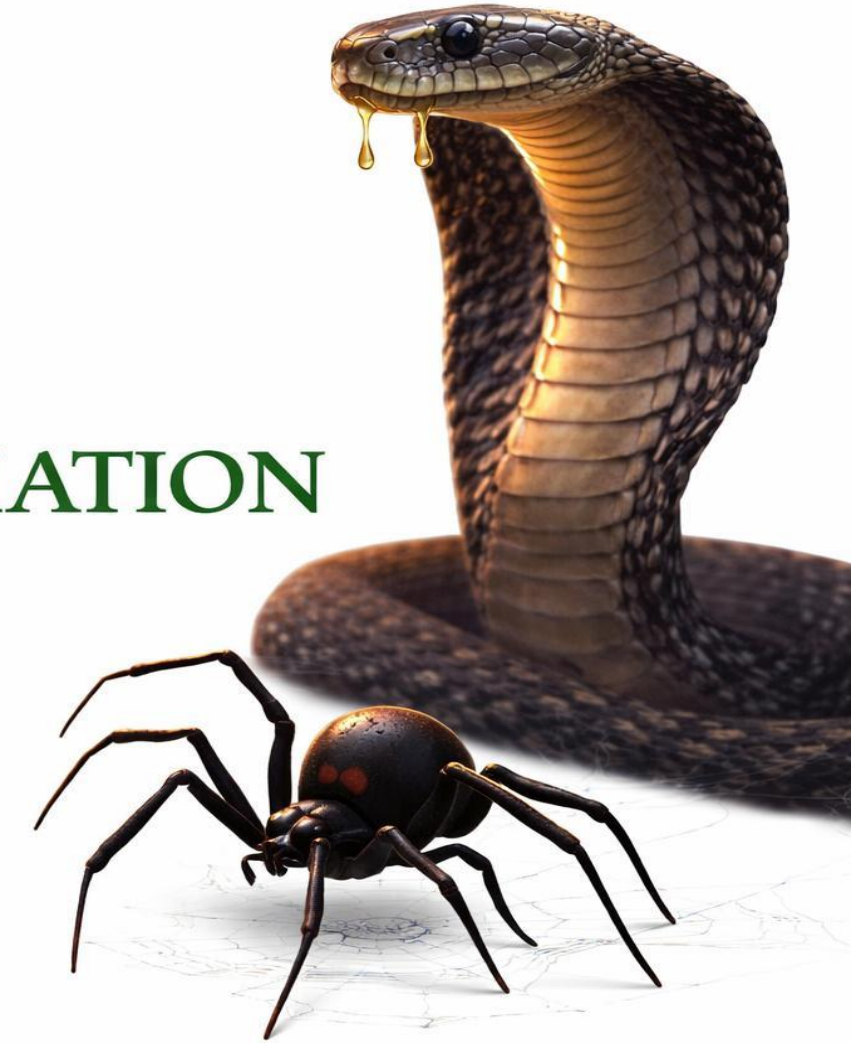
ENVENOMATION



AKSHAYA P
ROLL NO 14

- ***Envenomation occur when a venomous animal inject sufficient venom by bite / sting to cause deleterious local and/or systemic effect***
- ***Venom : complex mixture of diverse component often with several separate toxin that can cause adverse effect (Neurotoxin,Myotoxin, cardiotoxin,Hemostasis systemic toxin,hemorrhage toxin , nephrotoxin)***

11.2 Venomous animals and human envenoming

Phyla	Principal venomous animal groups	Estimated number of human cases/ year	Estimated number of human deaths/ year
Chordata	Snakes	> 2.5 million	> 100 000
	Spiny fish	? > 100 000	Close to zero
	Stingrays	? > 100 000	? < 10
Arthropoda	Scorpions	> 1 million	? < 5000
	Spiders	? > 100 000	? < 100
	Paralysis ticks	? > 1000	? < 10
	Insects	? > 1 million	? > 1000*
Mollusca	Cone snails	? < 1000	? < 10
	Blue-ringed octopus	? < 100	? < 10
Coelenterata	Jellyfish	? > 1 million	? < 10

*Social insect stings cause death by anaphylaxis rather than primary venom toxicity, except for massive multiple sting attacks.

