SNAKEBITE IN CHILDREN

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General

Diagnosis and treatment of snakebite in children can be challenging, especially when they are very young. The inability to give a proper history and the smaller body mass of a child presents unique problems when planning treatment. The dose of venom injected by the snake would be the same as that delivered to an adult victim, needing the same amount of antivenom to neutralise its effects. However, we have noticed that envenoming in children is not as severe as that in adults, for reasons that are still not understood.

The smaller body mass requires appropriate adjustments to the total volume of fluid used to administer the antivenom. This is a challenge when treating very young children, although rarely encountered.

Some examinations and tests performed on adults may be impractical or inappropriate for use on children. The recommendations given below are based on our experiences in a paediatric unit. There are only a few studies on snakebite in children, compared to those on adults, and these are inadequate to provide data for evidence based recommendations.

REPORTS OF SNAKEBITE

"26% of snakebites in Sri Lanka are in children under 15 years. 301 cases of snakebite in infants and children were investigated. 93 of these cases ended fatally."
Anslem de Silva et al, 1983

" …venomous snakes accounted for 41% of bites … 32% by vipers & 9% by elapids … deaths occurred in 5% of bite victims … bitten by common kraits (Bungarus caeruleus)."
Roshini Karunanayake et al, 2014

Diagnostic challenges

Neuro-muscular paralysis

Weakness of the trunk and proximal muscles may present before ptosis manifests. Such weakness of muscles should be actively assessed from time to time as it would not be obvious in a child lying on its back. Most instances of envenoming resulting in neurotoxicity occur late in the night (by kraits) when children are asleep. Assessment of ptosis and muscular weakness is extremely difficult in a sleepy child.

Respiratory failure

When monitoring breathing, chest expansion is as important as the respiratory rate. It may be possible to get an older child to cough and assess its strength as in an adult, but progressive reduction of chest expansion is a very useful early sign of impending respiratory failure in small children. Monitoring the heart rate and the arterial oxygen saturation (SaO2) are vital in the assessment of respiratory failure.

"chest expansion is as important as the respiratory rate"

Monitoring the respiratory rate alone may be misleading in some cases as the efficacy of breathing (chest expansion) is more affected than the effort of breathing (respiratory rate) in acute neuromuscular paralysis.

Management challenges

Antivenom administration

Ten vials of antivenom (the standard dose in both adults and children) diluted in 400ml of saline can cause fluid overload in small children of weight <10kg. It is therefore recommended that the 10 vials of antivenom diluted in 100ml be infused over 2 hours. An alternative would be to administer each vial dissolved in 10 ml as a direct infusion* over 1 hour, using an infusion pump (*Refer the manufacturer's leaflet for verification before direct infusion).

Children need the same antivenom dose as adults—but in smaller infusion volumes at slower rates to prevent fluid overload in small children

If signs of fluid overload develop (such as facial puffiness or signs of heart failure) frusemide (0.5 mg/kg iv) can be considered.

Management of antivenom reactions

Administration of adrenaline at the onset of early signs of anaphylaxis prevents severe consequences. A high degree of suspicion and anticipation of anaphylaxis helps early detection. Appropriate preparedness for the management of anaphylaxis should be made before the commencement of antivenom infusion.

Persistent prolonged WBCT

Prolonged persistent whole blood clotting time (20WBCT) without bleeding manifestations in a clinically stable child needs further assessment before repeating antivenom. Prothrombin time and further assessment of coagulopathy should be done. The benefit and risk of giving antivenom in this situation should be evaluated. A high serum dose given to a small body mass may cause problems with excess doses of antivenom. Unnecessary repeated administration of antivenom is discouraged. Fresh Frozen plasma can be considered in the management of persistent coagulopathy.

Management of acute respiratory paralysis

Acute respiratory paralysis due to neurotoxins is common in krait bite. Prolonged ventilation is required in the management of most patients. If respiratory failure is present, intubation and mechanical ventilation should be done without delay. Ventilation should be the priority before commencement of antivenom administration. A reaction to antivenom in a patient with respiratory paralysis who is not being ventilated will lead to a poor clinical outcome.

If the SaO_2 is falling, start high flow oxygen immediately. However, this action should not delay mechanical ventilation if it is indicated. Beware that routine administration of high flow O_2 in patients with normal SaO_2 may mask or delay the diagnosis of respiratory failure.

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