitats and prey species. Many species are mainly nocturnal (night hunters) e.g. kraits, but other species are mainly diurnal (day-time hunters). Be especially vigilant about snake-bites after rains, during flooding, at harvest time and at night. Snakes prefer not to confront large animals such as humans; so give them the chance to slither away. Attention to the following recommendations for community education might reduce the risk of bites.

Preventing Snake Access to Households

During the rainy season snakes look for comparatively dry places, as water enters into their hidden habitation. Small snakes move far from their usual habitat in searching for food (rats, chicken). Following measures might help to keep the snakes away from households:

1. Regularly cut short grasses around household.
2. Remove pile of woods, bamboo so that snakes don't find places to hide out.
3. Be careful about rats. Store food in rat-proof containers.
4. Pet chicken, pigeon, small animals may invite snakes.
5. Doors, windows should be closed properly so that no gaps exist between doors and floor.
6. Cut short plant or branches close to roof top, loan, doors, windows.
7. Try to avoid sleeping in floor. If it is unavoidable, then mosquito net should be used and tucked well under the mattress or sleeping mat.
8. Avoid those types of house construction that will provide snakes with hiding places (e.g. thatched roofs with open eaves, mud and straw walls with large cracks and cavities and large unsealed spaces beneath floorboards)

Other measures to prevent snakebites

Surrounding Households:

1. Clear termite mounds, heaps of rubbish, building materials etc. from near the house.
2. Do not have tree branches touching the house. Keep grass short or clear the ground around your house and clear low bushes in the vicinity so that snakes cannot hide close to the house.
3. Keep your granary away from the house, it may attract rodents that snakes will hunt.
4. Water sources, reservoirs and ponds may also attract prey animals such as frogs and toads.
5. Listen to wild and domestic animals, especially birds, as they warn of a snake nearby.
6. Use a light when you walk outside the house or visit the latrine at night.

Environment:

Snakebites usually have been observed in lower extremities. That's why people should be very careful while walking in places where snakes can hide out.

1. Use high shoes or boots while walking in paddy field, bushes, long grasses.
2. While walking in the dark, first look using light or strike the path using stick. If any snake is around, will go away.
3. Never play with snakes, or irritate them even if they are dead.
4. Avoid walking over pile of woods or stones.
5. Never insert hands into long grasses, tree holes or mud holes.
6. While camping outside, put some sulphur powder around which may keep the snakes away.
7. Check clothes before wearing in camps.
8. If you see a snake in front of you all on a sudden, stand still. Without provocation, snakes usually don't bite.
9. Never bit or irritate snakes without any reason. If you try to be away from snakes, they will do the same.
10. Don't swim in shallow water or river estuary.
11. Unfortunately if you are bitten by a snake, be calm and seek for help.
12. Never try to run after being bitten by a snake. The venom might spread quickly if you do so.

Implementing preventive and appropriate first aid strategies for community and mass education

1. Preparation, production, utilization of leaflets, video clips and posters that can be displayed on the walls of hospital and clinic waiting areas for the attention of patients and their families and broader community
2. At the village level, drama and puppet shows, 'Gambhira', 'Uthan Baitak' (Courtyard meetings) have been used successfully to portray snake-bite scenarios
3. Media such as radio (Bangladesh Betar and Community radio) and TV (BTV and non-government) can be used for health promotion and advantage can be taken of FM radio, SMS through phone.
4. Mobile phones and social networking (YouTube, Twitter) to communicate information
5. Religious organizations & leaders, and charities such as Rotary Club and Lions Club, PKSf might be persuaded to promote snake-bite awareness.
6. Volunteers of Red Crescent, Boy Scouts, Girls' guide, 'Shandhani' and Medical Student's forum
7. Involvement of Ministry of Communication, Social Welfare, Ministry of Education, MO Primary and Mass Education, Forestry & Environment,
8. High profile media figures such as media stars, film stars, pop stars, sporting heroes and politicians can be used for awareness activities.
9. Involvement of journalists and media personnels
10. Involvement of non government organizations (NGO), domestic and international.
11. Involvement of business and profit organizations and leaders as part of corporate social responsibility (CSR).
12. Involvement of religious leaders, school teachers to educate/disseminate their students or worshipers in formation about first aid specially during the high risk period of the year.
13. Involvement of academia including discipline of mass media & journalism, sociology, anthropology, public health, one health, medical science, agricultural and veterinary science.
14. Multisectoral involvement at all levels including active community engagement.

Case Study: Patient A

The place: A rural area of Bangladesh. Season: Late April.

A 24-year-old woman was fishing in fresh water in late April. She put her hand in 'Chai' (a trap for fish made of bamboo slips) and something bit her in the forearm. She was applied with four tourniquets and was taken to a traditional healer ('Ohza') who treated her with multiple incisions at the site of the bite. After four hours, her condition deteriorated and then she was taken to a Upazilla Health Complex. From there she was referred to Chattogram Medical College Hospital, Chattogram.

On admission:

She was found:

- restless
- right forearm was swollen and painful
- her pulse was 112 per minute
- blood pressure was 110/70 mm of Hg.
- respiratory rate was 12 breaths per minute and shallow, with cyanosis.
- bilateral ptosis with external ophthalmoplegia.
- antivenom started

Question 1: What precaution you will take during management of this patient?

Question 2: Which emergency measure will you take?

Question 3: What will you do?

Question 4: After two weeks, she developed blackening and haemorrhagic blister with sloughing out of necrosed area. What will you do?

Case Study: Patient B

The place: Upazilla Patya, District Chattagong.

Season: The month of July.

A 16-year-old young boy was sleeping on the floor of a hut at night. At around midnight, he woke up with pain in his left leg. The parents saw a bite mark in his left leg and immediately found a snake escaping from there, which disappeared into a hole. The patient was brought to Chattogram Medical College Hospital within half an hour.

On examination:

The patient was found restless and apprehended.

Swelling and pain in his left leg.

Question 1: What sign will you look for?

Question 2: The patient started vomiting and complaining of diplopia. What will you do?

Question 3: After the drug (antivenom), the patient developed itching. What will you look for?

Question 4: How will you manage such a case?

Question 5: What species does the snake belong to?

Case Study: Patient C

A 20-year-old male student hailing from Barendra village, Nachole Upazilla of Chapai Nawabganj District, Rajshahi Division, was bitten in his right lower forearm by a snake while he was trying to capture the snake as he thought it was nonvenomous python. He grabbed the tail of the snake and during elevation of the snake, had been bitten. He had taken picture by mobile phone before beating the snake to death.



Q 1: What are the important findings in the body? What is the local name of the snake? What is the biological name of the snake shown in the picture?

Two tight rope tourniquets were applied by ozha at his arm and he also assured him that it was python. Few hours later, he found to have bleeding from the bite site and swelling of right forearm developed and he was referred to Rajshahi Medical College hospital without visiting local Upazilla health comoplex.

Q 2: Please comment on the first aid and according to syndromic approach most likely diagnosis? Which initial bed side test you would like to do?

He was given 60 vials of polyvalent antivenom in the Medicine ward and also ICU. On investigations: TC 12,000/mm³, platelet count 40,000/ mm³, prothrombin time 23 sec with INR 2.1, APTT 52 sec, D Dimer level 367 ng/mL.

Q 3: What has happened to the patient?

As the patient had gross swelling of the right upper limb with absent pulse, fasciotomy of right forearm was performed.

Q 4: Was fasciotomy needed in this patient?

Despite continued fluid support, his urine output over initial 24 hours was 360 mL, his creatine kinase was 9800 IU/L, serum creatinine 7.1 mg/ dL.



Q 5: What is most likely problem? How will you manage this patient?

Gradually patient deteriorated, BP was 80/50, Spo2 was 85% and patient was intubated. Despite all measure patient died.

Q 6. What happened to him?

Picture Quiz

Number: 1



This young boy (left) and man (right) was bitten by snake few hours back, they developed features of envenoming. What features of envenoming are shown in these photographs?

Number: 2



This man was bitten by a snake few hours back, he developed features of envenoming. What feature of envenoming is shown in this photograph?

Number: 3



This young boy was bitten by a snake few hours back, he developed features of envenoming. What feature of envenoming is shown in this photograph? How he was treated?

