

CARUKIA BARNESI AND THE 'IRUKANDJI SYNDROME'

The Irukandji (Carukia barnesi) - Ecology

The 'Irukandji is a small 'box jellyfish that occurs in tropical Australian waters from the Agnes Water area in central Queensland, northwards around the north Australian coast and as far south as Broome in Western Australia. Although it is often found in deep water, swarms may often be brought to the surface at swimming beaches, where multiple stings may occur in summer months. The bell is transparent and only 2.5-3.5cm in diameter, making it almost impossible to see in the water. There are just 4 tentacles, one in each corner. When contracted these tentacles may be just 5-7cm but they may extend to some 60-70cm when the Irukandji is 'fishing' for its prey of small fish.

Nothing is currently known of its life cycle, but recently it has been found early in the season in river outlets. The first was in October 1996 when a fisherman found 7 specimens just inside the rock wall of the Pioneer River just before it joins the sea at Mackay, North Queensland. The second was 26 November 1997 when a lady, brought 4 small carybdeids into the author. They looked like Irukandji and so were rapidly frozen. Study of their nematocysts suggested that they were Irukandji (PJF) and later they were sent to Melbourne to the Australian Venom Research Unit where their identity was confirmed by venom study. She caught them off a small pier at the bottom of her garden, which backs on to Slade Point Inlet, 5k north of Mackay Harbour - a light on her jetty shines into the water and she saw hundreds but caught just a few. Despite repeated attempts since, no more have been found. It is possible that, like Chironex fleckeri, the Australian box-jellyfish, they have the early part of their life cycle in creeks or rivers.

Initial envenomation

The mark on the skin is usually the imprint of the jellyfish bell, making it very difficult, if not almost impossible to see; less often, tentacle marks may be seen. A couple of moments after the usual sting from the bell, the skin may develop a mild redness and a 'goose-pimple' effect which may last from 30 minutes or so - in some cases this initial sting may be totally missed. The reddish imprint, if visible, may last several days.

After the initial sting there is a characteristic time delay before the onset of the severe systemic symptoms which comprise the Irukandji syndrome. The delay varies between 5 and 50 minutes, but is characteristically 30 minutes after the initial envenomation.

Irukandji syndrome

After this initial time delay a bizarre set of distressing systemic symptoms occurs. The syndrome always has two recognised clinical sequelae - in some cases the third is also present:

1. Pain
2. Adrenaline-like effects
3. Heart effects

A victim may have any combination of the following signs and symptoms, but always has the severe muscle cramps:

1. Pain

a) Low back pain

A severe 'boring' pain in the sacral area;

b) Muscle pains or 'cramps'

That move rapidly into all 4 limbs and the abdominal and chest wall muscles. The pain is described as severe, unbearable and coming on in 'waves' (similar to labour pains) - although never fading completely;

c) Chest pain or 'tightness'

This is caused mainly by spasm of the intercostal muscles. There has been no bronchospasm demonstrated; cardiac muscle pain has not been excluded, especially as in more severe cases enzyme levels rises in the blood suggest cardiac muscle damage. However, chest pains also occur without the enzyme levels rising.

2. Catecholamine excess

Many of the signs and symptoms associated with the Irukandji syndrome resemble those of a severe fright, when adrenaline and other similar chemicals flood into the blood stream, causing the typical fight or flight syndrome.

Sweating - This may be localised or generalised. In severe envenomation the sweating is usually profuse and drenching. If the sweating is localised, it may be at the site of envenomation - or a body area that is totally unrelated to the initial sting.

Piloerection - hairs standing on end . This may be localised or generalised. Again, similar to the sweating, it may be at the original site of envenomation, or an area totally unrelated;

Anxiety and 'wretchedness - The victim is usually over-anxious . They feel absolutely dreadful and often have 'a feeling of impending doom (a thought often shared by the treating first aider!);

Restlessness - Victims are restless and move continuously. They may roll around on a couch where they are lying, or may sit up or even walk around the room, trying unsuccessfully to get comfortable. This is both part of the syndrome, and aggravated by the severe muscle pains;

Headache - This is usually severe, either in the front of the head, or all around it, and may be incapacitating;

Nausea - This is often severe with continuous vomiting

Increased respiratory rate - Respiration is often of a 'sighing nature , and more rapid than usual

Tremor - A fine tremor, or rippling of the small muscles of the limbs may be present;

Pallor, or peripheral cyanosis - The skin may look very pale due to the shutting off of the blood vessels to the skin;

Oliguria - A reduced urine output due to reduced blood flow to the kidney and fluid loss from the sweating and/or vomiting;

Tachycardia - The heart rate is often fast and may be irregular with ventricular extra-systoles (extra beats);

Hypertension - The blood pressure may reach levels as high as 280/150mm Hg in people whose blood pressure was previously in the normal range (about 120/80);

Cerebral oedema - A case has recently come to light where swelling of the brain, causing unconsciousness. This has only been reported on one occasion.

3. Later complications

Cardio-pulmonary decompensation (heart failure)

Acute pulmonary oedema (fluid on the lungs) - Sudden breathlessness may develop in victims with the Irukandji syndrome, usually some 15-18 hours after the initial sting (occasionally less). This has proved to be acute pulmonary oedema, or fluid on the lungs. To date the exact cause is not known, but it has been shown that the heart becomes very inefficient and does not beat strongly enough. This allows fluid to build up in the lungs, making the victim feel very short of breath. This breathlessness may be life threatening in the most severe cases.

Possible confusion with other medical problems

1. Myocardial infarction (Heart attack)

Cases with the initial chest pain of the Irukandji syndrome have been misdiagnosed as an acute myocardial infarction. This would especially be the case if pulmonary oedema developed, mimicking a heart attack with developing heart failure. This may be reinforced by a history of swimming (exertion), especially if the history of a mild sting is not forthcoming, or is forgotten by the victim.

2. Decompression sickness

The Irukandji syndrome in a diver also resembles decompression illness (DCI), and may present a difficult problem for diagnosis. There has only been one report of an envenomated diver who has actually seen an Irukandji. However, even then the syndrome was not recognised and confused with decompression sickness for some hours, before the actual cause was diagnosed. There have also been a number of cases from the Great Barrier Reef when the DES (Diving Emergency Services) have been phoned when, a short time after surfacing, a diver suddenly develops severe low back pain, chest pain ('trouble breathing) and becomes distressed and restless.

A high index of suspicion and careful questioning is needed. A history of a minor sting, often on the back of the neck when surfacing, a small mark, often difficult to see, and/or careful differentiation of the symptoms is necessary. All this may have to be conducted over a radiotelephone from a dive boat on the reef to the DES phone Base in Adelaide - no easy task.