STATE TOXINOLOGY SERVICES

Toxinology Dept., Women's & Children's Hospital, North Adelaide SA 5006 AUSTRALIA

SNAKEBITE MANAGEMENT OVERVIEW DOCUMENT

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Family **Scientific name combined**

Viperidae *Bitis nasicornis*

Common name

Rhinoceros-horned Viper , Nose-horned Viper , River Jack , Rhinoceros Viper

Global region in which snake is found

Sub-Saharan Africa

CLINICAL OVERVIEW

Minimal published information on Bitis nasicornis bites limits direct indication of likely effects. Given similarities to the Gaboon viper, it may be safest to assume a similar clinical spectrum. Gaboon viper bites have a high probability of significant, even lethal envenoming, with both local and systemic effects. The bitten limb is likely to develop moderate to severe swelling, with marked pain, blistering, bruising, and necrosis is common. Massive fluid shifts into the bitten limb can cause secondary shock and potentially, though uncommonly, renal failure. However, the local effects are generally less marked than those caused by the closely related puff adder. In addition, there may be significant general systemic symptoms and in some cases, systemic coagulopathy, with bleeding and thrombocytopenia. This is generally more severe than seen with puff adder bites. Bleeding can occur due to venom haemorrhagins, especially into the gut. Arterial thrombosis can potentially occur, principally affecting the bitten limb (especially the popliteal artery; reported for puff adder bites). Unlike puff adders, there may also be mild "neurotoxic" envenoming, but full respiratory paralysis is not expected. There may also be direct cardiotoxicity, with cardiac arrhythmias, brady- or tachycardias, or direct myocardial injury.

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SNAKEBITE MANAGEMENT OVERVIEW DOCUMENT (continued)

Bitis nasicornis

First aid

1. After ensuring the patient and onlookers have moved out of range of further strikes by the snake, the bitten person should be reassured and persuaded to lie down and remain still. Many will be terrified, fearing sudden death and, in this mood, they may behave irrationally or even hysterically. The basis for reassurance is the fact that many venomous bites do not result in envenoming, the relatively slow progression to severe envenoming (hours following elapid bites, days following viper bites) and the effectiveness of modern medical treatment.
2. The bite wound should not be tampered with in any way. Wiping it once with a damp cloth to remove surface venom is unlikely to do much harm (or good) but the wound must not be massaged.
3. All rings or other jewellery on the bitten limb, especially on fingers, should be removed, as they may act as tourniquets if oedema develops.
4. The bitten limb should be immobilised as effectively as possible using an extemporised splint or sling; if available, crepe bandaging of the splinted limb is an effective form of immobilisation.
5. If there is any impairment of vital functions, such as problems with respiration, airway, circulation, heart function, these must be supported as a priority. In particular, for bites causing flaccid paralysis, including respiratory paralysis, both airway and respiration may be impaired, requiring urgent and prolonged treatment, which may include the mouth to mask (mouth to mouth) technique of expired air transfer. Seek urgent medical attention.
6. Do not use Tourniquets, cut, suck or scarify the wound or apply chemicals or electric shock.
7. Avoid peroral intake, absolutely no alcohol. No sedatives outside hospital. If there will be considerable delay before reaching medical aid, measured in several hours to days, then give clear fluids by mouth to prevent dehydration.
8. If the offending snake has been killed it should be brought with the patient for identification (only relevant in areas where there are more than one naturally occurring venomous snake species), but be careful to avoid touching the head, as even a dead snake can envenom. No attempt should be made to pursue the snake into the undergrowth as this will risk further bites.
9. The snakebite victim should be transported as quickly and as passively as possible to the nearest place where they can be seen by a medically-trained person (health station, dispensary, clinic or hospital). The bitten limb must not be exercised as muscular contraction will promote systemic absorption of venom. If no motor vehicle or boat is available, the patient can be carried on a stretcher or hurdle, on the pillion or crossbar of a bicycle or on someone's back.
10. Most traditional, and many of the more recently fashionable, first aid measures are useless and potentially dangerous. These include local cauterization, incision, excision, amputation, suction by mouth, vacuum pump or syringe, combined incision and suction ("venom-ex" apparatus), injection or instillation of compounds such as potassium permanganate, phenol (carbolic soap) and trypsin, application of electric shocks or ice (cryotherapy), use of traditional herbal, folk and other remedies including the ingestion of emetic plant products and parts of the snake, multiple incisions, tattooing and so on.