Number: 4



This man was bitten by snake. He developed symptoms of local envenoming. What is the features of local envenoming that shown in the photograph?

Number: 5



This man was bitten by snake two weeks before, with features of local envenoming. The picture shows the status of local envenoming. What is the features of local envenoming that shown in the photograph?

Number: 6



The patient was bitten by a non-venomous snake and was treated by traditional healers (Ohza). What wrong was done with the patient?

Annexure: 1

Identification of venomous snakes:

Cobra: Head ovate, neck not well defined, but in living condition, neck is expansible into a hood. Vertebral scale row not enlarged, sub-caudals divided, golden-brown with white speckles.

Krait: Vertebral scale row (mid-back) enlarged, polygonal, sub-caudal scales (those posterior to the vent) undivided, glossy black or brownish-black with white crossbars.

Green pit viper: Bright green with black margins, head scales small, similar to body scales, a pit present between the nose and the nostril (loreal pit). Sometimes tail is golden in colour.

Russell's viper: Edges of body scales not saw-toothed, three longitudinal rows of chocolate-brown oval patches along the body, each outlined with black and yellow. Head triangular, neck well defined.

Sea snakes: Head often small in comparison to body, tail flattened, paddle like, tip rounded. Most are silver white with dark bands.

Source: Guidelines for the management of Snake bite in hospital issued by Sri Lanka Medical Association.

1. Identification of species of snakes and venomous snakes

- If a snakebite victim brings the snake, it is necessary to identify the species and whether the snake is venomous or not by examining the snake.
- Before that it has to be confirmed that the snake is dead.
- Record the species of snake if it is possible to identify looking at the appearance of snake. If not, check with the pictures and description in this book.
- Even if it is not possible to identify the species, look for the fangs using a forcep.
- If there are no fangs, instead just few teeth exist, then the snake is non venomous.
- If there is a small fang in front, then the snake might belong to elapidae or sea snake species.
- Sea snakes tail looks like sculls; head and face are relatively small.
- Elapidae have large scale on the top of the head. Vipers have long fangs, triangular head, and small scales.
- There is a pit between nose and eyes in pit vipers.
- To collect detailed information on snakes, reading books on snakes, visiting snake farms and museums could be useful.
- To identify species is pivotal for treatment of snakebite. The main obstacles in treating snakebite patients are identification of species and deciding on whether the snake is venomous or not.
- Now-a-days, in many countries, the level and concentration of venom and species of snakes can be detected examining blood, urine, wound site swab using ELISA or other genetic method.
- Moreover, venom effects can be scientifically determined through ELISA.
- In near future, it is essential to use ELISA in Bangladesh.

Annexure: 2

Snake Venoms:

Snake venom is produced in venom gland. The fangs are a pair of enlarged teeth containing a channel connected with the venom gland. During bite of a prey including human, the venom is injected subcutaneously or intramuscularly through the venom channel.

Snake venoms have special biochemical and pharmacological properties. They are either colourless or yellowish. All snake venoms contain multiple components with different mechanisms of action; the pathogenesis of reactions developing after a bite is of a very complex nature.

The following venom constituents cause important clinical effects:

Procoagulant enzymes: (Special for viperidae) That stimulate blood clotting that result in incoagulable blood. Venoms of such snake as Russell's viper contain several different procoagulants, which activate different steps of the clotting cascade. The result is formation of fibrin in the blood stream. Most of this is immediately broken down by the body's own fibrinolytic system. Eventually, and sometimes within 30 minutes of the bite, the level of clotting factors have been so depleted that the blood will not clot ('consumption coagulopathy').

Haemorrhagins (Zinc metalloproteinases) that damage the endothelial lining of blood vessel causing spontaneous systemic haemorrhage.

Cytolytic or necrotic toxins: The digestive hydrolases (proteolytic enzymes and phospholipases A), polypeptide toxins and other factors increase permeability resulting in local swelling. They may also destroy cell membrane and tissues.

Haemolytic and myolytic phospholipases A2: These enzymes damage cell membrane, endothelium, skeletal muscles, nerve and red blood cells.

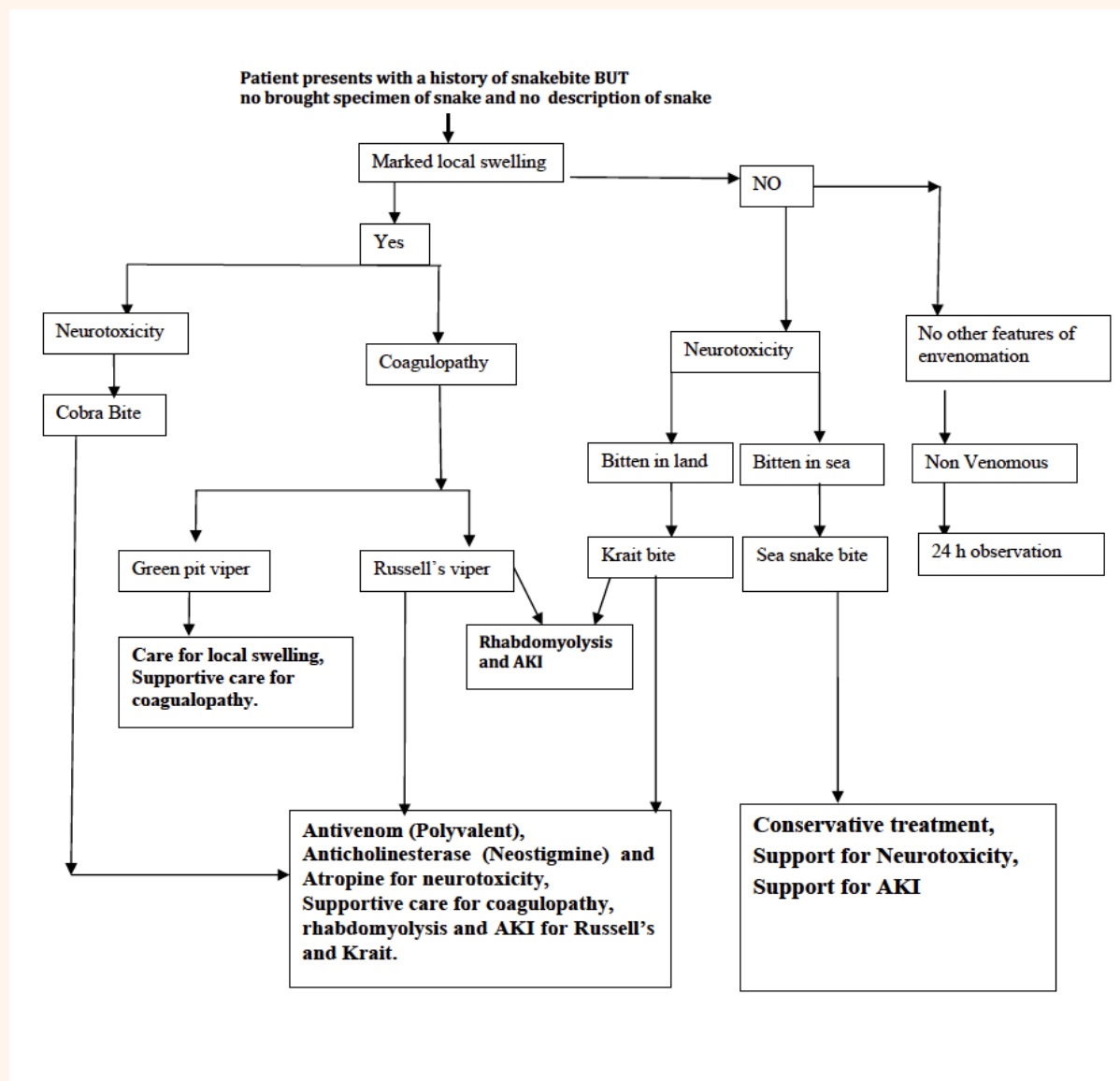
Presynaptic neurotoxins (Typical of Elapidae and some viperidae): These are phospholipases A2 that damage nerve endings, initially releasing acetylcholine, then interfering with release.

Postsynaptic neurotoxins (Elapidae): These polypeptides compete with acetylcholine for receptors in the neuromuscular junction and lead to curare-like paralysis.

Venom of cobra contains predominantly post synaptic neurotoxin and that of Krait contains both Pre and post synaptic neurotoxins.