Classification of Poisonous Snakes

1. **Elapidae** (Neurotoxic)

- Common cobra / Nag / Kaal sarp — *Naja naja*
- King cobra / Raj nag — *Ophiophagus hannah*

Kraits: Subgrouped into

- Common krait — *Bungarus caeruleus*
- Banded krait — *Bungarus fasciatus*
- Coral snake
- Tiger snake
- Mambas and kraits

2. **Viperidae** (Vasculotoxic)

They are grouped into:

- Pitless vipers
  — Russell's viper
- Saw-scaled viper
- Pit vipers
- Pit viper – family *Crotalidae*
- Common green pit viper

3. **Hydrophiiidae** (Myotoxic)

- About 20 types of sea snakes are found in India
- All are poisonous

Differences between poisonous and nonpoisonous snakes		
Points	**Poisonous snakes**	**Nonpoisonous snakes**
Belly scales	Large; They cover the entire breadth of belly	*Small:* They never cover
Head scales	> Usually small in vipers > May be large in pit vipers > Cobras and Coral snakes where third labial touches the eye and nasal shields > Kraits, where there is no pit and the third labial does not touch the nose and eye	Are usually large with exceptions as outlined under poisonous snakes
Fangs	Are hollow-like hypodermic needle	Short and solid
Tail	Compressed	Not markedly compressed
Habits	Usually nocturnal	Not so
Teeth bite marks	Two fang marks with or without marks of other teeth	Two fang marks with number of small teeth marks

