

## Severe Irukandji-like jellyfish stings in Thai waters

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### Key words

Envenomation, jellyfish, marine animals, case reports

### Abstract

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Over recent years, there have been more widely-reported sightings of chirodropids and carybdeids in Thailand. There has also been an increased awareness and documentation of fatal and severe non-fatal jellyfish stings occurring in Thai waters. Although the victims are usually swimming or wading in shallow water, divers are also at risk. Despite generally wearing some protective coverings while diving in the tropics, parts of a diver's body often remain exposed, and divers can and do sustain severe and/or life-threatening jellyfish stings. In December 2007 and January 2008, two serious cases of envenomation in divers in Thailand were reported to Divers Alert Network Asia-Pacific (DAN AP). Both of these victims displayed some typical symptoms of an Irukandji-like syndrome. Similar to Australia, appropriate measures need to be taken by the Thai authorities to warn locals and tourists alike of the possible presence of dangerous jellyfish, and suitable prevention and management strategies need to be established and implemented to minimise morbidity and mortality.

### Introduction

Cubozoans are cuboid jellyfish (box jellyfish) consisting of two main groups (Classes):

- Chirodropids – box jellyfish with multiple tentacles arising from each of the four lower corners of the bell. Their deadly venom has caused human fatalities throughout tropical waters worldwide.<sup>1-5</sup>
- Carybdeids – box jellyfish with just one tentacle arising from each corner; may measure just a few millimetres to 250 mm bell size. Many of these species can produce symptoms of the Irukandji syndrome (see below).

Various chirodropids occur throughout the tropical waters of the Indo-Pacific Ocean: westwards to the Maldives; eastwards through southern India, Myanmar, Indonesia, the Malaysian archipelago (east and west coasts), Gulf of Thailand, Cambodia, Vietnam, Brunei, Sarawak, Sabah, the Philippines and Solomon Islands; and northwards from the Tropic of Capricorn in Australia to Okinawa, Japan.<sup>4,6</sup> Chirodropids appear mainly in the summer months in their northern and southern geographical regions – often during the local rainy cyclonic or monsoonal area. They are most commonly found around sandy beaches close to mangrove areas. Their season is longest at the equator, where they may be present throughout the year, to just summer months as they extend down further towards the tropics.<sup>3</sup>

Serious and sometimes fatal jellyfish stings have always occurred in the Indo-Pacific, including Thailand.<sup>7,8</sup> The greatest risk is to the indigenous people whose existence includes fishing and gathering marine animals from the surrounding seas as part of their staple diet. Regularly facing dangers such as venomous snakes and marine animals is inherent in their day-to-day life, and a fatalistic approach is normal. Such deaths are not publicised and relatively unknown and are usually only discovered after diligent

local research.

Carybdeids are also present in these areas and are responsible for serious envenomation, often resembling an Irukandji, or Irukandji-like syndrome. The basic Irukandji syndrome symptoms include severe low back pain, generalised muscle cramps, vomiting, sweating, anxiety, headaches and palpitations. A severe Irukandji-syndrome also occurs with extreme hypertension and/or toxic heart failure. These symptoms, although somewhat bizarre, are accountable – Irukandji venom produces potent sodium agonist catecholamines, particularly noradrenalin, from the synapses of the autonomic nervous system.<sup>9</sup> Less commonly, severe autonomic dysfunction and/or distressing neuropathic pain particularly in the jaw and the lower legs may be experienced.<sup>10,11</sup>

Early reports of the Irukandji syndrome in divers came from north Queensland in Australia.<sup>12</sup> However, since then, DAN AP has received correspondence from divers who have suffered Irukandji-like symptoms after diving in Thailand, Indonesia, and the Philippines. In December 2007 and January 2008, two serious cases of envenomation, both occurring in Thailand, were reported to DAN AP, both cases displaying some of the more serious characteristics of an Irukandji-like syndrome. Both divers gave permission for their cases to be reported.

### CASE 1

The first case involved a 35-year-old experienced dive instructor, diving off the island of Koh Tao. At the safety stop, he hung his left arm over the mooring line to support his camera. He then surfaced, boarded the boat, pulled down his wetsuit top, and felt a stinging sensation like a cigarette burn on his inner elbow left arm. Here there was a small, raised red mark. One to two minutes later, the pain moved

up his arm and he had “waves of a strange sensation” across his upper and lower back. He describes “*the wind blowing across my shoulders and being incredibly sensitive to it to the point of pain*”. Two to three minutes after the initial sting, the pain radiated to his lower back, becoming more intense and then spreading down his legs. He became weak in the legs, having to kneel down, and then had difficulty breathing and started to get severe chest pain. By 3–5 minutes the breathing difficulties increased and the pain became “*unbearable*” – he was unable to talk, his body felt “*heavy*” and he was unable to move.

Forty-five to 60 minutes later he arrived at a ‘treatment clinic’. He was able to talk but still had moderate chest pain and lower back pain. Staff felt and heard an irregular heart beat and so he was evacuated to a hospital. During the trip he had an altered state of consciousness, waves of pain and difficulty breathing; later he was unable to remember much in this period. On arrival at the hospital emergency ward, the examining doctors suspected a heart attack due to chest pain and irregular heart beat shown on ECG. Blood tests showed no enzyme rise suggesting infarction, but high levels of creatinine, previously reported in some Irukandji, or Irukandji-like stings, suggesting some cardiac stress.<sup>10</sup> Treating doctors felt it was a severe allergic reaction to the envenomation. Treatment consisted of IV 5% glucose and ‘analgesia’ (unknown agent). The next day, he felt better, with reduced chest and muscle pain but he now had jaw pains (attributed to clenching his teeth the previous day).

