

jellyfish (*Chironex fleckeri*) cardiotoxin to intravenous administration of verapamil. *Med J Aust* 1983; 2: 192-194.

7. Burnett JW, Gean CJ, Calton GJ and Warwick JE. The effect of verapamil on the cardiotoxic activity of Portuguese man-of-war (*Physalia physalis*) and the sea nettle (*Chrysaora quinquecirrha*) venoms. *Toxicon* 1985; 23: 681-689.
8. Olson CE, Cargo DG, Calton GJ and Burnett JW. Immunochromatography and cardiotoxicity of sea nettle (*Chrysaora quinquecirrha*) polyps and cysts. *Toxicon* 1985; 23: 127-133.
9. Olson CE, Heard MG, Calton GJ and Burnett JW. Inter-relationships between toxins: studies on the cross-reactivity between bacterial or animal toxins and monoclonal antibodies to two jellyfish venoms. *Toxicon* 1985; 23: 307-316.
10. Burnett JW and Calton GJ. Recurrent eruption following a solitary envenomation by the Cnidarian *Stomolophus meleagris*. *Toxicon* 1985; 23: 1010-1014.
11. Portier P and Richet C. De l'action anaphylactique de certains venins. *Comp Rend Soc Biol (Paris)* 1902; 54: 170-172.
12. Hartman KR, Calton GJ and Burnett JW. Use of the radioallergosorbent test for the study of coelenterate toxin-specific immunoglobulin E. *Int Arch Allergy Appl Immunol* 1980; 61: 389-393.
13. Gour PK, Calton GJ and Burnett JW. Enzyme-linked immunosorbent assay to detect anti-sea nettle venom antibodies. *Experientia* 1981; 37: 1005.
14. Russo AJ, Calton GJ and Burnett JW. The relationship of the possible allergic response to jellyfish envenomation and serum antibody titres. *Toxicon* 1983; 21: 457-480.
15. Burnett JW, Cobbs CS, Kelman SN and Calton GJ. Studies on the serological response to jellyfish envenomation. *J Am Acad Dermatol* 1983; 9: 229-231.
16. Burnett JW, Hepper KP and Aurelion L. Lymphokine activity in coelenterate envenomation. *Toxicon* 1986; 24: 104-107.
17. Burnett JW, Calton GJ and Burnett HW. Jellyfish envenomation syndromes. *J Am Acad Dermatol* 1986; 14: 100-106.
18. Mjorndal TO, Chesrown SE, Frey MJ, Reed BR, Lazarus SC and Gold WM. Effect of beat-adrenergic stimulation on experimental canine anaphylaxis in vivo. *J Allergy Clin Immunol* 1983; 71: 62-67.

Dr John Williamson's address is MSO Box 5695, Townsville QLD 4810, Australia.

## THE MANAGEMENT OF STINGS BY JELLYFISH, OTHER THAN CHIRONEX

Peter Fenner

The term cubomedusan, simply translated, means box shaped jellyfish. There are so many box shaped jellyfishes that the deadly North Australian box jellyfish should always be referred to by its generic name of Chironex. This would then save any confusion from the terms box jellyfish or stingers, so loosely used by North Queenslanders for the deadly *Chironex fleckeri*. There have been recent problems with the Irukandji (*Carukia barnesi*) and the Morbakka, both of which are box jellyfish.

All types of jellyfish are derived from the Phylum Coelenterata and the biological classification for cubomedusans discussed in this article is presented on the next page.

Cubomedusans can also be simply classified as those with only four tentacles, ie. having only one tentacle per pedaliem (corner) and those with many tentacles at each corner.

### PREVENTION OF MARINE STINGS

The wearing of protective clothing helps to give protection against any sting. The new and popular "stinger suits" are ideally suited as the thickness prevents the thread tube, through which the venom is injected from the nematocyst, or stinging capsule, coming close enough to the skin to be able to puncture it to sufficient depth to reach underlying blood or lymph vessels.<sup>1</sup>

In the same way two pairs of pantihose, as used to be worn by northern lifesavers is just as effective although perhaps not as aesthetic! One pair is used normally, with the feet cut out (otherwise they fill with sand!) and the others are worn upside down with a head hole cut in the crutch and the arms fit into the legs of the pantihose.

### TREATMENT OF MARINE STINGS

Vinegar has been proven to prevent further firing of nematocysts on remaining adherent tentacles of most species, particularly the life-threatening ones such as *Chironex*.<sup>2</sup> It does not inactivate the nematocysts of *Cyanea* (hair jelly) or *Chrysaora* (Sea nettle which is found in the USA). As *Pelagia* (the little mauve stinger) is similar to these two species, vinegar may well be of little use in the treatment of its stings also.