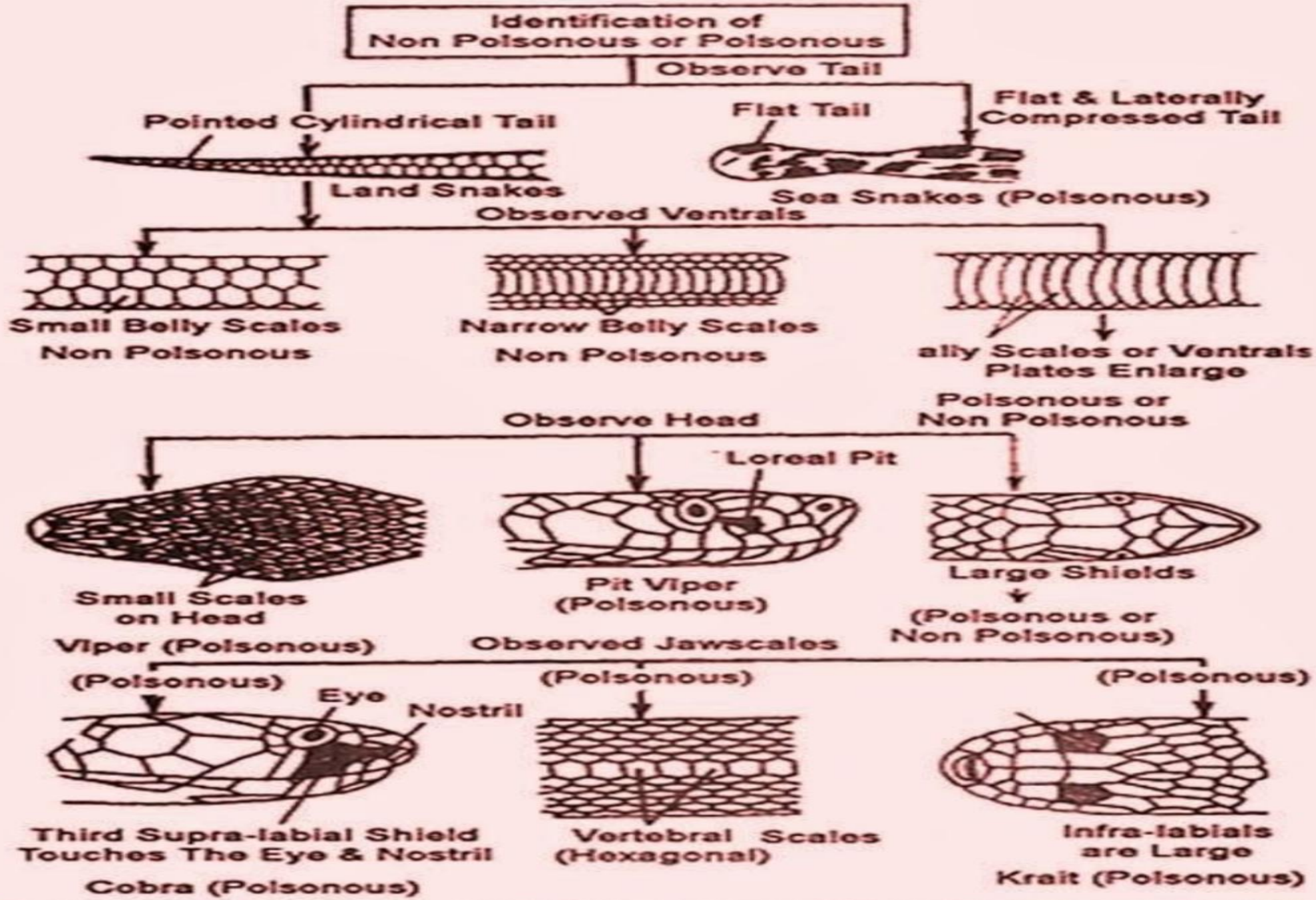


Table of identification of Poisonous and Non Poisonous Snakes

Clinical features

Local features

- ***Elapid bit : Fang marks, burning pain, swelling, discolouration, discharge***
- ***Viperid bite : Rapid swelling with discolouration, blister formation, bleeding, pain***
- ***Hydrophid bite : Local swelling, pain***

GENERAL SYSTEMIC EFFECT

- ***Headache, Nausea, Vomiting and diarrhoea***
- ***Abdominal pain, Tachycardia or bradycardia***
- ***Hypertension or hypotension***
- ***Pulmonary oedema ,Dizziness ,Collapse, Convulsions, Shock, Cardiac arrest***

SPECIFIC SYSTEMIC EFFECTS

1.Neurotoxic Flaccid Paralysis

- *Rapid (minutes: octopus, cone snail) or slow (hours–days: kraits, cobras, ticks)*
- *Cranial nerves first: Bilateral ptosis ,Ophthalmoplegia ,Drooling, loss of airway protection*
- *Then Progression to Limb weakness, Loss of deep tendon reflexes, Neck weakness, Respiratory paralysis*

2.Excitatory Neurotoxins (Autonomic Storm)

- *Profuse sweating*
- *Variable cardiac effects → cardiac failure*
- *Pulmonary oedema*
- *Causes: Scorpions (Indian red scorpion),Funnel-web spider*

3.Myotoxicity

- *Local or systemic*
- *Initially silent → later: Muscle pain & tenderness,Myoglobinuria,↑ Creatine kinase (CK)*
- *Complication: Renal failure → hyperkalemic cardiotoxicity (fatal)*

4.Cardiotoxicity

- *Usually secondary*
- *Direct effects (some scorpions):↓ Cardiac output ,Arrhythmias, Pulmonary oedema*

5.Hemostasis & Systemic Toxins

- *Coagulopathy: Bruising, Bleeding (bite site, gums, IV sites)*
- *Thrombosis: DVT, Pulmonary embolism, Stroke (esp. Caribbean/Martinique vipers)*