After two months, he continued to experience shooting pains, had altered sensation on his shins and tired very easily, needing much more sleep than normal. Even a year later, he still experienced recurring leg pain with altered sensation on his shins, chest discomfort and general exhaustion.

#### CASE 2

The second case involved a very fit 40-year-old British tourist diver who was diving near Pattaya. He was wearing a sleeveless suit without hood. While ascending from the dive up an ascent line, he suddenly felt a sharp pain on the back of his head. Reaching back, he felt a tentacle which became caught in the current and wrapped around one arm, and then the other. He described the pain as burning and very severe, scoring it at 10/10 on the pain scale. The tentacle was around 70 cm long, a brownish appearance with tinges of purple and with white spots. The victim immediately went to the surface and was helped onto the boat where staff promptly poured vinegar over the wound area and removed the remaining traces of tentacle.

He soon became nauseated, began to vomit and had severe epigastric abdominal cramps, the pain again scored at 10/10. He began to shiver, developed a bad headache, felt very dizzy, experienced tightness across the chest and became dyspnoeic, followed by a brief period of unconsciousness. He was placed on oxygen but continued to suffer from

**Figure 1**  
**The arms of Case 2, with an obvious tentacle mark over the left antecubital fossa; the offending tentacle is likely to have come from a large carybdeid**



vomiting, severe abdominal cramps and arm and head pain while he was being rushed to hospital by boat and then bus. He described his symptoms as “coming in waves”; all typical of the Irukandji syndrome.

On admission to hospital some three hours after being stung, he was hypertensive, still complaining of epigastric abdominal cramps. There were spiral erythematous marks with surrounding inflamed painful skin lesions over both arms and scalp. (Figure 1). After analgesia and anti-inflammatory medication (unknown agent), the head and arm pain decreased but he still had abdominal colic. He was discharged after 18 hours and returned to his hotel room at noon. However by 1600, the severe abdominal cramps returned; he vomited blood and returned to hospital, where hyoscine butylbromide 20 mg iv; metoclopramide 20 mg iv; pethidine 50 mg iv; esomeprazole 40 mg iv 12 hourly; cephalixin 500 mg q.d.s.; fexofenidine 60 mg b.d. and betamethazone-N cream were administered. He was discharged the following day and made a slow but steady recovery over a period of several weeks.

#### Discussion

These stings, although similar to the “basic” Irukandji envenomation, had further symptoms that have been reported and are not “the usual” Irukandji syndrome (author, PJF database of case studies). Case 1 had severe neuropathic pains (autonomic neurotoxicity).<sup>13</sup> Neuropathic pains are often helped by medication such as pregabalin, and this would be worth consideration to help reduce or prevent this very unpleasant feeling.<sup>14</sup> Jaw pain and burning leg pains have been described in severe Irukandji-like stings and are neuropathic in origin.<sup>11</sup>

News of fatalities and severe stings appears sometimes to be suppressed by tourism bodies and operators in the more

underdeveloped countries, concerned about the impact on their businesses and the local economy. Also, unlike Australia's comprehensive world news coverage, any reports of fatal jellyfish stings are far less likely to be publicised, unless the fatality involves an overseas tourist in which case foreign media may become involved.

However, in more recent times, when foreign tourists receive severe stings, especially if they are fatal, with worldwide media via the internet and similar facilities, the facts are rapidly transmitted worldwide. In addition, DAN AP has actively been canvassing its members and others in the diving community, to notify any serious stings and to send photographs of jellyfish seen during dives in tropical areas. The rapidly increasing publicity occurs much to the discomfort of tourism and government officials who are suddenly presented with events of which they had little or no previous knowledge. Recently in Thailand, there have been ongoing crisis talks with government officials, tourism chiefs, and Australian jellyfish experts, trying to deal with the publicity of a spate of deaths and severe stings from jellyfish and, hopefully, to establish management systems to try to prevent stings and better manage those that do occur in the future.

### Conclusions

Both chirodroids and carybdeids are present in Thai waters; as such, severe and sometimes fatal stings do occur. As most divers do not wear full body protection while diving in the tropics, they, like other water users, are exposed to the risk of serious envenomation. Stings and even fatalities will never be prevented. However, the old maxim, 'prevention is better than cure', means that tourists must be made aware of the danger and alternatives made available to them, as is done in Australia. Honest and accurate educational material needs to be freely available and provided by all tourism agencies arranging holidays in Thailand and all countries in the Indo-Pacific region where the problem exists. Similar educational materials should be freely available at airports and resorts. Beaches should have restricted access with walkways leading down to them and signs warning of the possibility of dangerous jellyfish should be displayed in all languages of tourists using that resort area and/or translation easily available by digital access; the language should include phonetic. Vinegar should be made freely available on all beaches and provision of stinger-resistant nets and suitably trained lifeguards will greatly reduce the possibility of stings. For areas where nets are unavailable, swimming pools will make excellent substitutes. If people insist on swimming or entering the water in high-risk areas for snorkelling, diving, water skiing and other in-water activities, lifeguards and the provision of protective clothing by tourism operators should be considered mandatory. Such measures would greatly reduce the possibility of a fatality and are unlikely to detract from tourism, indeed they may well enhance it due to the safety measures provided.

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