

TOXALERT



MARYLAND POISON CENTER

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Snake Envenomations

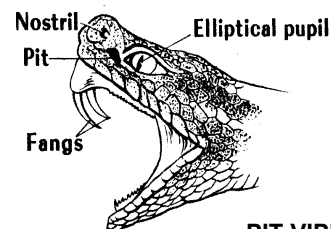
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The American Association of Poison Control Centers (AAPCC) receives an average of 6,000 snakebite reports annually, of which 2,000 involve venomous snakes. Since this reflects only those cases reported to AAPCC, it is likely that the actual number of venomous snakebites is higher. Five to six deaths are reported yearly in the United States, primarily involving young children, elderly, individuals treated with insufficient quantities of antivenom, and participants handling poisonous snakes as part of religious ceremonies. Snakebites are frequently associated with deliberate handling or molesting of snakes. Most venomous bites involve young males, many having a history of alcohol consumption. Over 90% of bites occur between the months of April and October, peaking during July and August, coinciding with increased outdoor activities.

Of the 120 species of snakes indigenous to the United States, about 20 are venomous. Most of these snakes are pit vipers (Crotalinae) named for the heat sensing organ (pit) located between the eyes and nostrils. They have two large anterior hollow fangs, lancet shaped heads, and elliptical pupils. Rattlesnakes, cottonmouths, and copperheads

are pit vipers and are responsible for most venomous snakebites occurring in the U.S. The only other venomous snake native to the U.S. (southeast and southwest U.S.) is the coral snake (Elapidae) characterized by contiguous red and yellow/cream colored bands separated by black bands. They have small, fixed fangs, rounded heads and round pupils. Coral snakes account for <1% of all bites.



PIT VIPER

Only two species of venomous snakes are native to Maryland, the copperhead and the timber rattlesnake. Copperheads are located throughout Maryland, with the exception of the central portion of the Eastern shore, and are responsible for the majority of envenomations in Maryland. The timber rattlesnake is located primarily in Western Maryland with infrequent sightings in the Baltimore Metro area. On occasion, collectors of non-native, venomous snakes (most often cobras) are bitten and present for treatment.

Snake Envenomations (continued)

Field Treatment: The victim should be moved out of striking distance of the snake and placed at rest, kept warm and reassured. The bite site should be immobilized in a functional position just below the heart. All constrictive items such as rings and watches should be removed. **The victim should be transported to the nearest medical facility as soon as possible.** The use of tourniquets, constricting bands, incision/suction, electroshock, and cryotherapy (ice) is strongly discouraged. First responders should focus on establishing/maintaining airway, breathing, circulation and starting an intravenous line in an unaffected upper extremity.

Emergency Department: Personnel should concentrate on maintenance of airway, breathing and circulation. Intravenous access should be established. A detailed history should include the time of the bite, description of the snake and any first aid measures employed. Any significant medical history including previous snakebite and/or treatment, drug and/or food allergies and, specifically, allergies to horse or sheep products should be elicited. The bite site should be examined for fang mark(s), scratches, edema, erythema, and/or ecchymosis. A complete physical examination should focus on the cardiovascular, pulmonary and neurological systems. Circumferential measurements of the bite site should be obtained along with measurements and marking of the advancing edge of edema utilizing an indelible marker. Baseline laboratory studies should include CBC with platelet count, coagulation profile (PT/INR, A-PTT, fibrinogen), electrolytes, BUN, serum creatinine and urinalysis (routine and microscopic). Addi-



tional testing should be based on the patient's age, medical history and/or severity of the envenomation and may include creatinine phosphokinase, blood type and cross match, CXR, and ECG. Testing should be repeated based upon the patient's clinical manifestations. Since manifestations of envenomation may be delayed, it is recommended that all victims be observed in the emergency department for a minimum of 8 hours.