6.Hemorrhagic Toxins

- *Vascular damage → fluid extravasation*
- *Hypotensive shock*
- *Internal bleeding (e.g., retroperitoneal)*
- *May cause capillary leak syndrome (late, e.g., Russell's viper)*

7.Renal Damage

- *Mostly secondary (e.g., hemolysis)*
- *Some cause primary renal injury (Russell's viper)*
- *Features:Polyuria / oliguria / anuria, Proteinuria↑ Urea & creatinine*

General approach to the envenomed patient

First Aid

- ***Venom spreads mainly via lymphatics. Keep patient still; immobilise limb with splint.***
- ***Provide supportive care (ABC).***
- ***Use: Local pressure pad or Pressure immobilisation bandage***
- ***Avoid :Suction devices, Cut and suck, Local chemicals, Snake stones, Electric shock and Tourniquets***

Ministry of Health & Family Welfare
Government of India

DO'S & DON'TS DURING SNAKEBITE

DO'S

Stay calm and reassure the bitten person.

Move slowly away from the snake.

Leave the wound area (or bite mark) alone.

Remove the shoes, belt, rings, watches, jewellery or tight clothes from the affected area.

Make the patient lie in prone, on the left side, with the right leg bent and hand supporting the face.

Rush to the nearest health facility for medical treatment.

DON'TS

Don't allow the victim to become over-exerted or panic.

Don't attack or kill the snake. If you are close enough to hurt it, it can defend itself by biting you.

Don't cut and apply or inject any anti-snake vemon locally on the wound.

Don't tie the affected area to stop blood circulation. It can lead to loss of limbs.

Don't lay the patient on his/her back. Lying on the back can block the airways.

Don't use traditional methods or any unsafe treatments.

SNAKEBITE PREVENTION AND CONTROL

www.mohfw.nic.in
www.mygov.in
www.pmindia.gov.in

mohfwindia
@MoHFW_INDIA

CALL AT 15400

http://ncdc.gov.in/
@director_NCDC

Transport

- ***Immediately transport patient to near by health facility***

Assessment and management in hospital

- ***Identifying and treating any life-threatening problems (e.g. Circulatory shock, respiratory failure)***
- ***determining whether envenomation has occurred and if that requires urgent treatment***

Key Questions in Envenomation Cases

– The following key questions should be asked:

- When was the patient exposed to the venomous bite/sting?
- Was the organism causing it seen and what did it look like (size, colour)?
- What were the circumstances (on land, in water etc.)?
- Was there more than one bite/sting? (multiple bites/stings are more likely to be severe)
- What first aid was used, how quickly was it applied and how long has it been in place?
- What symptoms has the patient had (local and systemic)?
- Are there symptoms suggesting systemic envenomation (paralysis, rhabdomyolysis, coagulopathy etc.)?
- Is there any significant past medical history and medication use?
- Is there a past exposure to antivenom/venom and allergies?

