

Detroit SonoWAR 2023

#1 Pediatric Envenomation Station

Your family is exploring the parks and wetlands around metro Detroit when your child screams out after feeling a sharp pain in their ankle just above the boot, and you see a snake slither away into the brush. They start to feel lightheaded. You take a picture of the snake.

You become concerned because you recall a fatal 2018 incident in Detroit where a 26yo male was bitten by a pet cobra and died, despite a multistate effort to scramble and administer 8 vials of antivenom.²

You were additionally concerned by a news story from 2019 where two Michigan residents were bitten by rattlesnakes in one month.³ Although neither died, one patient required a week of hospitalization and required use of a cane to walk for a prolonged time afterwards.



"All I felt was....my ankle was on fire," Bowen said. "It was just immediate. I took a couple steps and set down the stuff, and I turned around and it was a huge snake.

I kind of took a couple steps towards it and it rattled. But I wasn't sure because I'd never seen a rattlesnake before." ³

References

1. Michigan Department of Natural Resources www.michigan.gov/dnr
2. Zaniwski, A. *Bite from exotic snake sparks multistate scramble for antivenom*. Detroit Free Press, 2018.
3. Afana, D. Two Michigan residents bitten by rare rattlesnake in one month. M Live, 2019. https://www.mlive.com/news/ann-arbor/2018/09/pinckney_woman_bitten_by_rattl.html

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Recommended readings and cool new ideas to discuss en route to this station:

1. Crotalidae Envenomation – StatPearls, 2021. <https://www.ncbi.nlm.nih.gov/books/NBK551615/>
2. Zhou A, et al. *Interobserver Agreement of Inferior Vena Cava Ultrasound Collapse Duration and Correlated Outcomes in Children with Dehydration*. *Pediatric Emergency Care*, 2022. <https://pubmed.ncbi.nlm.nih.gov/32530838/>
3. Leviter, J et al. *“Full Stomach” Despite the Wait: Point-of-Care Gastric Ultrasound at the Time of Procedural Sedation in the Pediatric Emergency Department*. *Academic Emergency Medicine*, 2019. <https://pubmed.ncbi.nlm.nih.gov/30372569/>

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- 1 Point Navigate to this location
- 1 Point What is the only venomous snake native to Michigan?
- 1 Point 
- 1 Point Which of the following are recommended for immediate management of snakebites: Tourniquet to the limb; Sucking out venom; Cutting the wound to remove venom; Immobilizing the limb to prevent lymphatic spread; Catching the snake / killing it to bring it in for identification.
- 1 Point What are the main/significant differences between pit vipers, rattlesnakes, cottonmouths, and copperheads?

Emergency management of shock and bleeding, followed by timely antivenom administration to patients with progressive tissue swelling or systemic toxicity after Crotalinae envenomation, are the most common actions needed when stabilizing patients with Crotalinae snakebites.


- 1 Point But when should you administer antivenom?? I.e., which physical exam findings or laboratory values should alert you to “pull the trigger” to receive antivenom?

Hypovolemia from hemorrhage, fluid shift into the bitten limb, and/or direct venom effects with vasodilation may cause shock with hypotension.

Interesting recent studies have shown that in the pediatric ED population, eyeball assessment of the IVC collapse *time* may accurately reflect degrees of hypovolemia or dehydration.

- 1 Point The super cool volunteer child in front of you was bitten by a snake and you are assessing for hypovolemia and vasodilation. What is their IVC collapse time? Based on this would you administer IV fluids, PO fluids, or none?

Some populations of these snakes possess a neurotoxin that can produce weakness and respiratory failure. When there is time to consider airway options other than emergent RSI, a new and growing trend in anesthesia literature is the use of gastric POCUS to assess a patient’s aspiration risk.

- 1 Point EMS arrives to transport the child and decides to place an advanced airway. Should you use mild sedation and an LMA or jump to RSI? The parents report last meal was pancakes about 6 hours ago. According to ACEP, what is the association between fasting time and aspiration?
- 1 Point What are the four categories you should be looking for with Gastric POCUS?
- 1 Point 

Bonus Point: Tweet a photo of your score for this station (and an action shot) with #SonoWAR to have a bonus point added on the back end!