Symptoms & Signs of Snake Bite in Cambodia

Lecture 5: Snake Bite Management Course

Introduction

- Aims:
  - To present the typical symptoms and signs of snake bite in Cambodia
  - To re-iterate the toxinodromes seen after snake bite in Cambodia
  - To present the typical presentation features of the various snake bite syndromes in Cambodia
- Remember that venom can vary even within the same species of snake, i.e.: different populations of Indo-Chinese Russell's viper
- All symptoms & signs will be more pronounced if antivenom is given late and/or supportive medical treatment is inadequate

Definitions

- Symptoms are what the patient reports
- Signs are what you observe on examination
- Non-specific symptoms & signs are those which can be attributed to other conditions, such as the anxiety of being bitten & expecting to die
- Specific symptoms & signs are those regarded as confirming that envenomation has occurred
- Toxinodromes are sets of clinical signs specific for particular types of toxins, such as neurotoxicity or coagulopathy
- Clinical Syndromes are groups of symptoms & signs (concurrent toxinodromes) typically seen after envenomation by specific snake species

Non-Specific Symptoms & Signs

- Both anxiety due to snake bite & snake bite with envenomation can cause these; they are not specific for snake bite & can also be seen in other medical conditions:
  - Nausea & vomiting
  - Abdominal pain & tenderness
  - Chest tightness & breathlessness
  - Malaise, weakness
  - Headache

Symptoms & Signs: Local & Regional (1)

- Early local and regional symptoms & signs:
  - Fang marks
  - Local pain
  - Local bleeding &/or bruising
  - Local inflammation - erythema (redness)
  - Local swelling (spreading)
  - Local blistering (spreading) with/without internal haemorrhage
  - Lymphangitis & lymphadenopathy
  - Pain, loss of vision (spitting cobras)

Symptoms & Signs: Local & Regional (2)

Photos: Dr Trinh Xuan Kiem

Symptoms & Signs: Local & Regional (3)

- Later symptoms & signs:
  - Skin necrosis (spreading)
  - Local infection, abscess formation
  - Compartment syndrome
  - Corneal erosions (spitting cobras)
- Late:
  - Extensive tissue (skin, with or without deep tissue loss)
  - Chronic infection of soft tissues or bone (osteomyelitis)
  - Arthritis
  - Contractures
  - Digit or partial limb loss from necrosis +/- surgery

Symptoms & Signs: Local & Regional (4)

- The signs of local envenoming will progress, depending on the species, over hours to days:
  - Local pain
  - Local swelling
  - Local subcutaneous haemorrhage
  - Local blisters +/- bleeding
  - Local necrosis, either confined to the skin (cobras) or spreading deeper into muscle with time (Indo-Chinese Russell's vipers & Malayan pit vipers)
  - Compartment Syndrome (some with deep tissue necrosis)

Symptoms & Signs: Local & Regional (5)

Traditional Treatments

- Be sure to expose the ENTIRE bitten limb when examining a patient, looking for:
  - Incisions
  - Poultices & other “dressings”
  - Tourniquets

Timing of Onset of Toxinodromes

- In general, the temporal order of the development of the various acute toxinodromes will be (depending on the mechanism):
  - Coagulopathy (1-2 hours)
  - Cardiovascular/shock (2-6 hours)
  - Neurotoxicity (3-4 hours)(?post-synaptic before pre-synaptic)(cranial muscles, respiratory muscles, then truncal & limb muscles)
  - Acute renal failure (12-24 hours)
  - Then secondary effects from these
  - Myotoxicity after seasnake (or Russell's viper) bites (hours)
- Recurrence of symptoms can occur after less effective antivenoms (venom depot effect)

Coagulopathy: Mechanisms

- The exact presentation depends on the biting species, due to different effects on coagulation:
  - Consumptive coagulopathy
  - Anticoagulant coagulopathy
  - Endothelial activation
  - Platelet aggregation inhibition
  - Platelet activation
  - Thrombocytopenia

