Snakebite

Overview

Regular occurrence but severe/life-threatening envenomation is relatively rare.

Clinical Features

"Tiger Teeth Bring Massive/Big Death Soon"

Snake	Coagulopathy, Paralysis & Rhabdomyolysis Effects (VICC=Venom-induced consumptive coagulopathy)			Thrombotic micro-angiopathy	Other effects, systemic symptoms (D&V, headache, abdo pain)	Initial antivenom ampoule dose
Tiger	**VICC**	**P**(uncommon)	**R**(uncommon)	TMA(5%)	Early ↓BP(rare), SS(common)	1 x 3000u (Chappell Island Tiger: 4 amps)
Taipan	**VICC**	**P**(common)	**R**(rare)	TMA(5%)	Fits (esp children), SS(common)	1 x 12000u
Brown	**VICC**	**P**(mild & rare)	-	TMA(10%)	Early collapse(33%) or cardiac arrest(5%), SS<50%	1 x 1000u
Mulga/Black	**Anti-C** (mild & rare)	-	**R**	-	SS(common)	1 x 18000u (Red-bellied: use 1 amp Tiger av)
Death Adder	-	**P**(descending)	-	-	SS(common)	1 x 6000u
Sea snakes	-	**P**(uncommon)	**R**	-	SS(common)	1 x 1000u (Cannot use polyvalent/Tiger av)

Pre-hospital Management

First Aid: Pressure immobilisation bandage (or site pressure if on trunk) if <4hrs, keep calm & immobile. If available can use dilute adrenaline 1:10,000 sc locally to reduce venom spread.
Transport: ASAP to hospital that should have medical staff able to manage snakebite, have lab coagulation study facilities available, and have adequate antivenom stock.
Do Not: Wash, suck, cut, ice or tourniquet bite area.

Hospital Management

Resuscitation:

- If presenting promptly resuscitation not usually required.
- Establish IVC
- Brown, taipan & tiger may have early life-threats e.g. ↓BP, seizures (taipan only), paralysis (resp failure), or uncontrolled haemorrhage that req std treatment and early antivenom.

Risk Assessment:

- Lack of bite mark & asymptomatic on early presentation doesn't rule out envenomation, but with SE risk, antivenom not recommended if asymptomatic & lab tests normal.

Determination of envenomation:

- Seek objective evidence.
  - History: geography where bite occurred, snake appearance, where bitten, number of bites, first aid, clinical course to date
  - Exam: vitals, mental status, evidence of bite, LN, abnormal bleeding, descending symmetrical weakness (small muscles & bulbar function first), spirometry
  - Invs: INR/APTT (not POC machine), FBC, CK, UEC, (fibrinogen & D-Dimer if avail.)
- Snake Venom Detection Kit (SVDK) used to determine ***which*** antivenom, not ***if*** envenomed.
  - Take swab early but don't use SVDK unless signs/symptoms of envenomation
- If remains well & all initial inv normal can remove PIB.
- Rpt lab studies (at least INR, APPT, CK) at 1hr post PIB removal, and 6 & 12hr post bite.
- If any clinical or lab evidence of envenoming at any time, reapply PIB & admin antivenom:
  - Abs indications: cardiac arrest, sudden collapse, seizure, coagulopathy, neurological signs, CK>1000 IU/L (init normal ↑<12-24h). Rel inds: ↑WBC, systemic symptoms.
- If normal exam and inv at 12hrs after PIB removal then d/c (unless at night).

Venom Induced Consumptive Coagulopathy (VICC)

- VICC caused by prothrombin activators, thrombin-like enzymes, factor X activators → ↓fibrinogen, factor V and factor VIII.
- Complete VICC: undetectable fibrinogen, unrecordable ↑INR/APTT, D-Dimer ↑100-1000x.
- Incomplete/Partial VICC: detectable fibrinogen, INR <3.0
- INR recordable after 6-18hr & VICC resolves by 48hr.
- Blood products (e.g. FFP) not routinely indicated, but if major/active bleeding may help speed recovery of VICC (give after antivenom & >4-6hr post- bite).
- In anticoag coagulopathy normal D-Dimer/fibrinogen, APTT ↑1.5-2.5x ± mild ↑INR. Not clinically sig, however early antivenom (3-6h) rapidly reverses & may prevent myotoxicity.

Determine which antivenom is required:

- Monovalent superior to polyvalent (↑specific, ↓protein load & ↓serum sickness), cheaper, and safer. Polyvalent contains 1 amp equiv of each monovalent. Use 1 amp when no monovalent available, or SVDK suggests >2 possible monovalent antivenoms required.
- Likelihood of a particular snake in geographic area
- Clinical features profile & lab results
- SVDK result
    - Determines which monovalent antivenom to use.
    - Need dedicated person to follow instructions meticulously and watch test
    - Ideally performed on bite site swab, or if not possible, urine. Not blood.
    - First positive well to turn blue <10mins → result.
    - Can get false positive for brown snake in tiger snake envenomation

Give antivenom:

- No. ampoules (as above) in diluted 10:1 in NS IV over 20min. Can bolus if unstable/arrest.
- May need more in very severe cases.
- Prepare for possible anaphylaxis. No premedication. Close obs. Inv @ 6 & 12h post Rx.

Adjuvant/Supportive Treatment

- Monitor/support paralysis, rhabdo, wound Cx.
- Thrombotic microangiopathy (TMA) occurs in 5-20% cases of VICC: intravascular haemolysis, ↓plts & ↑Cr and may→ARF & req dialysis. Early antivenom may be beneficial.
- Serum sickness – 5d course of prednisone may help, but self-limiting.


Tiger


Common Brown


Red-bellied Black


Taipan


Mulga


Death Adder