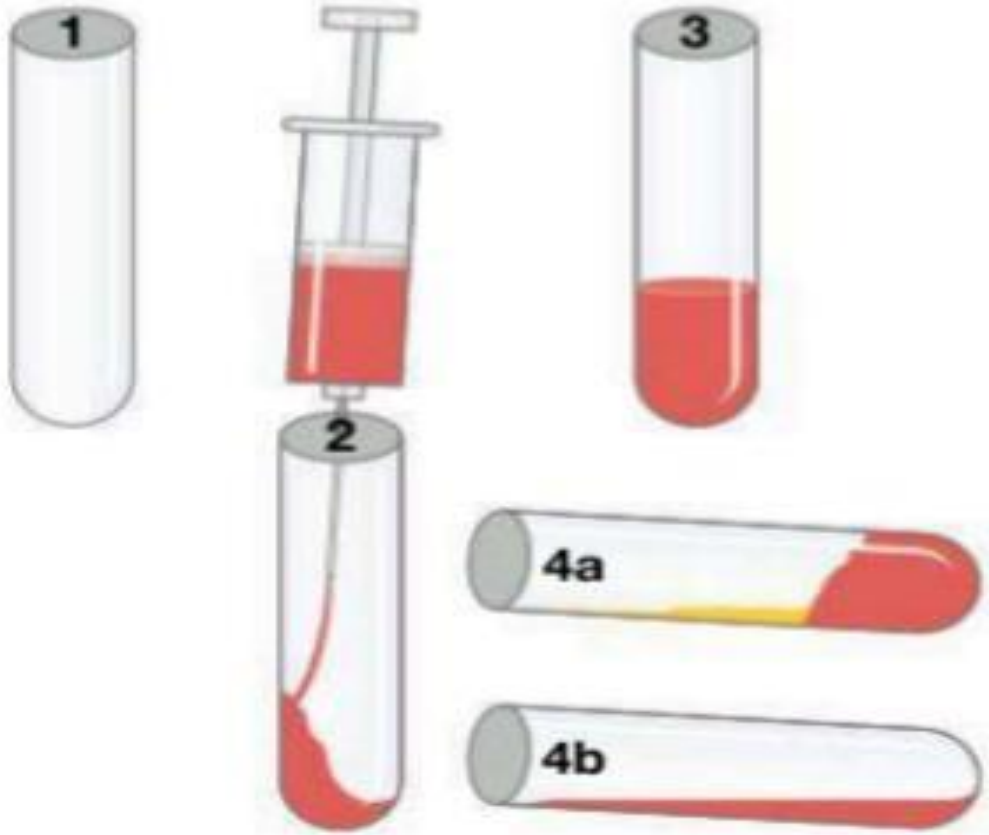
11.7 Snakebite envenomation syndromes for South-East Asia

Clinical definition/characteristics of syndrome	Likely snakes causing the syndrome
Syndrome 1	
Local envenoming (swelling etc.) + bleeding, clotting disturbances	Viper bite (many possible species)
Syndrome 2	
Local envenoming (swelling etc.) + bleeding, clotting disturbances + shock or AKI	Russell's viper
2a — ± conjunctival oedema and acute pituitary insufficiency	2a — Russell's viper in Myanmar and South India
2b — ± bilateral ptosis, external ophthalmoplegia, flaccid paralysis, dark urine (myoglobinuria)	2b — Russell's viper in Sri Lanka and South India
Syndrome 3	
Local envenoming (swelling etc.) + flaccid paralysis (bilateral ptosis, ophthalmoplegia, etc.)	Cobra or king cobra
Syndrome 4	
Minimal or no local envenoming + flaccid paralysis (bilateral ptosis, ophthalmoplegia, etc.)	
4a — If bitten on land (patient sleeping on ground at night) ± abdominal pain	4a — krait
4b — If bitten in water (sea, some lakes) ± dark urine (myoglobinuria)	4b — sea snake
4c — If bitten on land in New Guinea ± coagulopathy	4c — Australasian Elapid (taipan, small-eyed snake, etc.)
Syndrome 5	
Variable local effects + flaccid paralysis + dark urine (myoglobinuria) and AKI	
5a — If bitten on land (sleeping on ground)	5a — krait
5b — If bitten in water (sea, some lakes) + no coagulopathy	5b — sea snake
5c — If bitten on land + coagulopathy/bleeding	5c — Russell's viper (Sri Lanka and South India)

(AKI = acute kidney injury).
After World Health Organization, Regional Office for South-East Asia. Guidelines for the management of snake-bites, 2nd edn; 2016.

