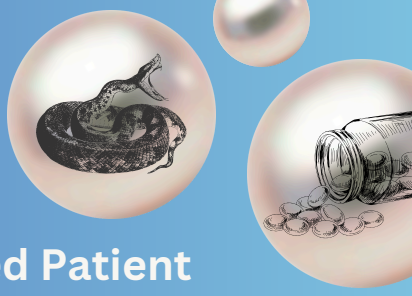
POISON PEARLS

Toxicology Topics for the Healthcare Team of a Poisoned Patient



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Venomous Snakes of Ohio

July 2025

Background

Approximately 7,000-8,000 snake envenomations are reported annually in the United States, resulting in fewer than six fatalities per year. The majority of bites occur in rural, socioeconomically disadvantaged regions with limited access to healthcare services (**Seifert, M.D et al., 2022**). Among snakebite cases reported to U.S. poison control centers, the specific species involved is often undocumented or unidentifiable. Venomous species native to Ohio include 3 crotalids: eastern copperhead (*Agkistrodon contortrix)*, timber rattlesnake (*Crotalus horridus)*, and eastern massasauga rattlesnake (*Sistrurus catenatus)* (**Ohio Department of Natural Resources, n.d**).

Pathophysiology and Clinical Presentation

Envenomation from venomous snake species most commonly involve the extremities. In some instances, bites may be "dry," with no envenomation occurring. The severity and composition of crotaline venom vary by species, resulting in a range of clinical manifestations, including:

- Hemotoxic effects such as thrombocytopenia, hypofibrinogenemia, and prolonged coagulation times
- Cytotoxic effects including progressive pain, edema, and local tissue necrosis
- Systemic effects such as hypotension or less commonly, significant neurotoxicity

Crotaline venoms contain a complex mixture of biologically active components, including procoagulant enzymes like snake venom metalloproteinases, which can aberrantly activate clotting pathways. This may predispose patients to thrombotic complications, including myocardial infarction and cerebrovascular accidents. Additionally, crotalid venom may precipitate hypersensitivity reactions, including anaphylaxis, particularly in sensitized individuals (**Ruha & Pizon, 2019**). The majority of envenomations in Ohio are caused by copperheads, which primarily result in local tissue destruction.

Treatment

Antivenom remains the cornerstone of management in venomous snake bites, with emphasis on controlling local tissue damage, coagulopathy, and systemic toxicity. Initial interventions include thorough wound cleansing, radiographic imaging to evaluate for retained fang fragments, and tetanus prophylaxis. Antivenom therapy is indicated for progressive local symptoms (e.g., worsening pain or swelling), hematologic abnormalities (e.g., coagulopathy, thrombocytopenia), or systemic manifestations such as neurotoxicity. In the United States, two antivenom products are currently utilized for crotaline envenomation: CroFab (Crotalidae polyvalent immune Fab, ovine-derived) and AnaVip (Crotalidae immune $F(ab')_2$, equine-derived). The primary therapeutic objective is to achieve venom control defined as halting the progression of local effects and stabilizing coagulopathy. Patients receiving antivenom should be closely monitored for immediate and delayed hypersensitivity reactions. The recommended observation period after a suspected or confirmed snakebite depends on the clinical presentation and identified species, typically ranging from 6 to 24 hours to monitor for signs of envenomation (**Seifert, M.D et al., 2022**).

Massasauga Rattlesnakes
(Massasauga Research at OSU, n.d)
Photos by Greg Lipps, Jr.

Key Points:

- Snake bites may be from either venomous or non-venomous snakes
- Venomous snakes native to Ohio:
  - Eastern Copperhead, timber rattlesnake, and massasauga rattlesnake
- Dry bites can occur where no venom is transferred
- Initial treatment for all snakebites:
  - Supportive care
  - Wound cleansing
  - Tetanus prophylaxis
- Antivenom for crotalids if indicated:
  - Either F(ab)2 or Fab fragment

Written by: Amy Feczer, PharmD Candidate
Reviewed by: Dr. Goertemoeller, Dr. Hays, Dr. Pancioli, Dr. Yin
Edited by: Julia Conroy

For non-urgent questions or to submit topic ideas please contact:
: **OhioPoisonCenters@cchmc.org**
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