CASE REPORT

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A case of immediate and delayed reactions after contact with a venomous mauve-stinger jellyfish in a diabetic patient

Laidon Shapo, Lance Saker

ABSTRACT

Introduction: A contact with the venoms produced by a pelagic jellyfish type, known as *Pelagia noctiluca*, can induce both local and general symptoms. We report here a case of jellyfish envenomation with a mauve-stinger in a diabetic patient who developed localized skin involvement, delayed systemic reaction and hyperglycemia. To our knowledge this is the first report of this kind in literature. **Case Report:** The patient, an adult male tourist with type I diabetes, was stung on the forehead by a mauve-stinger jellyfish while swimming on the Maltese coast in summer 2012. Local symptoms were initially of an erythematous, edematous and a vesicular topical lesion in the forehead region, followed by massive eye swelling 72 hours after the incident. In addition, his normally well-controlled diabetes was affected, with an unusual severe episode of hyperglycemia that did not respond readily to alterations in his insulin regime. **Conclusion:** *Pelagia noctiluca* is a jellyfish known for its strong cytotoxic properties. We hypothesize that the stress

response, following the jellyfish attack could have triggered a metabolic response and the consequences seen in this person with diabetes. The reaction described suggests that people with diabetes stung by *P. noctiluca* should monitor their glucose levels closely and in some cases seek treatment with more specialized endocrinology services.

Keywords: Jellyfish, Diabetes, Hyperglycemia

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INTRODUCTION

Jellyfish stings are common worldwide with an estimated 150 million cases annually [1, 2]. The incidence appears to be rising due to the increasing marine activities of local populations, tourists and those who are involved in water activities. Jellyfish stings can cause a wide range of clinical manifestations ranging from skin inflammation to cardio-respiratory and other syndromes [3, 4].

In general, most stings cause a mild skin reaction. Persistent, delayed or recurrent episodes are less common. However, contact with the venoms produced by a small pelagic common purple jellyfish type populating Mediterranean waters, known as *Pelagia noctiluca*, is minimally toxic. Its stings usually cause local skin irritation or pain with most symptoms occurring immediately after the contact including local

erythema, pain, pruritus, blistering, and swelling. Systemic complications, usually associated with exposure to a large amount of the toxin, are often limited to nausea, headache, and chills but could also lead to a major anaphylactic reaction. However, these are reported to be infrequent [5].

We report a case of jellyfish envenomation with *P. noctiluca* in a diabetic patient presenting with localized skin involvement and delayed systemic reactions and describe the treatment approach. Although case reports of jellyfish envenomation exist [2–4], we were unable to find any that reported on systemic effects in people with chronic conditions.

CASE REPORT

A white male, in his early 40s, with type I diabetes, was stung by a mauve-stinger *P. noctiluca* jellyfish (Figure 1) while swimming close to the shore off the Maltese coast near Mellieha bay in summer 2012.

The immediate reaction was of a sudden sharp pain in the forehead followed a few minutes later by dizziness. A large erythematous, edematous and vesicular lesion developed on the forehead over the next a few hours (Figure 2). These symptoms are characteristic of those usually described after contact with this species.

The affected area was treated at the Mellieha bay resort with white vinegar (5%) for a few minutes and an ice pack was applied locally for another 15 minutes. As the patient was also feeling dizzy, he was advised to stay seated. An emergency treatment was initiated consisting of a single daily dose of antihistaminics (12 mg of chlorphenamine maleate for 3 days), to provide relief for the redness and swelling of the skin, and, painkillers (ibuprofen 400 mg) to ease the pain. The erythematous topical lesion was treated later with Benadryl cream (1%) for one week. To date, some hyperpigmentation on the affected area is still present (Figure 3).

Figure 1: A mauve-pink jellyfish characteristic for Mediterranean Sea and seen on Maltese coast (*P. noctiluca*)
Source: http://en.wikipedia.org/wiki/Pelagia_noctiluca

Delayed symptoms: Although the localized rash and edema at the forehead region eased after a couple of hours, the patient experienced massive eye swelling 72 hours later, probably a delayed reaction to exposure to *P. noctiluca* venoms. On day 4, he was started on 10 mg prednisone daily for 3 days reducing to 5 mg for 2 days before stopping (i.e., a 5-day course). The dosage and duration took into account his underlying diabetes condition and in particular his sudden hyperglycemia after the incident, as described below.

Diabetes complications: This man has also type I diabetes. Usually, his glucose control is very good (average HbA1c level, in last year, around 7.2%), but after being stung he experienced an immediate and severe hyperglycemic reaction. His glucose levels varied from 9 mmol/L to 13 mmol/L during the day, and, 12 mmol/L to 16 mmol/L before breakfast with no changes in his diet, levels of physical activity or diabetes medication. Glucose levels did not normalize later despite him significantly increasing his daily intake of fast insulin (humalog) and basal insulin (lantus) from 32–40 IU/mL and from 50–56 IU/mL, respectively (tailored to pre-meal and before bed readings). Importantly, these changes occurred before the patient was started on prednisolone. Once steroid was commenced on day-4, the patient monitored blood glucose levels and adjusted insulin doses even more closely; however, both blood glucose and insulin

Figure 2: The jellyfish sting causing an evident erythematous topical lesion in the forehead (a few hours after initial treatment received).

Figure 3: Residual skin hyperpigmentation in the affected area (a few months later).

requirements only returned to normal at the end of the first week, once local and general symptoms related to the jellyfish sting eased (at which point the patient was still taking prednisolone). The hyperglycemic episode did not require hospitalization.

DISCUSSION

Pelagia noctiluca is known for its potent venom [6]. The characteristic delayed histological features found in such cases are dense superficial perivascular infiltrate of lymphocytes and eosinophils associated with edema of the papillary dermis, for which it has been suggested Langerhan's cells and T lymphocytes may play a central role [7]. The skin lesions seen on this patient were a result of contact with this particular cnidarians.

Systemic complications after someone is stung by *P. noctiluca* are reported to be infrequent [5]. The pain produced in this patient might be due to the reaction of exogenous or endogenous mediators on cutaneous nerves most likely due to a kinin-like factor [7].

These marine species are known to express strong cytotoxic properties [8]. The mechanisms whereby the venoms of *P. noctiluca* induce the cytotoxic effect are still not fully understood. Although some in vitro studies suggest its toxins may induce oxidative stress, it is not clear how this could lead to further metabolic changes in diabetic patients [9]. However, the available evidence suggests that hyperglycemia is known to develop as a normal and protective response to stress and trauma [10]. We hypothesize that in this case, the stress response to jellyfish trauma triggered a metabolic reaction raising plasma catecholamines and glucocorticoids, which in turn led to the short lived though significant episode of hyperglycemia [11]. Similar changes have been described in patients with burns and other serious injuries [12].

Although jellyfish stings are common, many general practitioners and other clinicians are unfamiliar with their management. Cutaneous injuries by any cnidarians have a myriad of clinical presentations but most are self limiting and only require symptomatic treatments that include simple steps to deactivate the nematocysts and control the pain. Dealing with delayed reactions and systemic complications often require specific measures of control and in more complex cases hospitalization [13, 14].

CONCLUSION

As per our experience with this case any diabetic patient stung by one of these marine creatures should also monitor carefully their glucose control, particularly if they experience severe local reactions or systemic symptoms. Supplemental and/or correctional insulin may be required to control hyperglycemia. It is possible that patients with other endocrine conditions may experience similar disturbances in their metabolic control.

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Author Contributions

Laidon Shapo – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Lance Saker – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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