Definitive diagnosis of envenomation requires positive identification of the snake along with clinical manifestations of envenomation. Since the snake

is usually not available, diagnosis depends on objective evidence of envenomation. Approximately 25% of bites from pit vipers are 'dry' where no manifestations of envenomation develop. The majority of victims present with evidence of fang puncture(s)/scratches. Pain, edema, erythema, and/or ecchymosis generally develop within the first hour following the bite but may be delayed for several hours. Systemic symptoms include nausea, vomiting, perioral paresthesias, and/or myokymia. Rattlesnake envenomations have been reported to cause unusual tastes (rubbery, minty or metallic). Severe systemic effects may include profound hypotension, dyspnea, and/or altered sensorium. Coagulopathies characterized by prolonged INR and A-PTT, hypofibrinogenemia, thrombocytopenia, and presence of fibrin split products may occur following rattlesnake envenomations and result in a DIC-like presentation. Envenomations are graded as none, minimal, moderate, or severe based upon the

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Pain, edema, erythema, and/or ecchymosis generally develop within 1 hour but may be delayed.

most severe clinical manifestation or coagulopathic abnormality at the time of evaluation. For example, a patient may exhibit minimal local edema but have profound hypotension resulting in the envenomation being graded as severe.

Antivenom: CroFab™ is a mixed, monospecific, polyvalent antivenom derived from immunizing sheep, that is recommended for the treatment of pit viper envenomations. Following the decision to treat with antivenom, 4-6 vials of CroFab™ are reconstituted and diluted in a crystalloid solution to a total volume of 250 mL. This is administered by slow intravenous infusion (1 mL/min) for the first 10 minutes and if tolerated, the remainder of the solution is infused over one hour. Following administration, the patient is reassessed for evidence of control defined as a cessation or attenuation of progression of local, systemic or coagulopathic effects. If control has not been established, an additional 4-6 vials are recommended until control has been established. Once control is achieved, the patient is administered a maintenance dose of 2 vials at 6, 12 and 18 hour intervals. It is recommended that antivenom be administered in the emergency department or ICU setting. Copperhead envenomations generally do not require antivenom treatment.

The majority of crotaline envenomations are subcutaneous and not subfascial. Consequently, compartment syndromes are rare and usually the result of either a delay in antivenom administration or the administration of insufficient quantities of antivenom. Fasciotomy should be reserved for cases of documented compartment syndrome where serial compartment pressure measurements remain elevated at ≥ 30 mmHg for over four hours.

General Considerations: Serum sickness is the most frequently observed complication of treatment with antivenom and manifests in fever, rash, arthralgias and lymphadenopathy. It generally begins 7-21 days following antivenom treatment and can be managed with tapering doses of corticosteroids. Tetanus prophylaxis should be administered based on the patient's immunization history. Prophylactic antibiotics are generally not indicated. Antibiotics should be reserved for objective evidence of wound infection. Steroids and heparin have no role in acute treatment. Blood products for coagulopathies should not be administered until antivenom has been administered to neutralize circulating venom components. The Maryland Poison Center should be contacted for all snakebite emergencies.

CroFab™ is the antivenom currently recommended for the treatment of pit viper envenomations.

Call the Maryland Poison Center for help in diagnosing and treating all snakebites:

1-800-222-1222

★ **Maryland Poison Center Celebrates 30 Years of Service!** ★
★
★ Dramatic changes have occurred since that first emergency phone call in 1972. ★
★ Our call volume has grown from 5,500 cases per year to over 37,000 cases per ★
★ year! We now provide a variety of poison prevention materials and programs to ★
★ the public, and our staff is actively involved in educating health professionals ★
★ through lectures, publications and on-site training. We work closely with the public ★
★ health infrastructure in Maryland to help recognize poisoning challenges and to ★
★ respond to those challenges. One thing hasn't changed, however... our mission ★
★ to decrease the cost and complexity of poisoning and overdose care while main- ★
★ taining and/or improving patient outcomes. ★
★

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TOXALERT

Older camping heaters can produce toxic levels of carbon monoxide.

TOXNOTES: Saving Campers' Lives

Is it safe to use a camping heater inside of a tent or camper?



Camping heaters that utilize propane tanks are intended only for outdoor use and have resulted in carbon monoxide poisonings and deaths when used in enclosed areas such as campers, cabins, tents and vehicles. Fortunately, a new generation of heaters can save lives by shutting off when oxygen depletion sensors (ODS) detect oxygen levels dropping below 18%, and before dangerous levels of carbon monoxide are produced. These new ODS-equipped heaters are designed for indoor use and are labeled as such or can be identified by "low oxygen automatic shut-off system", "oxygen depletion sensor", or a star and "CSA 4.98" on the label. Manufacturers' instructions for adequate ventilation should be followed, and the heaters should not be used while sleeping. For more information, go to the Consumer Product Safety Commission's website: <http://www.cpsc.gov/cpscpub/prerel/prhtml02/02179.html> .