"Morbakka" - Another Cubomedusan

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ABSTRACT

There is a large member of the cubomedusan family, which has not yet been formally identified, that is very similar to *Tamoya haplonema.* It is present in lndo-Pacific tropical waters but is also present in colder Australian waters. A case of severe envenomation in South Queensland is discussed and its clinical and histological features are described. Vinegar inactivates the undischarged nematocysts of this species and is recommended as the initial first-aid treatment.

INTRODUCTION

With the increasing awareness by the tourist industry of the problem with venomous jellyfish in Northern Australia, a media report last year that a "box jellyfish" had been found in Moreton Bay, South Queensland, came as a shock. The jellyfish in question, although of the Order Cubozoa, was not the deadly *Chironex fleckeri,* the "Northern Australia box jellyfish", but a species that has not yet been formally identified, but is similar to - and often incorrectly referred to as - *Tamoya haplonema.* In a recent letter to the Journal, Southcott suggested that the name "Morbakka" might be used for the jellyfish until the taxonomy has been clarified.

The name "Morbakka" is derived from "Moreton Bay carybdeid medusa" as several specimens have been described and a number of envenomations reported in that area. However, specimens have now been seen and reported by various persons from Moreton Bay in the south to Port Douglas in the north although as yet there has been no formal identification or research.

On April 18 and 23, 1985, two large "Morbakka" specimens were found in Mackay Harbour. The larger specimen was 130 mm in diameter across the body of the bell; the height of the bell was 180 mm. The other specimen was 120 mm in diameter, and had a bell height of 150 mm.

Each specimen had four large mauve tentacles, one attached to each corner of the bell. The tentacles on the larger specimen were well preserved and reached a length of 600 mm when extended, although they contracted to a length of 200 mm. After preservation in 10% formalin and seawater they contracted even further to just 60 mm. The tentacles were ribbon shaped, 10 mm wide but only 3 mm thick. They had a multiple transverse bar pattern similar to, but much larger than, that of *Chironex fleckeri.* Unlike that of *Chironex,* the centre canal in the pedalium did not have the "hook" or "rose-thorn" appearance.' Also, unlike *Chironex,* the bell was covered with numerous warty mauve mamillations. Each of these contained hundreds of nematocysts (stinging cells), which were capable of causing even the thick skin of the palm to "tingle" when the animal was picked up. The bell is transparent in the natural state but after preservation in formalin and seawater becomes completely opaque.

Although there has been some confusion and revision of the taxonomy of the carybdeid jellyfish, including that of the *genus Tamoya,* our specimens agree in most major characteristics with the descriptions of *Tamoya haplonema* Muller. 1 The exception lies in the absence of gastric cirri on the stomach walls, although Uchida regards this loss as a normal developmental phenomenon in larger *Tamoya.* Southcott reported a previously undescribed large carybdeid, that lacked gastric cirri, and was seemingly identical to the ones described in this article, but its taxonomy has never been resolved.'

The specimens that were caught in Moreton Bay are smaller than those that were caught in Mackay Harbour, although they are of a similar species. The specimen that caused the severe case of envenomation that is described in this article could not be caught and identified positively. However, the description of a specimen seen at the time of the envenomation of the young girl in Moreton Bay, the appearance of her sting, the burning sensation of the skin where she had been stung and the subsequent clinical features closely resemble those associated with the specimens caught in Mackay Harbour and identified in this paper as , Morbakka".

Clinical record

At 11.00 a.m. on January 20, 1984, while swimming with her father at Margate Beach, Moreton Bay, in murky water one metre deep, a 12-year-old girl was stung by a "Moreton Bay Stinger". At the time there was a strong on-shore wind.

She dived under the water and on surfacing she immediately complained of "pin-pricks all over her shoulder". Putting her hand to her neck and shoulder she pulled off a long tentacle that disappeared under the water. She described the tentacle as slightly white and translucent, as long as her arm, and as thick as a telephone cord. The jellyfish was seen by her father who immediately identified it visually as *Tamoya* from photographs that he had seen beforehand and confirmed this by checking afterwards.

Initially, the skin had raised white wheals with a surrounding red flare, which was photographed seven to 10 minutes later. The predominant symptom at this time was a severe "burning" pain, which lasted for almost 24 hours.

Within half-an-hour, the girl had developed a cough, backache and a feeling of a lump in the throat - symptoms which lasted for the next 24 hours. Paracetamol (500 mg) and dexchlorpheniramine maleate (2 mg) were given by mouth. They had little effect apart from that of sedation.

The skin lesions were basically unchanged 24 hours later, but had stopped burning and had become somewhat itchy. They were also tender to touch. The lesions became paler by the third day after envenomation and had a papulovesicular appearance, which persisted to the 10th day.

Laboratory investigations

To permit detailed investigation of the effects of the "Morbakka" sting under controlled conditions, envenomation from the specimen caught in Mackay Harbour was undertaken in a laboratory setting.

A mark was made on the forearm of the subject years in research projects, with no allergic with no history of allergy' and a photograph taken responses. of the normal appearance of the skin in this area. A piece of tentacle 20 mm long by 10 mm wide, The subject had been exposed to the sting of a with a thickness of 3 mm, was placed on the inner *Chironex fleckeri* on several occasions in previous aspect of the forearm where there were very few hairs. The sting was not painful but felt distinctly prickly". The tentacle piece was left on for three minutes, occasionally being pressed on to the skin to facilitate the discharge of nematocysts. The tentacle piece was then removed and a skin scraping taken by scraping a razor blade over the skin several times at a 90 degree angle. The scrapings were placed on a glass slide and examined microscopically for nematocysts. The tentacle was embedded in wax and also examined microscopically.