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Bitis nasicornis

Clinical summary

There is minimal case data on Bitis nasicornis bites. That which is available suggests that severe local effects, including necrosis, are possible. In view of the similarity between this species and Bitis gabonica, it should be assumed that it may, potentially, cause major envenoming of a similar nature. However, it is substantially smaller than Bitis gabonica, which may moderate the potential severity of envenoming. The following is based on Bitis gabonica envenoming, not direct experience with Bitis nasicornis.

Typical bites cause local pain, swelling, sometimes very severe and extensive, local blistering, ecchymosis, necrosis. There may be massive fluid shifts into the bitten limb, with hypovolaemic shock. Overall, however, the local effects are generally less severe than with puff adder bites.

The systemic effects are more severe than puff adder bites, In addition to the secondary shock, envenoming can cause cardiotoxicity, with cardiac arrhythmia's, bradycardia or tachycardia, cardiac-mediated hypotension, direct myocardial damage, plus severe coagulopathy, with fibrinolysis, major haemorrhagic problems, thrombocytopenia and major spontaneous bleeding, including haematemesis and haematuria. Mild "neurotoxic" features have been reported, but not classic ptosis or major paralysis.

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Bitis nasicornis

Treatment summary

Bites by Rhinoceros vipers are poorly documented, but may be similar to Gaboon viper bites, which are potentially very severe and lethal. The following is based on advice for Gaboon viper bites:

All cases require very urgent assessment and treatment. Most cases will develop major envenoming, local and/or systemic. All cases should be admitted and except for minor envenoming, should be observed for several days, as late re-envenoming from venom depots can occur.

Insert an IV line of large bore, preferably two lines and give an initial IV fluid load. Hypovolaemic shock secondary to massive fluid shifts into the bitten limb is a major risk, especially in children, requiring appropriate resuscitation. Beware late pulmonary oedema as fluid in the bitten limb is reabsorbed, especially in children. Carefully monitor fluid input/output and renal function. Compartment syndrome should be checked for in cases with severe swelling, but fasciotomy only used if pressure measurements confirm high intracompartmental pressure, but beware intervention with coagulopathy still active. Treat secondary wound infection, if present, with targeted antibiotics. Avoid wound debridement in first 24 hrs.

The cornerstone of treatment for Gaboon viper bites is the use of IV antivenom, with several available. Large quantities may be needed (5-10+ vials as initial dose, often further doses needed). Adrenaline + resuscitation facilities should be ready, in case of adverse reactions. Only antivenom is effective at reversing cardiotoxic and haemorrhagic envenoming; cryoprecipitate/FFP is often not effective without antivenom therapy. Heparin is not recommended. Unfortunately, there is no antivenom listed as covering rhinoceros vipers. However, the South African (SAIMR Polyvalent Antivenom) and Saudi (Polyvalent Snake Antivenom; National Antivenom and Vaccine Production Centre) polyvalent antivenoms, used for Gaboon viper bites, may be suitable.

Beware late re-envenoming, requiring follow up doses of antivenom up to days post bite.

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Bitis nasicornis

Available antivenoms

SAIMR Polyvalent Antivenom
South African Vaccine Producers (Pty) Ltd
Postal -
P.O. Box 28999
Sandringham 2131
Gauteng Province

Physical -
1 Modderfontein Road, Sandringham
Johannesburg
South Africa
Phone: ++27-11-882-9940
Fax: ++27-11-882-0812
Email: savpunit@global.co.za / savpqual@global.co.za
Website: www.savp.co.za

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Bitis nasicornis

Management Flowchart