Investigation

- ***Full blood count , coagulation screen ,urea and electrolytes***
- ***creatinine and electrocardiogram(ECG)***
- ***peripheral oximetry or arterial blood gases***
- ***20-minutewhole-blood clotting test***



1 Obtain a clean **glass** container (test tube or bottle) that is either new, or has only been washed with water (not detergent/soap)

2 Place 2–3 mL venous blood in the **glass** container

3 Allow to stand undisturbed for 20 mins

4 Gently invert/tip the glass container checking for presence of a blood clot

4a Clot present = negative test (no coagulopathy present)

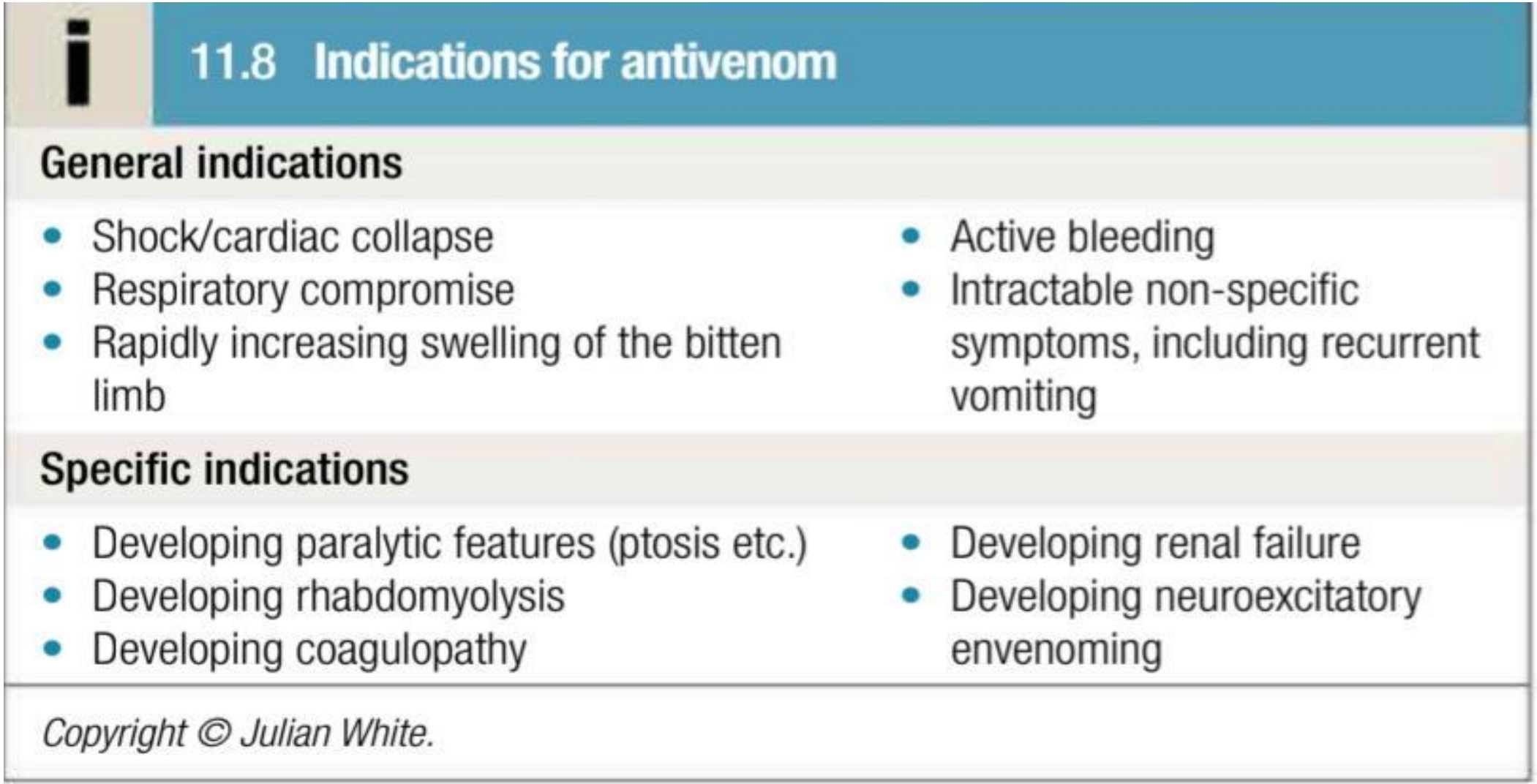
4b Clot absent = positive test (coagulopathy present)

Twenty-minute whole-blood clotting test (20WBCT). The presence of coagulopathy is a key indicator of major envenoming for some species. While full laboratory coagulation studies may be the ideal, the 20WBCT has emerged as a simple standardised bedside test of coagulopathy, applicable even in areas with limited health facilities.

