Snakebites

Traveler Summary

Key Points

- Most bites occur when a snake feels threatened, such as when a person stumbles across it or attempts to handle or pick it up. Risk of envenomation is highest in areas with dense vegetation or rock formations (especially in warm weather).
- Two families of snakes are most common and have distinct clinical outcomes:
  - **Elapids** : Cobras, kraits, mambas, coral snakes, Australasian snakes, and sea snakes have short fixed fangs that inject venom or, in the case of spitting cobras, spray venom into the eyes and mouth of victims. The venom from all elapids is neurotoxic and causes symptoms such as difficulty breathing, heavy eyelids, blurry vision, tingling of the mouth, headache, and dizziness progressing to paralysis of head, neck, and breathing muscles. Venom from Australian elapids can also cause bleeding, necrosis of muscles, and kidney failure.
  - **Vipers** : Old world vipers and adders, neotropical pit vipers (common in the Americas), American rattlesnakes, moccasins, lance-headed vipers, and Asian pit vipers have long, hinged fangs that inject venom deeply and cause symptoms such as severe swelling of limb (or entire body in children), followed by bruising, blistering, necrosis, and local to generalized bleeding.
- Prevention is predicated on avoidance. Wear boots and trousers when out in bushlands in high-risk areas. Walk on a path, and carry a light if necessary to see the ground ahead.
- First aid:
  - Call for medical assistance.
  - Do not apply a tourniquet.
  - Firmly apply a pressure bandage to the length of the affected limb.
  - Keep the victim as quiet and immobile as possible, and move him or her to a hospital quickly.
  - Do not clean the bite or attempt to suck out the venom (this may worsen the envenomation).
  - Take note of snake characteristics (scale pattern, colors, etc.)

Introduction

Snakebites are an important cause of illness and death in poor rural populations in tropical and subtropical Asia, Africa, South America, and Central America. About 2.7 million people are bitten by venomous snakes each year; 200,000 of those persons die as a result of the bites. Snakebites are rare in travelers.

Epidemiology and Risk Factors

The risk of snakebite depends on the density of the local snake population, activities that bring people into contact with snakes, and the aggressiveness or timidity of the species of snake. Most snakes will move away from danger.

Regions at high risk include South and Southeast Asia; central, eastern, and western sub-Saharan Africa; and tropical and central Latin America, including Mexico. These areas have high snake densities and the highest death rates from snake bite. Bites are most common in rural, resource-poor settings. People come into contact with snakes regularly; farm workers, women, and children are most frequently bitten. Less commonly, people are bitten at night in their homes or in towns. During the rainy season, flooding may drive snakes into houses.

Regions at lesser risk include Australia, East Asia, northern and southern Africa, the Middle East, Western Europe, southern Latin America, Andean Latin America, and North America. In these areas, snake densities are lower and/or people's occupations do not bring them into contact with snakes. Most bites occur when a person stumbles across a snake or attempts to handle or pick up a snake. Bites are most common in young adult males.

Rare reports of snakebites in travelers include those walking after dark in a caravan park in Broome, Australia; walking after dark to a restaurant in Turkey; walking after dark on a beach in Costa Rica; and a New Zealander camping in Wyoming, US

Types of Venomous Snakes

There are about 3,000 species of snakes; fewer than 200 of these cause severe envenomation in humans. Venomous snakes belong to 4 families:

- **Atractaspididae** : burrowing asps, mole vipers, Natal black snake, stiletto snakes
- **Colubridae** : arboreal back-fanged snakes, including boomslangs
- **Elapidae** : cobras, kraits, mambas, coral snakes, Australasian snakes, sea snakes
- **Viperidae** : Old World vipers and adders, American rattlesnakes, moccasins, lance-headed vipers, Asian pit vipers

How Snakes Envenomate

Venom is produced in a modified salivary gland and injected with needle-sharp fangs that have a venom groove or channel.

- **Atractaspididae** have long front fangs that impale the victim.
- **Colubridae** have short, fixed back fangs that are not very efficient in envenoming large prey, but several species, notably the African boomslang, have caused severe envenomation in humans.
- **Elapidae** have short, fixed front fangs that inject venom or, in the case of spitting cobras, spray venom into the eyes of their prey or aggressor.
- **Viperidae** have long, hinged front fangs that inject venom deeply.

The risk of envenomation following a bite depends on the species of snake, the volume of venom injected (many bites from venomous snakes are dry, where no venom is injected), and the size and weight of the victim.

Snake Venom Effects

Snake venom can cause swelling and necrosis (tissue death) at the site of the bite, low blood pressure, shock, heart abnormalities, bleeding, kidney failure, and muscle paralysis (e.g., eye, face, throat, and respiratory muscles).