Coagulopathy: Local

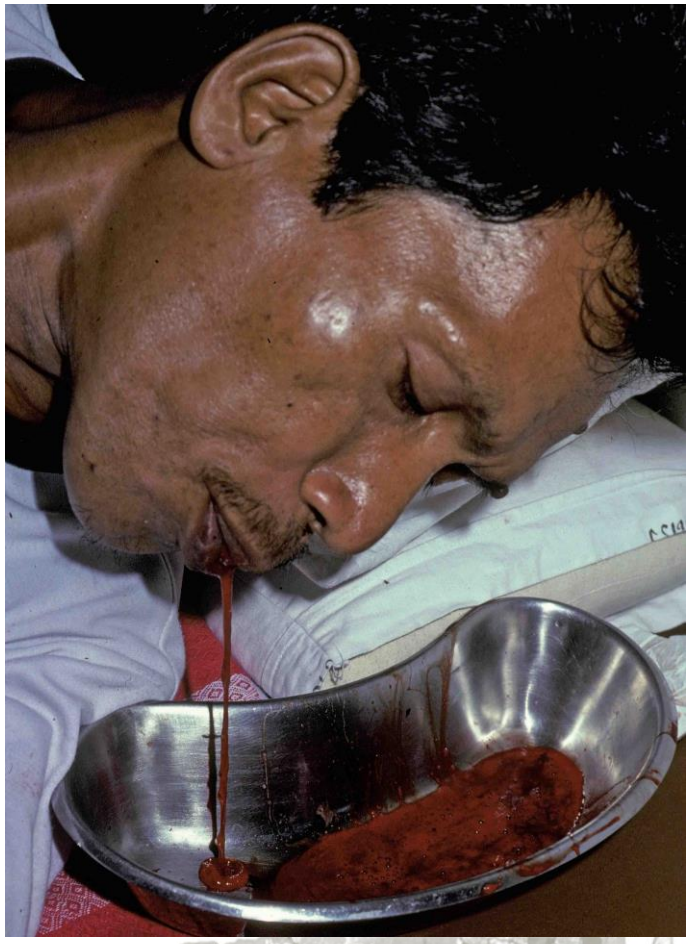
Photo: Prof. D.A. Warrell

- Local effects - bleeding:
  - From bite site/fang marks
  - From recent wounds
  - From scarification wounds
  - Into subcutaneous tissues
  - Into blisters/bullae
  - Into deeper tissues & muscle

Coagulopathy: Distant (1)

- Distant/systemic effects - bleeding from anywhere:
  - From venepuncture sites
  - Subcutaneous, subconjunctival
  - From gums, nose, into tears
  - Upper or lower gastrointestinal
  - Haemoptysis
  - From renal tract (especially after IDC insertion)
  - Vaginal
  - Retroperitoneal (difficult to diagnose)
  - Intracranial
    - Subarachnoid - headache, meningism, possibly coma
    - Intracranial: headache, sudden collapse, lateralising neurological signs
- Shock
- Anaemia, thrombocytopenia

Coagulopathy: Distant (2)



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Cardiovascular Effects

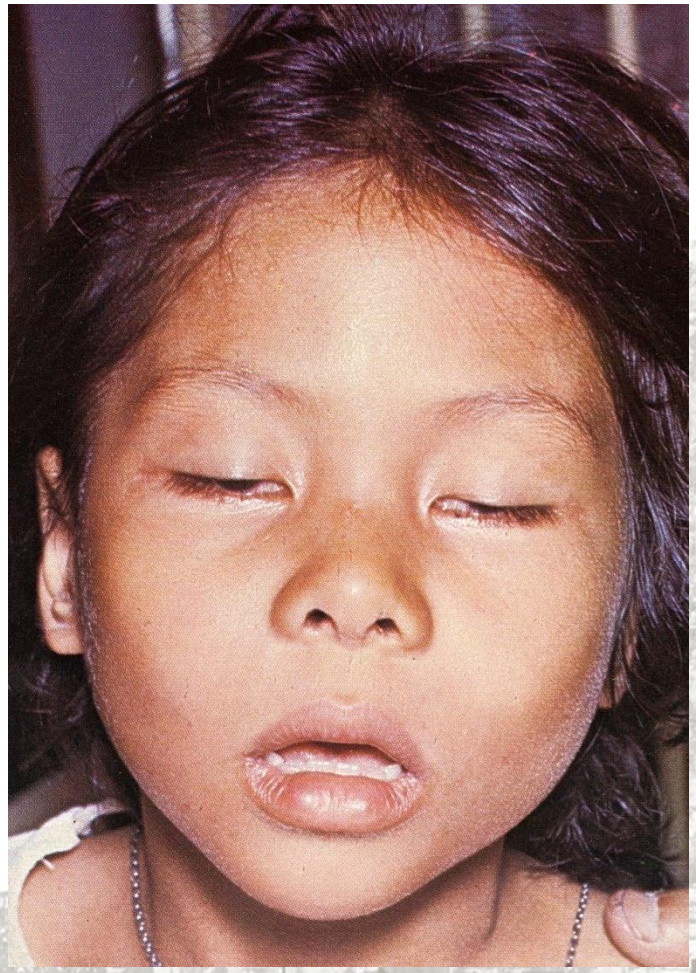
- Rhythm abnormalities
- Impaired contractility?
- Cardiac muscle damage?
- Right ventricular & pulmonary artery thrombosis? (from procoagulant effects): cause of early collapse?
- Shock from:
  - Blood loss
  - Extravascular oedema
- From acute renal failure:
  - Pulmonary oedema
  - Hyperkalemia & dysrhythmias

