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261. Stings, toxins, and tides: a 14-year descriptive study of marine envenomations

Monica Thacker[a], Michele Burns[b] and Jamie Lim[a]

[a]Boston Children's Hospital/Harvard Medical School, Boston, MA, USA; [b]Massachusetts and Rhode Island Poison Center, Boston, MA, USA

Background: Marine envenomations are a globally prevalent yet undercharacterized source of toxicologic injury, affecting primarily coastal populations and travelers. Envenomation occurs through a diverse range of organisms and can produce clinical effects ranging from localized pain and dermatologic injury to life-threatening cardiovascular and neurologic toxicity. Despite their frequency, these exposures are likely underreported and incompletely described in large datasets, limiting epidemiologic understanding. Prior literature highlights that the type and severity of envenomation vary significantly by geography, species, and environmental conditions, and that increasing human interaction with marine environments may be contributing to incidence.

Methods: We performed a retrospective descriptive study using data from the Toxicology Investigators Consortium (ToxIC) Core Registry from 2012 to 2025. Marine envenomation cases were identified within the registry, and investigators analyzed a deidentified, aggregate dataset. Extracted variables included patient demographics (age, sex), exposure type, reported clinical effects, and treatments administered. Data were stratified by age group and sex, and clinical features and interventions were summarized using descriptive statistics to evaluate temporal trends and characterize the presentation and management of marine envenomations.

Results: A total of 42 cases of marine envenomation met inclusion criteria over the study period. Case frequency remained low overall, with a peak observed in 2014 (n = 8) and smaller increases in 2016 (n = 6) and 2024 (n = 3). No cases were reported in 2022 or 2023. The majority of patients were male (57%, n = 24). Most exposures occurred in middle-aged adults, with the highest proportion in the 40-50-year age group (n = 11), followed by 20-30-year age group (n = 7) and 50-60-year age group (n = 7). Ciguatera poisoning was the most commonly reported exposure (n = 16), followed by palytoxin (n = 10). Other identified agents included lionfish (n = 4), scombroid poisoning (n = 4), shellfish poisoning (n = 2), tetrodotoxin (n = 2), bristle worm envenomation (n = 1), and unspecified marine toxins (n = 3). Clinical effects were predominantly neurologic and dermatologic. The most frequently reported symptom was numbness/paresthesia (n = 20), followed by rash (n = 8). Cardiopulmonary manifestations included tachycardia (n = 4), hypotension (n = 1), and lung injury/acute respiratory distress (n = 6). Additional findings included weakness/paralysis (n = 3), peripheral neurologic symptoms (n = 2), agitation (n = 1), hyperreflexia/myoclonus (n = 1), and hyperthermia (n = 1).

Treatment was largely supportive. The most commonly administered therapies included bronchodilators (n = 6), corticosteroids (n = 6), antihistamines (n = 5), and intravenous fluids (n = 4). Mannitol was used in 25% of cases involving ciguatera poisoning (n = 4). Hot water immersion, a targeted therapy for certain envenomations, was documented in 3 cases. Advanced interventions were uncommon but included vasopressor use (n = 2) and intubation/mechanical ventilation (n = 2). Benzodiazepines (n = 2) and opioids (n = 1) were used less frequently.

Conclusions: Marine envenomations represent a consistent and geographically variable source of toxicologic exposures. While most cases are self-limited, a clinically significant minority develop systemic toxicity requiring medical intervention. These findings reinforce prior literature describing marine envenomation as both common and potentially severe yet incompletely characterized at a population level. Improved surveillance using large toxicology datasets may help identify high-risk exposures, regional patterns, and evolving epidemiologic trends, particularly in the context of increasing human-marine interaction and environmental change.