RESULTS

When the tentacle piece was removed it left a small, red, raised wheal with the same dimensions. In a band 20 mm around this wheal a marked "capillary flare" or erythema was present. Over the next 30 minutes the central wheat remained raised, but the colour faded until it became white. The surrounding erythema seemed to become more intense in colour and numerous “punctate" lesions of less than 1 mm in diameter formed up to 10 mm around. It looked as if the skin was burning and so perhaps the name "fire jelly" is apt! A punch biopsy was taken at this stage from the edge of the envenomated area.

Over the next two hours the central area where the tentacle had been in contact with the skin became red again and remained slightly redder than the surrounding erythema. A second punch biopsy was taken after two hours. There had been no systemic effects during this time.

The envenomated area remained red and itchy for three days before the itch became less troublesome; the skin remained raised and red for two weeks and so a third biopsy was taken at 14 days. The redness slowly faded during the third week until nothing was visible a month after the original envenomation.

Histological examination of the punch biopsy of the skin taken at 30 minutes after envenomation showed oedema of the papillary dermis with dilatation of the superficial vessels only. However, in the second biopsy taken 90 minutes later, small numbers of eosinophils, some degranulated, were present around the vessels. In this later specimen, occasional thread tubes (which connect the nematocyst to the barb) could be seen penetrating the epidermis and dermis as far as the superficial vessels. At the site of penetration the squamous cells had undergone eosinophilic necrosis and, in the dermis, Collagen fibres around the thread tubes appeared to be disintegrating.

The final biopsy 14 days after the original laboratory envenomation showed a superficial and deep perivascular lymphohistiocytic infiltrate which contained small numbers of eosinophils and was similar to the reaction seen in coral dermatitis and some arthropod bites.

Use Of vinegar

Preliminary experiments have been carried out (RJH) to determine the effectiveness of in vitro discharge assays with chemical stimulants that were previously described by Hartwick for nematocysts of *Chironex fleckeri and Physalia physalis. The* results indicate a similar inactivation effect in the "Morbakka" after brief immersion in vinegar.

Although not yet confirmed by clinical studies, there is evidence in the cases reported here, and in others, that the severity of the stings, particularly with regard to systemic effects, is dependent on the amount of venom injected, and that adherent tentacles can cause secondary envenomation to occur after the initial sting. The application of vinegar is therefore indicated as a first-aid measure for stings by "Morbakka" in order to curtail further envenomation. As has previously been pointed out in the case *of Chironex* stings no other beneficial effects of vinegar application have been documented, and its use does not preclude other measures to relieve local or systemic symptoms that may arise from the initial sting.

DISCUSSION

Currently confusion exists in the use of the term "box jellyfish". To many people it means the deadly *Chironex fleckeri* that has been responsible for over 50 deaths to date in Australian tropical waters. To others in Western Australia it means the "Jimble" or *Carybdea rastoni.* To marine biologists the term applies to all members of the Order Cubomedusae (or even Class Cubozoa), which is comprised of jellyfish that have four corners from each of which arises one to 15 tentacles. The term "sea-wasp", which is also often used to describe *Chironex fleckeri, has* also been used to describe *Tamoya.*

This paper discusses a species that has not yet been formally identified but for which the name "Morbakka" has been suggested. It is similar in many ways to *Tamoya haplonema.* However, as it lacks the gastric cirri described in 1859 by Muller in his specimens from the Atlantic it may need a genus of its own and we await further developments in this difficult field. Nevertheless, it, is another type of "box jellyfish" that is found in Queensland (as far south as Brisbane) and is more prevalent than is generally realised.

The "Irukandji" *(Carukia barnesi) is* another species that was described by a non-scientific name for many years until its true identity was clarified. It is a Carybdeid, similar in some respects to the "Morbakka" and has the single tentacle from each pedalium, although it is much smaller (bell, 2 cm in diameter and 2.5 cm in height). In spite of its size its sting has severe systemic effects which characteristically start about half-an-hour after envenomation; the actual sting may even be missed as it is so mild and only leaves a small, pale red area on the skin but later develop an impending sensation of doom. They suffer severe backache and often its victims feel "terrible", often with abdominal and chest pains together with nausea and vomiting. Limb and body pains are often present as is severe headache and, occasionally, difficulty in breathing. The number of envenomations caused by the "Morbakka" is not known, but in those that have been documented patients have complained of significant localised pain and a burning feeling in the skin, which later becomes an irritating rash. In the event of any doubt skin scrapings from the tentacle contact area may show the typical nematocysts but, if vinegar has been used to inactivate the tentacle, it might make it difficult to find the nematocysts microscopically (the late Dr J. Barnes, personal communication). The sting may also be accompanied by systemic effects such as cough, backache and throat discomfort. As yet no envenomation by the "Morbakka" has proved fatal in Australia. Reports that "Morbakka" have caused death in other countries have yet to be substantiated; investigation is being undertaken to document further the effect of cubomedusan stings in South East Asia.

Vinegar is efficient in disarming undischarged nematocysts in the adherent tentacle and thus prevents further envenomation. This role of vinegar is already proven for other species of jellyfish." As it is non-flammable it is safe to use, and being cheap and readily available is strongly recommended as immediate first - aid treatment on the beach.