Annexure: 3

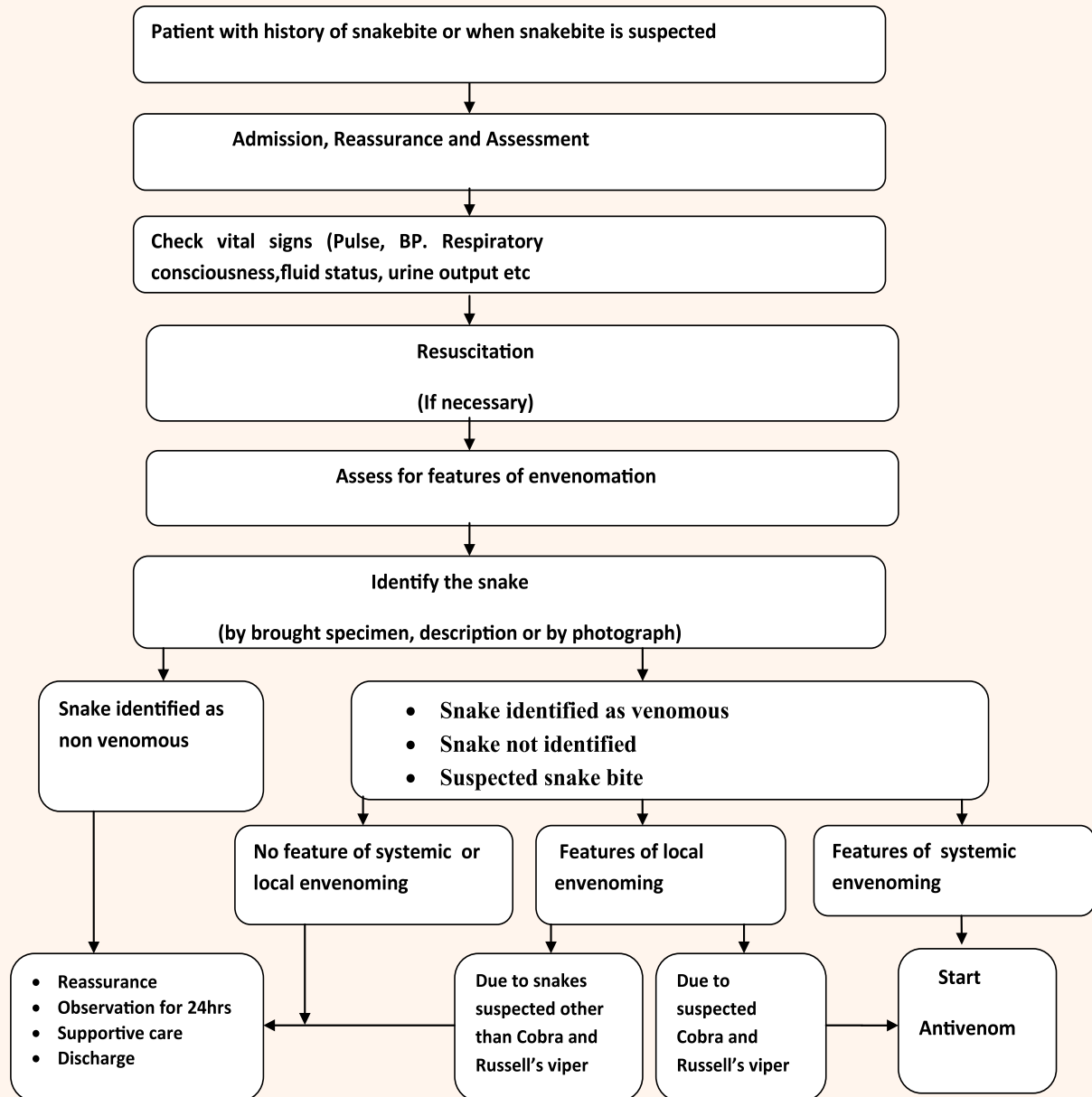
Approach to identification of common snakebite patients of Bangladesh by clinical syndrome and treatment principle



- The above clinical syndrome is applied for all areas of Bangladesh.
- Russels viper is more common in northern area (Rajshahi, Chapainawabganj etc)

Annexure: 4

Hospital management of snakebite

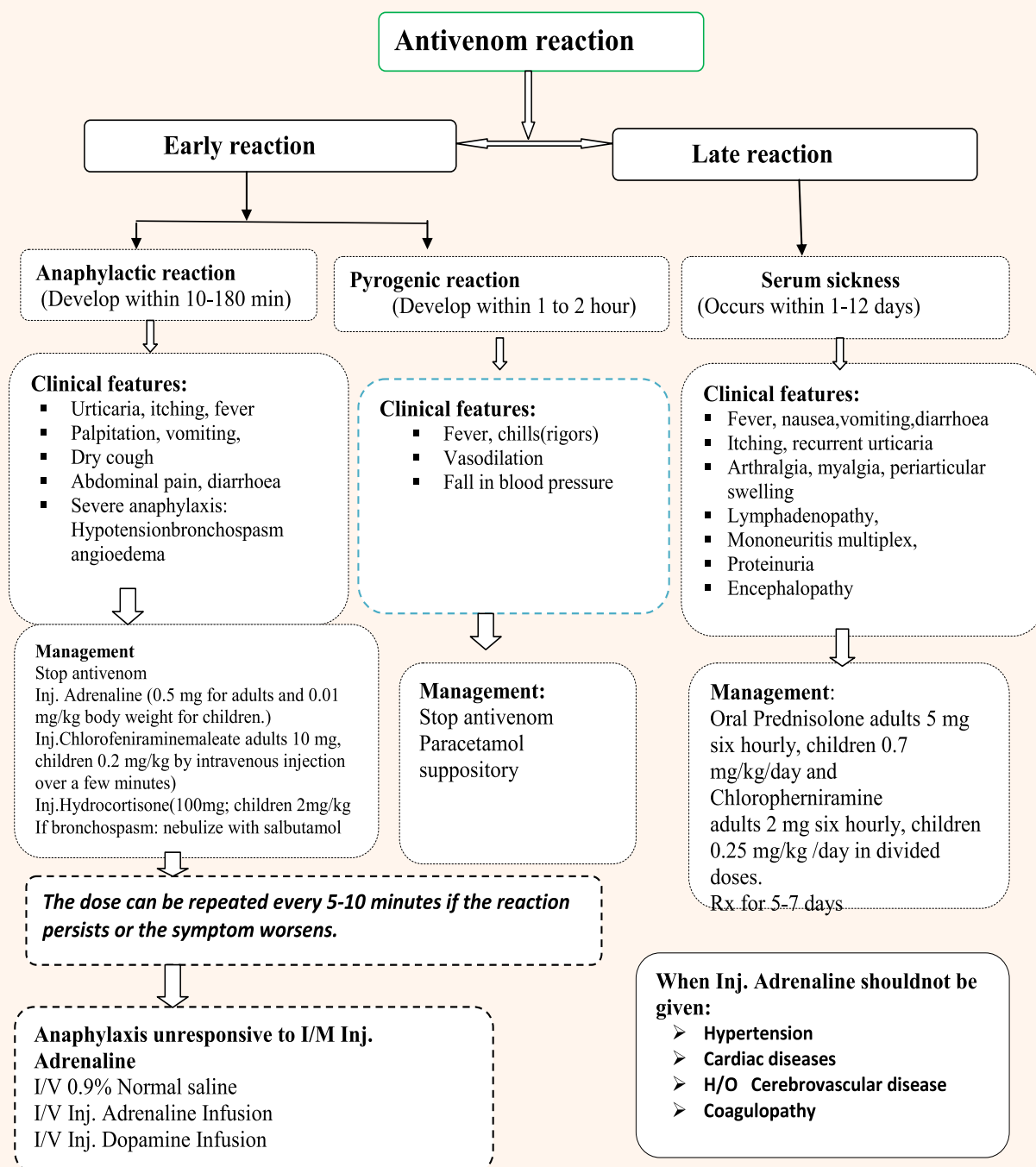


Local envenoming:

- Local swelling involving more than half of the bitten limb (in the absence of a tourniquet) within 48 hours of the bite.
- Swelling after bites on the digits (toes and especially fingers).
- Rapid extension of swelling (for example beyond the wrist or ankle within a few hours of bite on the hands or feet).