Geographical Distribution of Venomous Snakes Dangerous to Humans

- South and Southeast Asia: Asian cobras, kraits, Russell's viper, Malaysian pit viper, Green pit viper
- Africa: saw-scaled or carpet viper, puff adder, Egyptian cobra, spitting cobras, mambas
- Central and tropical Latin America: rattlesnakes, cascabel, caissaca, fer-de-lance, jararaca, bushmaster
- North America: rattlesnakes. In the US, about 45,000 snake bites are reported annually; of these, 10,000 are seen in emergency departments. One in 3 treated bites is caused by a venomous snake.
- Australasia: death adder, eastern brown snake, tiger snake, taipan. Australia is the only continent where venomous snakes constitute the majority of species. Twenty-one of the world's 25 most deadly snakes are found in Australia, where about 1,000 bites and 2-5 deaths are reported annually.
- Europe: adder/viper. In the UK, about 200 adder bites are reported annually.

There are no venomous snakes dangerous to humans in islands of the western Mediterranean, Atlantic, Caribbean, or Eastern Pacific, or in Iceland, Ireland, Madagascar, New Caledonia, New Zealand, or Antarctica.

Symptoms

All snakebites cause pain and tenderness at the bite site and bleeding from the puncture wounds.

- Bites by **Atractaspididae** cause local pain, swelling, necrosis, tender lymph nodes, violent diarrhea, vomiting, and difficulty breathing.
- Bites by **Colubridae** cause vomiting, abdominal pain, and widespread bleeding, starting hours or days after the bite, followed later by kidney failure.
- The venom of **Elapidae** is neurotoxic and causes difficulty breathing, heavy eyelids, blurred vision, tingling around the mouth, headache, and dizziness; later, paralysis of head, neck, and breathing muscles occurs.
    - Spitting cobra bites and spray cause local inflammation at the bite site or painful red swollen eyes and corneal ulceration.
    - Krait bites cause severe abdominal pain and respiratory paralysis.
    - The venom of Australian elapids is neurotoxic but can also cause bleeding, necrosis of muscles, and kidney failure.
- Bites by **Viperidae** cause severe local swelling that spreads to the whole limb or even the entire body in children, followed by bruising, blistering, necrosis, and local and generalized bleeding.

- The European vipers cause local pain and swelling, nausea, abdominal symptoms, and sweating.

For envenomation by **sea snakes** see ***Marine Hazards***.

Prevention

- A snake that has been surprised or cornered is likely to bite.
- Never threaten a snake or attempt to pick one up.
- If a snake is seen, back off and wait for it to move away.
- Wear boots and long trousers/pants and avoid tall grasses when hiking/trekking in a high-risk country. In dense vegetation, walk slowly, beating the vegetation ahead with a long stick to scare off any snakes. Tread carefully in sand. Do not reach into holes in the ground or cracks between rocks.
- When camping, sleep under a bed net.
- When walking after dark, use a torch/flashlight.

Carrying antivenom while traveling is not advised because it is highly specific to the type of snake, and, if used incorrectly, can cause lethal shock. In addition, antivenom is expensive and may require refrigeration.

First Aid

If a bite occurs:

- Request medical assistance by phone or runner.
- Reassure the victim and keep him or her calm and still.
- Apply a pressure immobilization bandage.
  - For bites on the leg: Apply the bandage firmly as for a sprain but not so tight as to prevent blood flow. Start bandaging well below the bite and continue up to the groin, leaving the toes exposed. Bandage over the clothing. Apply a long splint to prevent joint movement and bandage it firmly to as much of the limb as possible.
  - For bites on the hand or forearm: With the elbow bent, apply the bandage from fingers to arm pit, leaving fingertips exposed; bind a splint along the forearm and apply a sling.
- Wash spitting cobra venom out of the eyes with lots of cold water.
- Move the victim to a hospital quickly, keeping the victim as quiet and immobile as possible.
- Do not cut, suck, clean, or treat the bite in any way; this may accelerate the spread of venom.
- Do not apply a tourniquet, as this may lead to gangrene.
- Take note of the features of the biting snake. Its identification may help with decisions on treatment with antivenom.

Need for Medical Assistance

- Anyone bitten by a snake should seek medical assistance. All snakes carry potentially dangerous bacteria in their mouths, and an antibiotic may be indicated.
- Severe pain or swelling or fresh bleeding at the bite site or the onset of systemic symptoms or generalized bleeding requires urgent assessment.
- In a setting where venomous snakes are common, the victim should be assessed for antivenom treatment.
