NEWS FROM THE PIT

Arizona Poison and Drug Information Center

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Myokymia After Rattlesnake Bites

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In this month's newsletter, we will discuss myokymia following rattlesnake envenomation in Arizona. Myokymia is a type of involuntary muscle contraction that produces a rippling, wave-like pattern of rhythmic contraction. It has been reported as a possible neurological sign of rattlesnake envenomation in case reports going back at least as far as the 1980s; however, the existing literature only describes myokymia that is visible to the naked eye. For the last 10 years, we have been conducting an observational study of subclinical myokymia. In other words, myokymia not visible to the naked eye. You may be wondering how we knew the muscle contractions existed if we could not see them, and the answer is ultrasound! While a formal manuscript is already well in the works, we felt it was worth sharing some of our preliminary findings and discussing the rationale behind the study for this month's newsletter. To the best of our knowledge, we will be the first group to report on this phenomenon, so we naturally wondered if subclinical myokymia is clinically significant. Can this phenomenon that no one can see cause problems for patients?

NEWSLETTER HIGHLIGHTS

Discussion of observational study on subclinical myokymia

Image 1: Speckled Rattlesnake (*Crotalus pyrrhus*)

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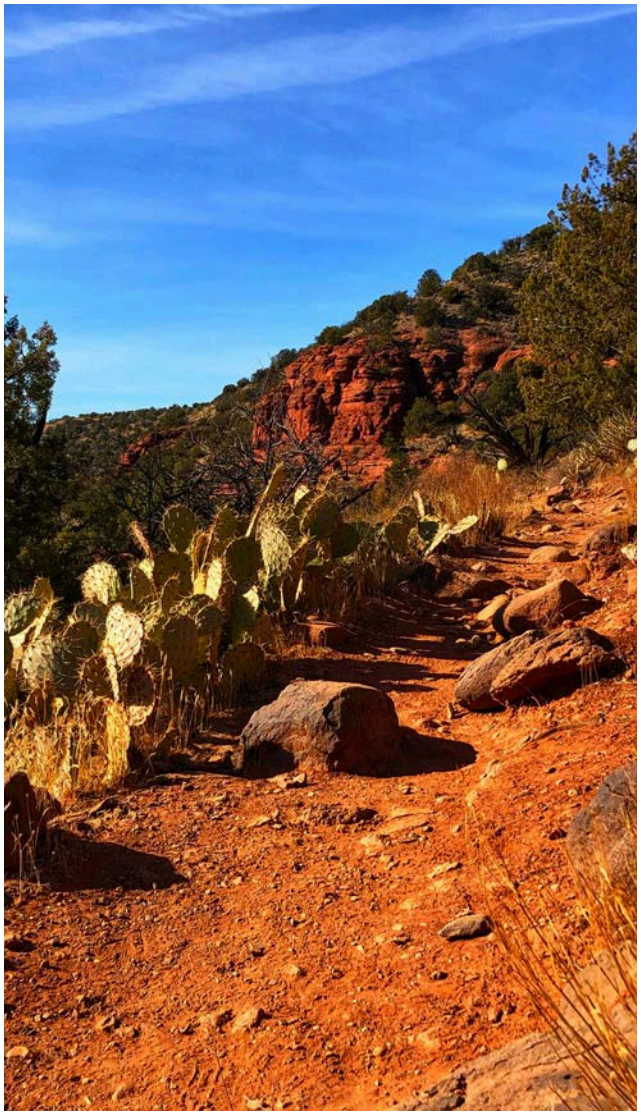

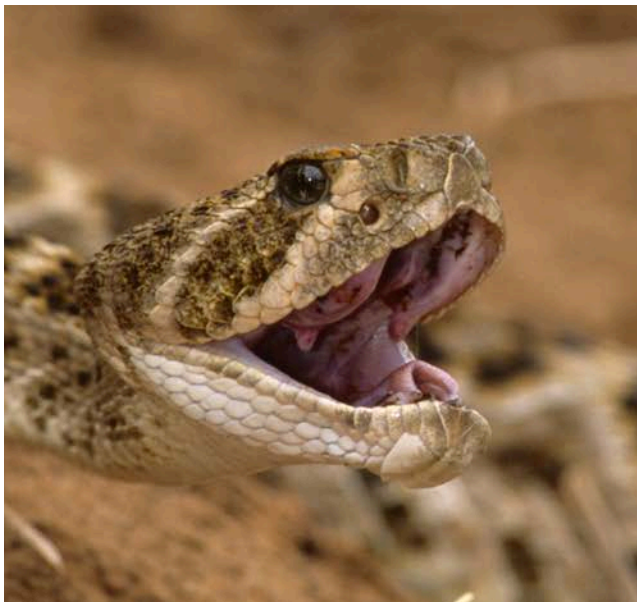

Let's start with a refresher on what a typical rattlesnake bite looks like and how it is treated. The most common signs and symptoms patients suffer are related to local tissue injury, which includes pain, swelling, redness, bruising, and blistering. Systemic toxicity affecting blood pressure, blood clotting, and neuromuscular effects such as myokymia can occur, but do so less frequently. There is such a wide variety in clinical toxicity following a bite, as well as the severity of these symptoms, that the concept of "typical" rattlesnake envenomation is a bit of a misnomer. The severity of symptoms after a bite can range from none, such as from a "dry bite" when no venom is injected, to severe illness with life-changing long-term complications, or even death. Given the wide range of possible outcomes, it is beneficial for healthcare providers to recognize signs of worse envenomation because it can guide treatment decisions.

This is where our study comes in. We believe that myokymia may be a sign of worse illness because it could facilitate venom absorption from the bite location, leading to increased amounts of venom in circulation earlier, possibly even before antivenom can be administered. Our study's goal was to determine whether myokymia is associated with more severe envenomation. But how do we determine the severity of an envenomation? Though this is a seemingly simple question, there is hardly a simple answer! There are no universally accepted criteria for determining envenomation severity while treating a patient. Existing criteria are only intended for research purposes and have no place guiding treatment decisions. One method is to consider the receipt of treatment as a surrogate. In our situation, this would mean presuming that people who received more total antivenom vials also had a more severe envenomation. While this could work, the lack of objective criteria for administering doses of antivenom beyond the initial loading dose would become a massive study limitation due to the subjective nature of clinical decision making based on bedside assessment. We opted to look at peak proximal spread of edema, the Brown hypersensitivity criteria, and some markers of healthcare resource consumption for our study.

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We examined 50 patients at the bedside, of which 20 had myokymia visible on ultrasound and 30 did not. We found that patients with myokymia were more likely to have swelling above their knee or elbow, when compared to those without myokymia. We also found they scored higher on the Brown scale for hypersensitivity reactions. Hospital bills were about $30,000 greater for those with myokymia, which also aligned with their longer hospital stays and more antivenom administered. One other notable difference between the two groups was the presence of cardiopulmonary complications. In patients with myokymia, 20% of patients had complications: one patient had a heart attack, and three others had low oxygen saturation levels. Of the 30 patients who did not have myokymia, none had cardiopulmonary complications.

So, does myokymia worsen the severity of an envenomation? Maybe. Our study wasn't designed to determine any kind of cause and effect relationship, but it does provide evidence to support more focused research in the future. For now, it is a bit more information that likely fits somewhere into the puzzle of understanding why some patients recover from their envenomation within a few days, while others experience pain, swelling, and loss of function that persists for months to years.