Annexure: 5

Antivenom reaction is common but rarely fatal. Appropriate timely management of antivenom reaction is shown below

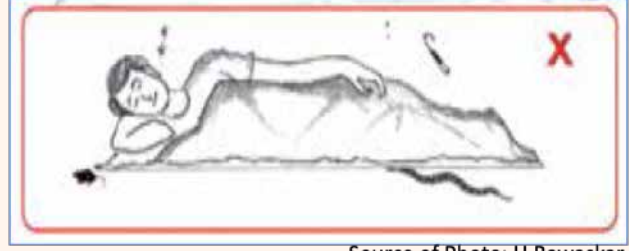
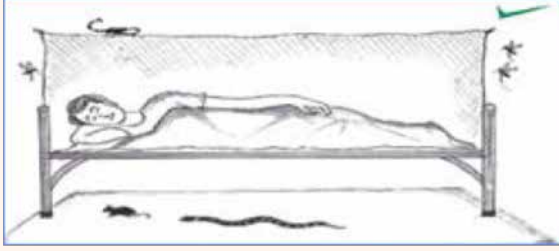


Annexure: 6

সর্প দংশন প্রতিরোধ সম্বন্ধে জানা

সর্প দংশন কিভাবে এড়ানো যায়?

১. বসত বাড়ীর শোয়ার ঘরের সাথে খাবার সামগ্রী যেমন ধান-চাল, হাঁস-মুরগী, কবুতর না রাখা উত্তম। এসব সামগ্রী হাঁদুরকে আকর্ষণ করে যার খোঁজে সাপ ঢুকতে পারে।
২. ঘাসের মধ্যে কিংবা ঝোপ-ঝাড়ের ভিতর আপনাকে যদি হাঁটতে হয় তাহলে খুব সাবধানে হাঁটুন ও লম্বা জুতো কিংবা বুট জুতো পড়ুন। গর্তের মধ্যে হাত-পা ঢুকাবেন না। স্তপকৃত লাকড়ি বা খড় সাবধানে সরান। বড় বড় পাথর বা কাঠের গুড়ি সাবধানে সরানো উচিত। যদি আপনাকে ঘাসের বা ঝোপ-ঝাড়ের ভিতর দিয়ে হাঁটতে হয় খুব সাবধানে হাঁটুন প্রয়োজনে বুট পড়ুন।
৩. মাছ ধরার সময় 'চাঁই' বা জালের মধ্যে হাত দেওয়ার আগে সাপ আছে কিনা দেখে নিন।
৪. বেশীরভাগ সাপ রাতে সক্রিয় থাকে। রাতে হাঁটার সময় কিংবা প্রাকৃতিক কাজে বের হলে টর্চ লাইট ও লাঠিসহ বিশেষ সাবধানতা অবলম্বন করুন।
৫. বাংলাদেশের বিষধর সাপ ও তাদের স্বাভাবিক বাসস্থান সম্বন্ধে জানুন, যাতে আপনি তাদের এড়িয়ে চলতে পারেন।
৬. ঘুমের সময় বিশেষ সাবধানতা অবলম্বন করুন: খাটের উপর ঘুমাবেন, মেঝেতে ঘুমাবেন না। ঘুমানোর সময় মশারি ব্যবহার করুন। রাতের বেলায় শস্য, ফলের বাগান কিংবা মাছ পাহারা দেওয়ার সময় মাটিতে কিংবা মাচায় ঘুমানোর বা শোয়ার ব্যাপারে বিশেষ সাবধানতা অবলম্বন করুন।



Source of Photo: H Bawaskar

৭. বাড়ীর চার পাশ পরিষ্কার রাখুন। বসতবাড়ী ও চাষ করার জমির মধ্যে দূরত্ব রাখুন।
৮. বাড়ির আগুনা ময়লা-আবর্জনা মুক্ত রাখুন:
 - সাপ ছদ্মবেশী শিকারী, অর্থাৎ তারা শিকারকে লুকানোর জয়গা থেকে আক্রমণ করতে চায়।
 - ময়লা-আবর্জনা সাপ লুকানোর জন্য উপযুক্ত স্থান। পাতা, সার, খড়ের গাদা, লাকড়ির স্তপ, কাটা ঘাসের স্তপ সাপের জন্য লুকিয়ে থাকার পছন্দনীয় স্থান। কাজেই এগুলো বাড়ীর আগুনা থেকে সরিয়ে নিন।
৯. বাড়ীকে সাপের সম্ভাব্য খাবার মুক্ত রাখুন। প্রজাতি ভেদে হাঁদুর, ছোট প্রাণী, তেলাপোকা, ঘাস ফাঁড়িং সাপের প্রিয় খাবার।
১০. সাপ বসত বাড়ীর গর্তে বা ফাটলে লুকিয়ে থাকতে পারে বিধায় এগুলো মেরামত করুন।
১১. ঘরে প্রবেশের পূর্বে লাইটের সুইচ অন করুন।
১২. বিছানা, বালিশের নিচ ও স্কুল ব্যাগ যত্ন সহকারে দেখুন। শব্দ করুন যাতে লুকিয়ে সাপ থাকা সাপ সরে যেতে পারে। জোরে পায়ের শব্দ করে আপনার উপস্থিতি সম্বন্ধে সাপকে সতর্ক করুন। সাপ বায়বীয় শব্দের প্রতি অপেক্ষাকৃত বধির তবে ভূগর্ভস্থ কম্পনের প্রতি সংবেদনশীল।

১৩. উইয়ের ঢিবিতে, গাছের গর্তে, স্থপকৃত গাছ-তক্তা, লাকড়ির ঘন অগাছার মধ্যে হাত দিবেন না। কাণ্ডে ও মুঠি দিয়ে পাকা ধান কাটার সময় সাবধানতা অবলম্বন করুন। মানুষের বাসস্থানের চারপাশে সাপ থাকার সম্ভাব্য জায়গা গুলো পরিস্কার রাখুন। উইয়ের ঢিবি পরিস্কার করুন, গাছের গর্ত ভরাট করুন। পতিত গাছ, লগ, জ্বালানী লাকড়ি সরানোর সময় বিশেষ সাবধানতা অবলম্বন করুন।
১৪. আবর্জনা এবং জানক নিয়মিত অপসারণ করুন। বসতবাড়ী সাপ আকর্ষণ করে এমন প্রানী মুক্ত রাখুন যেমন- ইঁদুর, মুগরীর বাচ্চা, গিরগিটি, ব্যাঙ।
১৫. কেবলমাত্র প্রশিক্ষিত ব্যক্তির সাপ নাড়াচাড়া ও লালন-পালন করা উচিত। সাবধান! সাপ মেরে থাকলে খালি হাতে সাপ ধরবেন না, কারণ সাপ মরার ভান করতে পারে।

সাপ দেখলে আপনি কি করবেনঃ

- অযথা ভয় পাবেন না।
- নিজ গতিতে সাপটিকে চলে যেতে দিন। সুযোগ দিলে সাপ সরে যাবে।
- অনাবশ্যক সাপ মারবেন না, কারণ সাপ কীটপতঙ্গ ও ছোট ছোট প্রাণীদের নিয়ন্ত্রনে রেখে মানুষের উপকার করে ও পরিবেশের ভারসাম্য রক্ষা করে।
- সাপ অযথা মানুষকে দংশন করে না। মানুষ কর্তৃক কোন ভাবে উদ্ভুক্ত হলেই কেবল সাপ দংশন করে কাজেই সাপের কাছে না ঘেঁষা উচিত।