Neurotoxicity: Motor Effects (1)

- Most neurotoxic effects occur in a predictable order ("descending paralysis"):
  - Ptosis, ophthalmoplegia
  - Poor tongue protrusion
  - Reduced mouth-opening (this is NOT trismus, it is due to facial muscle weakness)
  - Difficulty swallowing; pooling/drooling of saliva: dysphagia
  - Weak speech (dysarthria: difficulty speaking; dysphonia: change in voice)
  - Weakness of respiratory muscles, low tidal volumes, weak cough (not increased RR, usually): intercostals & accessory muscles first, diaphragm last
  - Limb (distal before proximal) & trunk muscle weakness

Neurotoxicity: Motor Effects (2)

Photo: Prof. D.A. Warrell



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Neurotoxicity: Other Effects

- Blurring of vision
- Pupillary abnormalities
  - Some patients may have long-term pupil dilation after krait envenoming
- Parasthesiae
- Abnormalities of taste & smell
  - May persist for many months post-bite
- Urinary retention

Causes of Renal Dysfunction

- Direct & indirect effects:
  - Intravascular thrombosis
  - Prolonged shock, hypoxia - acute tubular necrosis
  - Direct nephrotoxic effects - glomerulonephritis (with back/loin pain)(avoid anti-inflammatory drugs!)
  - Haemolysis (haemoglobinuria), myolysis (myoglobinuria)
  - Renal tract haemorrhage
  - Dehydration
  - Urinary retention
  - Acute & chronic renal failure

Myotoxicity

- Muscle pain, tenderness, weakness, occasionally trismus suggesting rhabdomyolysis
- Dark ‘Coca Cola’-coloured urine suggesting myoglobinuria
- Raised serum K^+
- Compartment syndrome

Envenomation Syndromes

- Night-time bite, neurotoxicity not reversible with anticholinesterase - **kraits**
- Neurotoxicity reversible with anticholinesterase +/- local (cutaneous) toxicity, no coagulopathy - **cobras, king cobra**
- Any bleeding, blister formation +/- shock or renal failure – **pit vipers**
- Generalised muscle pain, neurotoxicity, bite in water - **seasnakes**

Complications of Snakebite Effects

- Many effects of snake bite are secondary effects from the primary venom effects:
  - Coagulopathy - end-organ failure, shock, anaemia
  - Cardiac effects - shock
  - Neurotoxicity - hypoxia, respiratory failure, respiratory acidosis
  - Renal - acute renal failure & secondary effects of this
  - Myotoxicity - compartment syndrome, renal failure
  - Infections - local & generalised infections, septicemia
  - Local toxicity - skin +/- deeper tissue loss, compartment syndrome, digit or partial limb loss

Complications of Traditional Treatments

- Long delays in seeking effective medical care:
  - Pressure immobilisation bandaging (PIB) or immobilisation
  - Resuscitation
  - Correct antivenom
  - Good supportive care
- Effects of tourniquets - compartment syndrome, worsening of necrosis, loss of limb,
- Wounds, pain, blood loss, infection from incisions
- Infection from poultices, especially cow dung
- Toxicity from herbal remedies

Chronic Systemic Effects of Snake Bite

- Pit vipers:
  - Chronic neurological deficits in those who survive intracranial haemorrhages
- Russell's viper:
  - Chronic renal failure (bilateral cortical necrosis)
  - Chronic panhypituitarism (pituitary necrosis)
  - Diabetes insipidus

Differential Diagnoses

- Infections
- Cellulitis
- Stroke
- Myocardial infarction
- Allergic reactions
- Envenoming by another organism, e.g.: wasps, spiders, scorpions or centipedes
- Diabetic emergencies
- Drug overdose, e.g.: chloroquine
- Closed head injury (+/- intracranial bleed)

Summary - Key Points

- Look for local, regional, systemic symptoms & signs
- Use the identification algorithm (Lecture 15) to decide which envenomation syndrome is present
- Make antivenom decision, watch for adverse effects
- Look for complications of snake bite & traditional treatments
- Consider other diagnoses if there has not been a definite snake bite
- Monitor the changes in symptoms & signs after antivenom until obvious recovery has occurred
- Watch for recurrence of symptoms after less effective antivenoms (venom depot effect)