Snakebite Neurotoxicity: A Retrospective Review of Patients Reported to the ToxIC North American Snakebite Registry

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Background

- Neurotoxicity is an uncommon effect of North American snake envenomation (NASE).
- Neurotoxicity is expected following Eastern coral snake envenomation, however these comprise only 2% of NASE reported to US poison centers.1
- Pit vipers make up the majority of NASE and are mainly associated with tissue and hem effects; neurotoxicity is less frequently reported.
- Reports of NASE neurotoxicity are generally limited to small case series and may represent the most severe presentations rather than the complete spectrum of neurotoxicity.

Research Question

- What are the snake species, neurotoxic presentations, management and outcomes reported to the North American Snakebite Registry (NASBR)?

Methods

- Data reported to the NASBR between January 1, 2013 and October 22, 2015 were reviewed.
- Inclusion criterion was any neurotoxic effect observed after snakebite.
- Patient demographics, snake species, and clinical findings and outcomes were collected. Microsoft Excel and Descriptive statistics were used.

Results

- 433 cases representing 10 US states were reviewed
- 24 cases with neurotoxicity were reported in Arizona, California, Colorado and Texas.
- Mean age 41 years (2-78).
- 19 (79%) were male.
- 13(54%) upper extremity bites.
- Snakes included: 20 (83%) North American rattlesnakes (2 Grand Canyon, 1 Sidewinder, 1 Southern Pacific, 16 unknown species), 1 Texas coral snake, 1 cottonmouth, 1 copperhead, 1 non-native South American rattlesnake.
- Texas coral snake and copperhead neurotoxicity was described as extremity paresthesias.
- Cottonmouth neurotoxicity was described as extremity paresthesias and fasciculations/myokymia.

Discussion

- Reports of neurotoxicity after pit viper envenomation typically describe fasciculations or myokymia and respiratory failure.
- In this cohort, paresthesias were the most common neurologic symptoms reported after NASE.
- Fasciculations were the most common objective finding, but respiratory failure didn’t occur
- Seizure is unexpected and not a known effect of snake venom. However it has been reported previously after NASE, though in association with respiratory arrest. 2
- There were no reports of respiratory failure in this cohort.
- The North American pit vipers best known for neurotoxic venom are the Mojave, Timber and Southern Pacific rattlesnakes (all Crotalus spp). Other neurotoxic Crotalinae in this cohort included Grand Canyon and Sidewinder rattlesnakes. Agkistrodon envenomations have not previously been reported to cause neurotoxicity.
- Limitations include retrospective nature of review as well no standardized method of species identification.

Conclusions

- Paresthesias were the most common neurotoxic symptom and fasciculations/myokymia the most common neurotoxic finding reported in this study.
- Neurotoxicity may be associated with Agkistrodon envenomation.