Annexure: 7

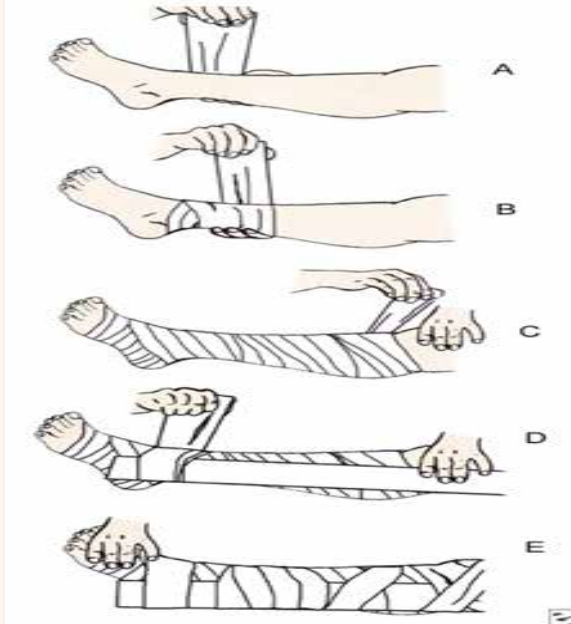
সর্প দংশনের প্রাথমিক চিকিৎসা

১. প্রাথমিক চিকিৎসা: প্রাথমিক চিকিৎসার উদ্দেশ্য হচ্ছেঃ

- সর্পদংশনের পর শরীরে যে বিষ ঢুকেছে তার প্রবাহের গতি হ্রাস করা।
- হাসপাতালে পৌঁছানোর আগে মৃত্যুহার এবং জটিলতা রোধ করা।
- মারাত্মক বিষক্রিয়ার প্রাথমিক লক্ষণ সমূহ লাঘব করা।
- সর্পদংশন আক্রান্ত ব্যক্তির জন্য ক্ষতিকর কাজ সমূহ না করা।

২. সর্পদংশনের জরুরী প্রয়োজনীয় চিকিৎসাঃ

- 'ভয়ের কোন কারণ নেই, সর্পদংশনের বৈজ্ঞানিক চিকিৎসা আছে' - এই মর্মে রোগীকে আশ্বস্ত করা।
- রক্তক্ষরণ হতে থাকলে চাপ দিয়ে ধরে রাখা।
- দংশিত অংগ (হাত, পা) স্প্লিট/চেপ্টা কাঠ/বাঁশের চোলা এবং ব্যান্ডেজ/লম্বা কাপড় (৩ থেকে ৪ ইঞ্চি চওড়া) যেমন- গামছা, ওড়না ইত্যাদি দ্বারা ছবির নির্দেশনা অনুযায়ী ব্যবহার করতে হবে। সব চেয়ে উত্তম হচ্ছে প্যাড চাপ স্থবিরকরণ পদ্ধতি কাপড় বা রাবার প্যাড (৬×৬×৩ সেমি) সরাসরি দংশনের উপর প্রয়োগ করা: প্রায় ৭০ মিমি মার্কারী চাপে অনমনীয় (inelastic) ব্যান্ডেজ দিয়ে শক্তভাবে সুরক্ষিত করা।



ছবি: প্যাড চাপ স্থবিরকরণ পদ্ধতি

- দংশিত অংগ এমনভাবে জড়াতে হবে যেন বাঁধন অনেক বেশী শক্ত অথবা টিলা না হয়। বাঁধনের নিচ দিয়ে যাতে দুটি আঙ্গুল চালনা করা যায়।
- রোগীকে নিখর এবং নিশ্চল হয়ে শুয়ে যেতে হবে।
- দংশিত অংশ এমনভাবে রাখুন যাতে আক্রান্ত অংগ নড়াচড়া না করে।
- রোগীকে দ্রুত নিকটস্থ হাসপাতালে যেমন- উপজেলা, জেলা অথবা মেডিকেল কলেজ হাসপাতালে প্রেরণ করতে হবে।

৩. প্রাথমিক পরিচর্যা সম্বন্ধে সুপারিশ সমূহ (কিছু সাধারণ নিয়মাবলী):

১. রোগীকে আশ্বস্তকরণ: “অনুগ্রহপূর্বক ভয় পাবেন না”। বেশীরভাগ সাপ অবিষধর। এমনকি বিষধর সাপের পক্ষেও দংশনের সময় কার্যকরভাবে প্রচুর পরিমাণ বিষ ঢেলে দেওয়া সব সময় সম্ভব হয় না।
২. নিশ্চল রাখা: নিশ্চিত করুন যে দংশিত অঙ্গ (হাত কিংবা পা) নিশ্চল করা হয়েছে এবং দংশিত ব্যক্তি পূর্ণবিশ্রামে আছে।
 - ক. পায়ে দংশনে: বসে যেতে হবে, হাঁটা যাবে না।
 - খ. হাতে দংশনে: হাত নাড়াচাড়া করা যাবে না।
 - গ. দংশিত অংগ (হাত-পা) হাড় ভেঙ্গে গেলে যেভাবে স্প্লিন্ট এর সাহায্যে নাড়াচাড়া প্রতিরোধ করা হয় তেমনভাবে রাখতে হবে। হাতের কাছে যদি ট্রেপ ব্যান্ডেজ থাকে তাহলে তাই ব্যবহার করতে হবে। দংশনকৃত হাত-পা এমনভাবে কাপড় ও কাঠ (বা বাঁশের কঞ্চি) দিয়ে পেঁচিয়ে নিতে হবে, যাতে গিড়া নাড়াচাড়া করা না যায়। গিড়া নাড়াচাড়ায় মাংসপেশীর সংকোচনের ফলে বিষ দ্রুত রক্তের মাধ্যমে শরীরে ছড়িয়ে গিয়ে বিষক্রিয়া সৃষ্টি করতে পারে।
 - ঘ. দংশিত স্থান নিষ্ক্রিয় করার জন্য আদর্শ পদ্ধতিতে ব্যান্ডেজের চাপ প্রদান করতে হবে। (Pressure immobilization)।
 - ঙ. দংশিত স্থানে বিষদাঁতের ক্ষতচিহ্ন আছে কিনা দেখতে হবে।
৩. দংশনকৃত জায়গা ধোয়া: কেবলমাত্র ভিজ়ে কাপড় দিয়ে কিংবা জীবাণুনাশক লোশন দিয়ে ক্ষতস্থান একবার মুছে নিন এবং ব্যান্ডেজ দিয়ে ক্ষতস্থান ঢেকে রাখতে হবে।
৪. খুলে ফেলা: যত তাড়াতাড়ি সম্ভব দংশিত অঙ্গ থেকে আংটি, চুড়ি, তাবিজ, ‘তাগা’ খুলে ফেলতে হবে। দংশিত অঙ্গ ফুলে গেলে পরবর্তীতে এগুলো খুলতে অসুবিধা হবে।
৫. দ্রুত হাসপাতালে প্রেরণ: দংশিত ব্যক্তিকে দ্রুত হাসপাতালে নেওয়ার জন্য মোটরবাইক বা এম্বুলেন্স এর সাহায্য নিতে হবে।
৬. রোগীকে একপাশে কাত করে রাখতে হবে।
৭. যদি শ্বাস-প্রশ্বাস না থাকে, তাহলে মুখে বায়ু ঢোকান নল (Oral Airway) ব্যবহার করা এবং প্রয়োজন হলে কৃত্রিম শ্বাস-প্রশ্বাস সঞ্চালনের ব্যবস্থা করতে হবে। (ইউনিট- ৭)

কেউ যদি সাপ মেরে থাকেন, হাসপাতালে যাওয়ার সময় সনাক্তকরণের জন্য তা নিয়ে যেতে হবে। সাবধান, খালি হাতে সাপ ধরা যাবে না, কারণ সাপ মরার ভান করতে পারে। কিন্তু সাপ মারার জন্য কিংবা ধরার জন্য অযথা সময় নষ্ট করা যাবে না।

৪. সর্প দংশনের পর যা করা উচিত নয়ঃ

১. দংশিত অঙ্গে কোন রকম গিঁট (tourniquets) দেওয়া যাবে না।

বিশেষ সতর্কতা: ইতিমধ্যে যদি গিঁট প্রদান করা হয়ে থাকে তাহলে তা সাথে সাথে খুলে ফেলা যাবেনা। হাসপাতালে ভর্তি হয়ে, চিকিৎসকের উপস্থিতিতে, কৃত্রিম শ্বাস-প্রশ্বাস ব্যবস্থা নিশ্চিত করে এন্টিভেনম শুরু করা হলে অতপর গিঁট অপসারণ করুন।

