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Cerebriform eruption related to acute coral dermatitis

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Abstract

A 27-year-old woman presented with an acute, tender, geographic lesion on her left shin that developed after contact with a brain coral while scuba diving. Photographs obtained two hours after the incident reveal a well-demarcated, geographic, erythematous plaque with a serpiginous and cerebriform pattern at the site of contact, resembling the outermost surface contour of brain coral. The plaque resolved spontaneously over a three-week period. The biology of corals and potential biological features that lead to cutaneous eruptions are reviewed.

Keywords: aquatic, coral, dermatitis

Introduction

Given the prevalence of travel to tropical locations and the prevalence of recreational watersports, dermatologists should be familiar with the clinical presentation and management of travel-related and aquatic dermatoses. We report a case of acute coral dermatitis resulting from contact with a brain coral.

Case Synopsis

A 27-year-old otherwise healthy woman presented with an acute tender lesion on her left shin that developed while scuba diving in Hol Chan Marine Reserve, Belize. During the dive, she accidentally kicked her bare shin against a brain coral. She noted instant pain at the time of contact. Photographs obtained two hours after the incident reveal a well-demarcated, geographic, erythematous plaque with a serpiginous and cerebriform pattern at the site of contact (**Figure 1**). The morphology of the lesion resembled the outermost surface contour of brain coral (**Figure 2**). The lesion resolved spontaneously over a three-week period.

Case Discussion

Corals are marine invertebrates of the phylum Cnidaria. Hard corals are composed of numerous small polyps that encase the surface of an underlying calcium carbonate skeleton. Each polyp, which measures from a few millimeters to several centimeters, is composed of a central mouth that leads to the gastrodermis. The mouth is encircled by

Figure 1. *Acute, well-demarcated, geographic, erythematous plaque with a serpiginous and cerebriform pattern on the left shin.*

Figure 2. *Brain coral refers to various species of hard coral with a spheroid shape and grooved, cerebriform surface resembling a brain. The surface is encased with polyps that create the underlying calcium carbonate skeleton.*

several radially-arranged stinging tentacles called nematocysts, which sting and capture prey. The overall morphology is most easily imagined as analogous to numerous, small, matted, upside-down jellyfish attached to the surface of limestone. During the day, the polyp's soft tissue is typically retracted into the skeleton; at night, the polyps extend their tentacles to feed. Tropical corals derive most of their caloric demands from microscopic photosynthetic algae called zooxanthellae that reside within coral soft tissue. In this symbiotic relationship, the hard skeleton and stinging tentacles provide the zooxanthellae with physical protection from predation; in return, algae provide the coral most of its energy needs.

Skin contact with corals is most common when snorkeling or scuba diving in tropical coral reefs and may lead to either acute or chronic coral dermatitis. Acute lesions appear immediately or within hours of exposure [1]. Some cases of acute coral dermatitis are due to trauma from the highly abrasive calcium carbonate skeleton [2]. Toxins within the nematocysts may also cause an acute eruption mediated by histamine release or cytotoxic reactions [2-4]. In particular, fire corals are covered by numerous, barely-visible, needle-like projections that easily lodge within the skin [5]. In rare instances, systemic anaphylactic or toxic reactions and even death may ensue [2].

Whereas acute lesions resolve within a few days to weeks, chronic coral dermatitis is characterized by persistent, firm, lichenoid, or granulomatous plaques that develop days-to-weeks after exposure and may be rather resistant to treatment [1]. The mechanisms for chronic coral dermatitis are varied and may include dermal inoculation with calcium carbonate causing granulomatous inflammation, chronic envenomation due to retained nematocysts, or a dermal hypersensitivity reaction in the absence of any foreign body, possibly due to the persistence of toxins in the tissue [2,6].

Due to the rapid onset of the plaque and its geographic shape, the most likely cause of the eruption seen in our patient is direct toxin envenomation from the nematocysts. Despite the large biomass of stony corals, their immense ecological importance, and the awareness that they are venomous animals that rely on toxins to catch prey and defend themselves, little is known about the chemical arsenal reef-building corals deploy. A recent study that tried to isolate the coral proteins that are capable of causing in vitro hemolysis found 25 proteins in different coral species. It appears that each species utilizes an array of toxins whose specific identity and function require further study [7].

The initial management of coral dermatitis involves cleansing of the contact site with saltwater and soap to remove any remaining surface nematocysts and calcium carbonate [2]. Tetanus vaccination, topical corticosteroids, and oral antihistamines may also be considered. Prevention is best achieved by covering the skin either with whole-body neoprene wetsuits or with thinner polyurethane "dive skins" that provide physical protection without any thermal insulation.

Conclusion

Coral dermatitis may encompass a range of acute, subacute, and chronic dermatoses. Dermatologists should be familiar with the presentation and management of this condition, as well as with the pathophysiologic mechanisms through which coral dermatitis may develop.

Potential conflicts of interest

The authors declare no conflicts of interest.

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