Snakebites

Snakebite is an eminently treatable, but neglected, injury affecting predominantly tropical developing countries. As is also the case with dog bites, recent improvements in injury coding and surveillance, including community surveys in low-income and middle-income countries, have led to an increased understanding of the issue.

How great is the problem of snakebite?

The annual number of cases of snakebite worldwide is about 5 million, among which there are some 100 000 to 200 000 deaths (53, 59). In addition to the deaths, there are an estimated 400 000 snakebite-related amputations each year around the world (60). Children have both higher incidence rates and suffer more severe effects than do adults, as a result of their smaller body mass (61, 62). Snakebites are concentrated in mainly rural areas and vary considerably by season, with the peak incidence seen in the rainy and harvesting seasons (63).

Analysis of 2002 WHO mortality data suggests that snakebite contributes to 35% of all child deaths, globally, from venomous bites and stings, with boys about twice as likely to suffer as girls (64). Boys appear to have a higher risk, from a very early age, of more severe, upper limb bites (65). This type of injury is considerably more common in low-income and middle-income countries, largely in Asia (53, 59).

Unfortunately, although the specific antidotes for snakebites — antivenoms — are organic products, there is a worldwide shortage of this pharmaceutical (59). This has a severe impact on poor rural communities, who cannot afford the refined antivenoms used in high-income countries. As a consequence, many developing countries are driven to making crude sera that are both less safe and less effective. At the same time, those most at risk of snakebite, such as rice farmers and plantation workers and their families, are frequently far from medical care.

There are a number of snakebite studies in the published literature, but few report specifically on the impact on children — although fatality rates among children are generally higher (63). Furthermore, less than 10% of countries in WHO’s South-East Asia Region, an area of high snakebite incidence, report paediatric snakebite mortality data. Nonetheless, the recent community health and injury surveys in Asia show that snakebite-related injury ranks as a leading cause of childhood morbidity and mortality in this region (66).

Papua New Guinea has some of the highest snakebite rates in the world, with the country’s rural central province recording an annual incidence of 561.9 cases per 100 000 population (63). Among paediatric snakebites treated at Port Moresby Hospital Intensive Care Unit, the fatality rate for 2003–2004 was 25.9%, compared to 14.5% for adults. Children also represent 36% of all snakebite-related ventilator bed-days in an intensive care unit, in which snakebite-related paralysis accounts for 60% of the ventilator bed-days (63).

Data from developed countries, on the other hand, reveal much lower snakebite-related injury and very low mortality rates. In Australia, 1512 snakebite hospitalizations were recorded between 2000 and 2002, resulting in a crude annual rate of 3.9 per 100 000 population. The highest rates — of 7.5 per 100 000 — were among boys aged 10–14 years (67).

In the United States during the period 2001–2004, the estimated crude rate of snakebite presentations to emergency departments was 3.4 per 100 000 population, with an overall admission rate of 31%. The crude presentation rate was highest among children aged 10–14 years, at 5.5 per 100 000 population (62).

What can be done about snakebites?

Few studies have comprehensively examined this question for adults, and even fewer have looked at paediatric snakebite. The evidence is therefore somewhat anecdotal. Nevertheless, several general points can be made about why children are at particularly high risk of snakebite (67).

- Natural curiosity leads children to interact with animals in general, and in particular leads boys to interact with snakes.
In rural areas in developing countries, children are often employed on the farm, thus incurring an increased risk of making contact with snakes. Children’s small body weight means that a snakebite is likely to have a relatively great impact. Hence children, especially boys, should be specifically targeted for snakebite prevention educational initiatives.

The primary avoidance of snakebite relies on minimizing children’s interaction with snakes. Approaches here include:

– wearing appropriate protective clothing – such as shoes or boots – particularly at night and in rural areas;
– avoiding demonizing snakes, as deliberate aggressiveness towards them is more likely to result in a snakebite;
– keeping sheds and fodder storage areas clear of mice and rats, as these attract snakes;
– keeping grassy areas well cut.

Regarding secondary prevention, two recommendations should be made.

– Compartment syndrome – where excessive pressure impairs blood supply, leading to possible nerve damage and muscle death – is often associated with tourniquet use following a snakebite, and is the most common reason for amputation in children in many areas of Africa. The use of tourniquets as first aid following snakebite should therefore be discouraged, and vigilance maintained against pressure-induced cell death (68).

– Traditional healers, who often initially treat snakebite, should be specifically targeted so that modern principles of medical care can be incorporated into their traditional methods. This can help avoid delays before treatment can be given in a health-care facility, and thus minimize the frequent serious harm that results from late treatment of snakebite.

Snakebite is a widespread and previously poorly-documented global injury problem, in which children and young people are disproportionately represented. Low-income and middle-income countries, particularly the rural areas, are the most affected. Most deaths and serious consequences from snakebites are entirely preventable by existing means, including making antivenom much more widely available. Better surveillance and reporting are necessary to assess the extent of this forgotten injury and to improve prevention strategies.