



Antibiotic Use in the Management of Snake Envenomation: A Retrospective Cohort of Patients Reported to the ToxIC North American Snakebite Registry

Ruha AM¹, Kang AM¹, Onisko N², Greene S³, Vohra R⁴, Seifert SA⁵, Smith E², Padilla-Jones A¹, On behalf of the ToxIC Snakebite Study (TICCS) Group. ¹Center for Toxicology and Pharmacology Education and Research, Phoenix AZ; ²University of Texas Southwestern Medical Center, Dallas TX; ³Baylor College of Medicine, Houston TX; ⁴UCSF Fresno Medical Center, Fresno CA; ⁵University of New Mexico School of Medicine, Albuquerque NM

Background

- Snake envenomation produces inflammatory effects that may mimic and be difficult to distinguish from infection, including erythema, warmth and inflammation of lymphatic channels. The incidence of infection is unknown but culture-proven infections are rare.
- There is no evidence that prophylactic antibiotics change the incidence of infection and they are not recommended in the routine management of North American snake envenomation.

Research Question

- Are health care providers administering prophylactic antibiotics to patients with snake envenomation?

Methods

- Data reported to the ToxIC North American Snakebite Registry (NASBR) between Mar 1 2013 and Dec 31 2014 were reviewed. All cases were included.
- Data collected included patient demographics; physical findings; antibiotic use, doses, and purpose.
- Results are reported using descriptive statistics.

The 2014 TICSS group: Anna Arroyo-Plascencia, Vikhyat S. Bebarta, Michael C. Beuhler, Adam Bosak, Jeffrey Brent, Daniel Brooks, E. Martin Caravati, James D. Cao, Nathan Charlton, Steven Curry, Michael Darracq, William Dribben, Kimberlie Graeme, Spencer Greene, Kennon Heard, C William Heise, Janetta Iwanicki, Aaron Min Kang, William P Kerns II, Thomas Kibby, Joshua King, Ronald Kirschner, Kurt Kleinschmidt, Michael Levine, Rachel Levitan, Philip Moore, Michael Mullins, Ayrn O'Connor, Nancy Onisko, Angie Padilla-Jones, Tammy Phan, Frank LoVecchio, Anne-Michelle Ruha, Steven A. Seifert, Daniel J Sessions, Aaron Skolnik, Eric Smith, Meghan Spyres, An Tran, S. Eliza Halcomb, Evan S. Schwarz, Shawn M. Varney, Rais Vohra, Brandon Warrick, Sam G. Wang, Paul Wax, Brian J. Wolk

Results

- 280 cases were reported from 14 sites in 10 US states
- 265 (95%) had swelling and 109 (39%) had erythema
- 32 (11%) received at least one dose of antibiotics
 - 17 patients were treated with antibiotics in the ED
 - 24 patients received antibiotics while admitted
 - 9 for prophylaxis
 - 13 for empiric treatment of erythema or suspected cellulitis
 - 2 for a documented infection
 - one pre-existing & unrelated to bite
 - one associated with venom-induced necrosis with digital nerve injury requiring multiple surgeries
- Erythema was present in 18 (56%) patients who received antibiotics and 91 (37%) patients who did not receive antibiotics
- Of 4 patients reported to have lymphangitic streaks on exam, one was treated with antibiotics
- Mean age of those treated with antibiotics was 38 years
 - 34% were extremes of age (≤ 10 years, ≥ 60 years) (34% of NASBR cases also ≤ 10 years, ≥ 60 years)
- In follow-up, infection of necrotic tissue was reported 18 days post-bite in a patient who initially incised the wound, was not treated prophylactically or empirically with antibiotics, but had received prednisolone following the bite

Discussion

- Antibiotics are not routinely recommended in the treatment of North American snakebite ^{1,2}
- In this cohort of patients, 11% were treated with antibiotics, and 53% of those upon initial evaluation in the ED
 - Antibiotics were given for a confirmed infection in only one complicated case
 - Of the 89% not treated with antibiotics, only one late infection reported
- Other reports have documented similar rates of prophylactic antibiotic use in North American snakebite, without demonstrated benefit ³
- Unnecessary antibiotic use presents risks of adverse medication reactions, medication errors, drug resistance and pseudomembranous colitis
- Study limitations include no confirmation of infection or its absence, and inconsistent follow up

Conclusion

- Routine administration of antibiotics to snakebite patients continues despite published evidence and recommendations against the practice
- Medical education regarding management of snakebites should include the appropriate use of antibiotics



Example of erythema of the upper extremity following rattlesnake envenomation