২. দংশিত স্থানে কাটবেন না, সুঁই ফুটাবেন না, কিংবা কোন রকম প্রলেপ লাগাবেন না।
৩. ওষা বা বৈদ্য দিয়ে চিকিৎসা করে কিংবা ঝাড়-ফুক করে অযথা সময়ক্ষেপণ করবেন না।
৪. হাসপাতালে নেওয়ার পথে রোগীর কথা বলতে অসুবিধা হলে, নাকে কথা বললে কিংবা মুখ থেকে লালার ঝরলে রোগীকে কিছু খেতে দিবেন না।
৫. দংশিত স্থানে রাসায়নিক জাতীয় পদার্থ ব্যবহার করা যাবে না।
৬. দংশিত স্থানে কোনভাবেই- হারবাল ঔষধ, পাথর, বীজ, মুখের লালার, পটাশিয়াম, কাদা, গোবর ইত্যাদি ব্যবহার করা যাবে না।
৭. তেল, ঘি, মরিচ, গাছ-গাছালীর রস ইত্যাদি খাইয়ে বমি করানোর চেষ্টা করা যাবে না।
৮. সর্পদংশনের জায়গায় এলকোহল জাতীয় কিছু দেয়া যাবে না।
৯. ব্যাথা উপশম করার জন্য অ্যাসপিরিন বা অন্য NSAID দেবেন না।
১০. স্বাস্থ্য সুবিধা নিতে হাসপাতালে পৌঁছাতে বিলম্ব করবেন না।

৫. যে সকল ঔষধ ব্যবহার করা যাবে না:

- প্রচলিত বিভিন্ন বনাজী বা হোমিওপ্যাথিক ঔষধ।
- অ্যান্টিহিস্টামিন জাতীয় ঔষধ- হিস্টাসিন, এভিল, ফেনারগন।
- স্টেরয়েড জাতীয় ঔষধ- ওরাদেক্সন, ডেকাসন, হাইড্রোকর্টিসন।
- সিডেটিভ জাতীয় ঔষধ- সেডিল, রিলাক্সেন।
- অ্যাসপিরিন এবং অন্যান্য ব্যাথা নিরাময়কারী ঔষধ- ডিসপ্রিন ক্লোফেনাক, সিলেক্সিব, রোফেক্সিব।

- সর্পদংশনের সাথে সাথে কোন লক্ষণ নাও প্রকাশ পেতে পারে।
- উপরে বর্ণিত একটি বা একাধিক লক্ষণ পাওয়া গেলে সর্পদংশনটি বিষধর সাপের বলে গণ্য করতে হবে।
- কোন লক্ষণ না পাওয়া গেলেও রোগীকে কমপক্ষে ২৪ ঘন্টা হাসপাতালে পর্যবেক্ষণে রাখতে হবে।

৬. প্রাথমিক পরিচর্যা সম্বন্ধে কিছু সাধারণ নিয়মাবলী:

১. রোগীকে আশ্বস্তকরণ, সর্পদংশনকৃত অনেক লোক ভয়ে বিশেষ করে মৃত্যুভয়ে আতঙ্কগ্রস্ত হয়ে অসংগত আচরণ করেন। যেমনঃ দংশিত আঙ্গুল কেটে ফেলা, কামড় দেওয়া, পাগলের মত ভান করা ইত্যাদি। রোগীকে বুঝাতে হবে যে সর্পদংশনের বৈজ্ঞানিক সফল চিকিৎসা আছে। মারাত্মক বিষক্রিয়া হতে যে সময় লাগে ততক্ষণে আপনি হাসপাতালে পৌঁছে যেতে পারবেন। সব সময় সর্পদংশন বিষধর সাপ দিয়ে হয় না। অনেক বিষধর সাপের দংশনের পরও বিষক্রিয়া হয় না, কাজেই অনুগ্রহ পূর্বক ভয় পাবেন না ও শান্ত থাকুন।
২. দংশিত স্থান কিছুতেই কাটবেন না। দংশিত স্থান থেকে কেটে বিষ বের করা সম্ভব নয়। রক্ত জমাট বাঁধা প্রক্রিয়ায় ব্যাঘাত থাকলে ক্ষত স্থান থেকে বেশী রক্তক্ষরণ হতে পারে। এ ছাড়া কাঁটা স্থানে সংক্রমণ হওয়ার সম্ভাবনা বেশী।
৩. কোনক্রমেই রোগীকে হাঁটতে দেবেন না বা দংশিত অঙ্গ ব্যবহার করতে দেবেন না। যানবাহন না থাকলে প্রয়োজনে রোগীকে স্ট্রেচার, খাটিয়া, দোলনা কিংবা এমনকি কারও পিঠে বহন করুন।

৪. আমাদের দেশে অনেক ক্ষতিকর প্রাথমিক চিকিৎসা 'ওঝা' ও সর্প-চিকিৎসকরা' প্রদান করে থাকেন। কার্বলিক এসিডজাতীয় ক্ষার কিছু রাসায়নিক পদার্থ দিয়ে কটরী (ঈর্ষংবু) করা, দংশনকৃত অঙ্গ কেটে দেয়া, মুখ, কিংবা কোন প্রাণী (যেমন ছোট মুরগীর বাচ্চা) দিয়ে দংশিত স্থান চোষন করা, গাছ-গাছড়ার রস দিয়ে প্রলেপ দেয়া, বমি করানোর জন্য বিভিন্ন রুঢ় পদ্ধতির ব্যবহার করা, কানের ভিতর বা চোখের ভিতর গরম কিছু ঢেলে দেয়া এসব ক্ষতিকর চিকিৎসা গ্রহণ থেকে বিরত থাকবেন। এতে সময় ক্ষেপন হবে। সঠিক চিকিৎসা প্রদানে বিলম্বের কারণে দংশিত রোগীর আশানুরূপ ফল নাও হতে পারে। এসব চিকিৎসার পার্শ্বপ্রতিক্রিয়া হিসেবে সংক্রমণ হওয়া, রক্তপাত হওয়া বিচিত্র নয়। এছাড়া অনেক সময় স্নায়ু, রক্তনালী, মাংসপেশীর ক্ষতি ছাড়াও ধনুষ্ঠংকারের মত মারাত্মক সংক্রামক ব্যাধিও হতে পারে।

৭. যা যা করা যাবে না:

- গিট দেওয়া
- সর্পদংশনের স্থান কেটে রক্ত বের করা
- সর্পদংশনের স্থান কেটে মুখ দিয়ে অথবা মুরগীর বাচ্চা দিয়ে রক্ত চোষা
- কার্বলিক এসিড জাতীয় রাসায়নিক পদার্থ দিয়ে সর্পদংশনের স্থান পোড়ান
- সর্পদংশনের স্থানে কাদা, গোবর কিংবা ভেজ মলম লাগান
- তেল, ঘি, মরিচ, গাছ-গাছালীর রস ইত্যাদি খাইয়ে বমি করানোর চেষ্টা করা
- সর্পদংশনের স্থানে পাথর, লাল, সীমের বীচি ইত্যাদি লাগান
- অযথা সময় নষ্ট করা

৮. বিষ অবরোধক গিট প্রয়োগে সৃষ্ট জটিলতা:

- রক্ত সঞ্চালনের ব্যাঘাত হয়ে পচন ধরা।
- প্রান্ত দেশীয় স্নায়ুর উপর চাপ পড়ে মাংশ-পেশী অবশ হওয়া।
- গিট দেয়া অংশ ফুলে যাওয়া, রক্ত জমে থাকা ও রক্তপাত হওয়া।



৯. উপরের বিষয় গুলো স্বাস্থ্যকর্মী সহ সবার জানতে হবে:

- সাপ দেখে ভয় পাবেন না। বেশীর ভাগ সাপ বিষধর নয়।
- হাতে বা পায়ে দংশন করলে হাঁটা চলা ও হাত নাড়া চাড়া করবেন না।
- দংশিত স্থান সাবান পানি দিয়ে ভালভাবে ধুয়ে মুছে দিন ও ব্যান্ডেজ দিয়ে ঢেকে রাখুন।
- দংশিত রোগীকে দ্রুত নিকটস্থ সরকারী হাসপাতালে প্রেরণের ব্যবস্থা নিন।
- হাসপাতালে নেওয়ার পথে রোগীর কথা বলতে অসুবিধা হলে, মুখ থেকে লাল বারলে কিংবা রোগী নাকি নাকি গলায় কথা বললে রোগীকে কিছু খেতে দেবেন না।
- ওঝা দিয়ে চিকিৎসা করে কিংবা ঝাড় ফুঁক করে সময় নষ্ট করবেন না।