SNAKE POISONING

Treatment

1. Antivenom



11.8 Indications for antivenom

General indications

- Shock/cardiac collapse
- Respiratory compromise
- Rapidly increasing swelling of the bitten limb
- Active bleeding
- Intractable non-specific symptoms, including recurrent vomiting

Specific indications

- Developing paralytic features (ptosis etc.)
- Developing rhabdomyolysis
- Developing coagulopathy
- Developing renal failure
- Developing neuroexcitatory envenoming

- *Specific treatment is antisnake venom*
- *Dosage :*

  # should be given within 4 hrs but even effective within 24 hours

  # mild case – 5 vials, moderate -5-10 vials, severe 10-20 Vials
- *Mode : IV 2 ml/ min*
- *Given with NS or 5% dextrose over 1 hr*

- ***Repeat every 6 hourly in vasculotoxic till coagulation is restored***
- ***In neurotoxic envenomation 2 nd dose given if no improvement within first hour***

Envenomation				
	Absent	**Mild**	**Moderate**	**Severe**
Fang marks		+	+	+
Local reaction:				
Pain	Absent	Moderate	Severe	Severe
Local edema	Absent	Minimum (0-15 cm)	Moderate (15-30 cm)	Severe (>30 cm)
Ecchymosis	Absent	+	+	++
Systemic features	No	+	+	++
Systemic features	No	+	Weakness, sweating, syncope, nausea, vomiting, thrombocytopaenia	Hypotension, paresthesia, ptosis, broken neck sign, coma, pulmonary dem, respiratory failure

- *For coagulopathy : fresh frozen plasma, cryoprecipitate, fresh whole blood, platelet concentrate*
- *Neurotoxic envenomation :*

  # Tracheostomy, incubation, mechanical ventilation

  #Atropine 0.6 mg +Neostigmine 1.5 mg IV and repeat every 30 minutes 5 dose and tapering dose

  # Glycopyrrolate 0.25 mg
- *Renal failure : dialysis*
- *CLS: Methyl prednisolone 10 mg / kg Q8H for 3 day*
- *Compartment syndrome : Fasciotomy*
- *Surgical debridement and care of wound*

Adverse Reaction Of ASV

- ***Early Anaphylactic reaction***

  # Adrenaline (1:1000)IM

  # Chlorpheniramine maleate

  # Hydrocortisone

- ***Late serum sickness***

  # Oral anti histamine CPM 2 mg /6 hour (0.25/kg)

  # prednisolone 5 mg/ 6 hrs (. 7 mg / kg / day)

SCORPION BITE

- ***Scorpion venom colourless toxalbumin, neurotoxic /hemolytic***
- ***Hemolytic venom simulate viper bite***
- ***Neurotoxic venom similar to cobra bite***

Treatment

- ***Local anaesthetic (2% novocaine, 5% cocaine)***
- ***Specific Antivenom***
- ***Calcium gluconate IV***
- ***Prazosin***
- ***Barbiturates for convulsion***
- ***IV fentanyl for pain***
- ***Atropine***
- ***Oxygen, IV aminophylline or nitropruside***

HYMENOPTERA STING

- ***Local inflammation***
- ***Large local reaction due to IgE mediated***
- ***In sensitized individual causes fatal anaphylaxis (0.1 % Adrenaline)***
- ***No antivenom***
- ***Treatment symptomatic***

REFERENCE

- ***Davidson'sPrinciples and Practice of24th Edition***
- ***Archith Boloor***


Thank
you!