Annex: 8: Prevention of Snakebite, First Aid, Quick referral Hospitalization, Treatment Net for Venomous bite

Community/MPHV Community Clinic	Upazila Hospital	District Hospital	Medical College Hospital
<u>Avoid bite</u> • Cot- Mosquito net • Homestead: free from animal and foods • Walk carefully • - Light-stick • Watch the Harvest - Carefulness • Carefulness during fishing • Cleanup round the house • Piled up things- - Handle carefully • Do not put hands in the hole <u>Emergency Primary Treatment</u> • Rest the bitten part (Splint) • Pressure immobilization • Assure: - Take to Hospital quickly (Motorbike, Vehicle) <u>What not to do?</u> • Give knot • Treatment from 'Ohza' • Incision • Difficulty speaking - Feed • Induce vomiting	Team Treatment, 24/7 <u>History</u> • Site of bite • How long ago • Saw the snake, Killed it, took pictures Physical Examination • <u>Syndromes: 5</u> 1. Viper 2. 'Chaondrabora' (Russell's viper) 3. Gokhrra/Cobra 4. Krait, Sea Snake 5. Russell's viper Observation: 24 hours • Laboratory test • 20 WBCT • Venomous snakebite • Antivenom - Application - Side effects - Anticholinesterase Non Venomous Snakebite ↓ Home	Team Treatment, 24/7 • Laboratory test • 20 WBCT • Antivenom - Application - Side - effect • Ancillary Treatment • Respiratory Support • Disruption of blood clotting • Shock • Surgery • Training Refer Advanced Treatment	Team Treatment, 24/7 • Trained snake team • - 'Snakebite Clinic' • Laboratory test • 20 WBCT • Others tests • Antivenom - Application - Side effects • Ancillary Treatment • Paralysis • Respiratory Support • ICU • Disruption of blood clotting - Green pit Viper - Russell's viper • Renal Failure (AKI) • Dialysis • - Russell's viper • - Black Krait • Shock • MOF • Surgery • Training

Snakebite: Awareness

সর্প দংশন প্রতিরোধ, প্রাথমিক চিকিৎসা, দ্রুত হাসপাতালে প্রেরণ, বিষধর দংশনের চিকিৎসা নেট

কম্যুনিটি/MPHV কম্যুনিটি ক্লিনিক	উপজেলা হাসপাতাল	জেলা হাসপাতাল	মেডিকেল কলেজ হাসপাতাল
দংশন এড়াণো - টোঁকি- মশারী ও - বসতবাড়ী: প্রাণী ও খাবার সামগ্রী মুক্ত - সাবধানে হাঁটা - আলো-লাঠি - শস্য পাহারা-সাবধানতা - মাছ ধরার সাবধানতা - বাড়ীর চারপাশ পরিষ্কার - স্থপাকৃত সামগ্রী - সাবধানে নাড়াচাড়া - গর্তে হাত না দেয়া জরুরী প্রাথমিক চিকিৎসা - দংশিত অঙ্গ বিশ্রাম (অচল করা, স্প্রিন্ট) - চাপ ও অচল করা (Pressure immobilization) - আশস্তকরণ: - দ্রুত হাসপাতালে নেয়া (মোটরবাইক, গাড়ী) কি কি করবেন না? - গিট দেওয়া - ওঝা/বেদ্যের চিকিৎসা - দংশিত অঙ্গ কাটা ছেড়া - কথা বলতে অসুবিধায় - খেতে দেওয়া - বমি করানোর চেষ্টা	দলগত চিকিৎসা, ২৪/৭ ইতিহাস - দংশনের স্থান - কত সময় আগে - সাপ দেখেছেন, ছবি তুলেছেন। - মেরেছেন, ছবি তুলেছেন। - শরীর পরীক্ষা সিড্রোম সমূহ: ৫ ৬. ভাইপার ৭. চন্দ্রবোরা (রাসেলস্ ভাইপার) ৮. গোখরা ৯. ক্রেইট, সামুদ্রিক সাপ ১০. রাসেলস্ ভাইপার পর্যবেক্ষণ: ২৪ ঘন্টা দলগত চিকিৎসা - ল্যাবরেটরি পরীক্ষা 20 WBCT - বিষধর সর্প দংশন - এন্টিভেনম - প্রয়োগ - পার্শ্ব-প্রতিক্রিয়া - এন্টিকোলিন এসটারেজ অবিষধর সর্প দংশন ↓ বাড়ী	দলগত চিকিৎসা, - ল্যাবরেটরি পরীক্ষা 20 WBCT - এন্টিভেনম - প্রয়োগ - পার্শ্ব-প্রতিক্রিয়া - আনুষঙ্গিক চিকিৎসা - কৃত্রিম শ্বাস-প্রশ্বাস - রক্ত জমাটে ব্যাঘাত - শক - সার্জারী - প্রশিক্ষণ রেফার উচ্চতর চিকিৎসা	দলগত চিকিৎসা, ২৪/৭ - প্রশিক্ষিত দল সর্প - দংশন ক্লিনিক - ল্যাবরেটরি পরীক্ষা 20 WBCT - অন্যান্য পরীক্ষা - এন্টিভেনম - প্রয়োগ - পার্শ্ব-প্রতিক্রিয়া - আনুষঙ্গিক চিকিৎসা - প্যারালাইসিস - কৃত্রিম শ্বাস-প্রশ্বাস (Respiratory Support) - আইসিইউ - রক্ত জমাটে ব্যাঘাত - সবুজ ভাইপার - রাসেলস্ ভাইপার - কিডনী অচলাবস্থা (AKI) - ডায়ালাইসিস - রাসেলস্ ভাইপার - শক - MOF - সার্জারী - প্রশিক্ষণ

সর্প দংশন: সচেতনতা

Annexure: 9

সর্পদংশনকৃত রোগীর চিকিৎসায় ব্যবহৃত অত্যাৱশ্যক চিকিৎসা সামগ্রীর তালিকা

সর্পদংশন রোগীর চিকিৎসার জন্য কিছু অত্যাৱশক ঔষধ ও চিকিৎসা প্রদানকারী হাসপাতালে থাকতে হবে, সার্বক্ষণিক প্রাপ্তি নিশ্চিত করতে হবে। এসব সময়মত ও যথাযথ ব্যবহারের জন্য চিকিৎসা দলের (চিকিৎসক, নার্স, স্যাকমো) প্রশিক্ষণ থাকতে হবে। নীচে সর্পদংশনের জাতীয় চিকিৎসা নীতিমালায় প্রস্তাবিত সামগ্রীর একটি মডেল তালিকা দেয়া হলো যা স্থানীয় হাসপাতালের ও চিকিৎসা দলের চাহিদা অনুযায়ী প্রয়োগ করা যাবে।

1. Antivenom (with sterile water for reconstituting lyophilized antivenom)
2. Tetanus toxoid
3. Epinephrine (adrenaline) injection 0.1% (1:1,000) (1 mg/ml)
4. Parenteral antihistamine and hydrocortisone
5. Pain killers e.g. paracetamol and codeine NOT aspirin or nonsteroidal anti-inflammatory agents
6. Antipyretics (paracetamol tablets, syrups and suppositories)
7. Local anaesthetic agents (1-2% lidocaine)
8. Intravenous (IV) fluids e.g. normal saline (0.9% NaCl)
9. Vasopressor drug e.g. phenylephrine, adrenaline and nonadrenalin
10. Injection atropine and neostigmine (Prostigmin)
11. Fresh frozen plasma or cryoprecipitates
12. Blood platelets
13. Oxygen cylinders with spanners, gauges, necessary connectors
14. Antibiotics (chloramphenicol, benzylpenicillin, flucloxacillin, metronidazole, gentamicin, amoxicillin-clavulanic acid)
15. Laryngoscope (adult and paediatric sizes) with spare batteries and bulbs
16. Cuffed endotracheal tubes (various sizes)
17. Ambu bag with connectors to endotracheal tube and face mask that fit
18. Face masks and oral airways
19. Suction apparatus and catheters
20. Urine dip sticks
21. New, clean, dry glass vessels for 20WBCT
22. Syringes, needles, intravenous cannulae
23. IV administration set
24. Sticking plaster
25. Scissors
26. Splints
27. Urethral catheters
28. Bathroom type weighing scales
29. Stretchy, elasticated crepe bandage and splint

- শ্বাস-প্রশ্বাস নিশ্চিত করণে উপকরণ (Airway & Breathing equipment):
 - Cuffed Endotracheal tube- (size- 7, 7.5, 8ID)
 - LMA (laryngeal mask airway, size 4, 5)
 - Umbo bag-
 - Bain circuit (modified)
 - Orogastric tube (NG tube)
 - Laryngoscope set (different size for adult and child)
 - Battery for laryngoscope
 - Suction catheter & suction machine
 - Oxygen Cylinder & flow meter
 - Nasal cannula & face mask
- অন্যান্য (Miscellaneous):
 - Gloves
 - Pulse oximeter (portable)
 - Water and soap
 - Gauze and cotton (For wound care and sling)



Fig: Emergency Cart/Crash cart

Annexure: 10

সর্পদংশনে তথ্য সম্বলিত একটি নমুনা পোষ্টার

সর্প দংশনে ভয় না পেয়ে, চিকিৎসা নিই সঠিক সময়ে

১ প্রাথমিক চিকিৎসা

পায়ে দংশন করলে না হেঁটো বরং ঘরে গভুস, ঘাকে দংশন করলে হাত নাড়া-কাড়া করবেন না। হাত কেবল ঘেঁষে থেকেবে কটে-খাটোকে নিয়ে শিঁড়কি করে, ফলাবে বাধা দিলে

পায়ে দংশনের ঠিককে, হাতে দংশনে বাহুরে রক্তেরা কিছু নিয়ে মোরে পিট দিল। হাতি আবে ঘটা অঙ্কর আবে হিমিটের জন্য পিট বুসে দিল

দংশন করা নাগটিকে কেউ ঘেঁরে থাকলে সন্দেহকরণের জন্য তা হোসীর পাশে হাপপাতালে নিয়ে যাবেন

২ কী কী বিষয় থেকে বিরত থাকবেন?

অমধ্য ভয় পাবেন না। বেশিরভাগে সাপ অবিষধর বিধাত সর্প দংশনে খুব কম হোসীর বিধের প্রতিক্রিয়া হয়

দংশিত স্থানে দুই ঘন্টা ঘেঁষে দিল ও বাডক নিয়ে আঁকুর করে হাপপ

দংশিত স্থানে কটিবেন না, দুই ফুটাবেন না, কিংবা কোন রকম প্রলেপ লাগাবেন না

ভাটা-র চিকিৎসা কিংবা কাড়-সুক করে সম্বর কেপন করবেন না

দংশনের পর কটা বসকে অটুবিধা হলে, নাগে কটা বসলে কিংবা ঘেঁরে লাগা করলে হোসীকে কিছু থেকে দিবেন না

দংশকে দারার ওয়া করবেন না

৩ রোগীকে যত দ্রুত সম্ভব উপজেলা হাসপাতালে নিয়ে যান

উপজেলা স্বাস্থ্য মহাপাঠ

সোশ্যাল এডভোকেসি এন্ড নলেজ ডিসেমিনেশন ইউনিট
SOCIAL ADVOCACY AND KNOWLEDGE DISSEMINATION

পল্লী কর্ম-সহায়ক ফাউন্ডেশন (পিকেএসএফ)

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Annexure: 11

Observation and follow up chart for Neurotoxic Snakebite

	0	30 mint	60 mint	90 mint	120 mint	150 mint	180 mint
Nasal Voice							
Drooling of saliva							
Ptosis							
Inability to open/ close mouth							
Brocken Neck Sign							
Pupil							
Ophthalmoplegia							
SPO2							
Resp Rate							
Pulse							
BP							

Annexure: 12

Venom Research Centre, Bangladesh

‘A scholastic endeavor of Non-Communicable Disease Control Program of Directorate General of Health Services under Ministry of Health and Family Welfare, GOB’.

Commencement: 2017-18 fiscal year

Current project: Provision of improved antivenom (AV): collection, processing and preservation of snake venom from the major venomous snake species that are medically relevant in Bangladesh.

(45.165.032.02.00.004.2015-147, Date: 06-08.2020 (RPA_SP-03))

Principal Investigator: Dr Aniruddha Ghose, Professor of Medicine

Collaborators:



Department of Medicine, Chittagong Medical College

Department of Zoology, University of Chittagong:

Department of Tropical Medicine and Public Health, Institute of Occupational Medicine, Social Medicine and Environmental Medicine, Health Sciences Centre, Goethe University, Frankfurt am Main, Germany: will provide technical support, consultancy and necessary technological knowhow for venom related research.

Toxicology Society of Bangladesh (TSB):

Bangladesh Society of Infectious and Tropical Disease (BSITD)



Snake bite is an important public health problem in Bangladesh and many other countries in the world. In our country every year about 600,000 persons are bitten by snake and about 6000 persons die due to envenomation. Due to its global impact WHO has categorized snakebite as one of the most neglected tropical diseases and World Health Assembly has passed a resolution urging each member state to take necessary steps to mitigate the sufferings of millions of people affected by snakebite globally and to reduce death to 50% by 2030. The main stay of management of snake envenomation is antivenom. Due to variability of venoms among and within different species of snakes, antivenom is most useful when it is produced against the venom of locally available snakes. WHO has also emphasized the need for use of antivenom produced against the venoms from species of snakes

which are actually causing the envenomation. In Bangladesh currently we use the antivenom which is produced against the venoms of different species of snakes of India. Scientifically this is not fully effective in neutralizing the venoms of our local species of snakes.

With a view to produce our own Antivenom, a 'Venom Research Centre' (VRC) has been established and started working in 2017 as a project of Non-Communicable Disease Control program under Directorate General of Health Services of Ministry of Health and Family Welfare, Government of Bangladesh. It's a collaborative endeavor of Department of Medicine, Chattogram Medical College; Department of Zoology, Chittagong University; Department of Tropical Medicine and Public Health, Goethe University, Frankfurt am Main, Germany; Toxicology Society of Bangladesh and Bangladesh Association for Advancement of Tropical Medicine. The centre is being hosted by Chattogram Medical College. We have a facility with about 3000 square feet floor space where we have a serpentarium, mouse room, lab etc.

The immediate aim of this is to collect and rear up specimens of all the medically important snakes from different parts of the country and to collect venoms from them. The objectives are to obtain representative samples of venoms, standardize these venoms, use them for venomomic and proteomic studies and to make representative, effective and affordable Antivenom(s). To achieve this, we have been collecting enough specimens of snakes from various geographical locations of our country, rear them up and collect enough venoms from them. After nearly four years we now have specimens of snakes from almost all geographical areas of Bangladesh. We have specimens representing Cobra (*N kaouthia*, *N naja*), Krait (*B caeruleus*, *B walli*, *B niger*,

B fasciatus, B lividus), and Viper (T albolabris, T erythrurus, D. russelii). We have collected venoms from all them. Though the volume of venom differs, we are now in a position to commence venom and anti-venom studies to define the effectiveness of currently available antivenoms and to start a scientific search to produce antibodies in goat and chickens to test it against our venoms regarding neutralization of venom activities. This will lead to the production of first representative batch of our own 'Candidate antivenom'. We are in collaboration and have started these studies with 'Molecular Biology and Protein Science Laboratory, University of Rajshahi.



To rear up these number of snakes we had to develop a mice breeding facility of our own to feed them.

We are also running a registry of all the patients coming with snakebite in Snakebite clinic of Chittagong Medical College Hospital. This will create a huge data base for future studies on snakebite.

Under this project we are also conducting public awareness program, which were with public engagement in first two years but virtually now due to covid-19 pandemic situation. Our research assistants are now actively involved in rescuing snakes across the whole country.

This facility (VRC) is being used by interested students of Chittagong University and CVASU for herpetological studies on snakebite. Our research assistants have documented and published so far unknown species of snake in Bangladesh. Researchers of this centre have published several scientific papers.

This facility is also providing a unique opportunity for Veterinary physicians who never had an organized way of studying snake diseases.

This is a unique and flagship project of NCDC, going out of box and addressing a very important public health problem like snakebite through a scientific approach and at the same time creating an enormous opportunity for flourishing scientific research in future.

Further Reading:

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