Note that vinegar, when used as treatment for *Chironex fleckeri*, the North Australian box jellyfish, or any other painful jellyfish sting **DOES NOT HELP PAIN**. It only prevents more nematocysts firing off and so possibly causing further envenomation.<sup>2</sup>

### FOUR TENTACLED CUBOMEDUSANS

#### IRUKANDJI (*Carukia barnesi*)

This stinger is very much in the news recently as there have been many reported cases, far more than usual.

PHYLUM COELENTERATA  
CLASS CUBOZOA (Order Cubomedusae)



It is a very nasty little jellyfish! Or it may be a syndrome, ie. a number of similar symptoms, caused by a number of different types of jellyfish, presumably all cubomedusans!

Usually the bell is only 2 cm diameter and 2.5 cm deep although the tentacles may extend out to 65 cm! It is probably no more common than usual and the recent large number of stings may be due to two factors. The first is the normal periodicity. In some years they are much more common than usual and this year may have been one of those years. Many factors may influence this although one of the more likely ones is the climatic conditions. The second factor is the construction of stinger resistant enclosures. Normally people will not swim in the North in the summer months. However with the advent of the stinger resistant enclosure they were able to do with relative safety from the large and lethal Chironex, and so many people started swimming, only to be faced with stings from the smaller Irukandji. Presumably the Irukandji is small enough to get through the protective mesh on the outside of the enclosure.

### Sting and symptoms

The initial sting may often be disregarded as being a minor skin irritation although some are described as being a somewhat painful sting. Classically the symptoms start with backache about 20-40 minutes after the sting. This then usually progresses to severe backache, with muscle and joint pains and maybe abdominal pains and chest pains. In the past has been mistaken for a heart attack and appendicitis!<sup>3</sup> Severe headache is often present along with severe nausea and vomiting. Patients often feel they "want to die". As the late Dr Jack Barnes once said, "I'd rather be stung by a small Chironex than an Irukandji."

The victim may be very restless, have localized sweating, particularly over the painful muscles and localized pilo-erection. They may have cold extremities, a decreased urine output and some also develop hypertension and/or cardiac arrhythmias.<sup>4,5</sup> As yet there have been no reported fatalities from an Irukandji

sting but there is a potential problem in the patient who is elderly or who may have heart problems and they should be assessed carefully.

### Treatment

As the initial sting takes place some time before the patient usually presents there are usually no nematocysts left on the skin and so treatment with vinegar is of little benefit. Some patients have very little reaction and only require re-assuring. Others may need admission to hospital for intramuscular analgesia or anti-emetics. Treatment may be needed to lower blood pressure in some patients.<sup>5</sup>

There is reason to believe that immediate rest after the sting may produce far fewer and less severe symptoms although this has not yet been proven in practice. However, because the sting is often mild, the patient often continues to exercise.

My personal experience has shown that anti-histamines, and cortisone injections do not help at all. However a trial of Chironex fleckeri anti-venom gave pain relief within 2 minutes, and this lasted for up to 30 minutes before pains started to become severe again. Intravenous and intramuscular pethidine had the effect of stopping the severe pain but the patient was still aware of a discomfort coming on in waves for several hours later.

The use of Chironex fleckeri antivenom is not recommended as it produces only a transient effect. It is also too expensive for routine use, costing \$50 per ampoule), and it has the potential for anaphylaxis, although it must be stressed that no case of reaction has been seen as yet after many years and several hundred ampoules used. Furthermore pethidine is extremely effective in pain relief although very high doses need to be used at times, often necessitating the use of a drip to control the dose to achieve pain relief without side effects. I suggest 25-30 mg per hour after the initial dose which is approximately 50 mg intravenously for an adult.<sup>5,6</sup>

All the above symptoms seem to be related to the excessive release of catecholamines and this led to the recent use of phentolamine, an alpha adrenergic blocker. A paper detailing the use of these treatments has recently been prepared for publication and further details should be available later.<sup>5</sup>

### MORBAKKA

Previously referred to as the Moreton Bay stinger, or the fire jelly. Also wrongly classified until recently as *Tamoya haplonema*.<sup>7,8</sup> It looks similar to *Irukandji* except that it is much larger. The bell may measure up to 12 cm across and 16 cm deep and the tentacles, one in each corner, may be up to 1 metre in length and as thick as the flat 3 core electric cable used by electricians wiring houses. The bell is covered with pinkish looking mammillations which are clumps of nematocysts and so envenomation can also occur by handling the bell.<sup>8</sup> Fortunately the symptoms are not as bad as those of *Irukandji* despite the much larger size of the *Morbakka*. However the number of recorded stings is low with little documentation and more symptoms may be confirmed in the future.

#### Sting and symptoms

Called the fire jelly the *Morbakka* lives up to its name. The area touched by tentacles is covered with raised white wheals with a bright red erythematous flare. The skin looks as if it is on fire and the sting area is very itchy and burns. Other symptoms include a cough, lump in the throat and mild backache.

#### Treatment

Tentacles and nematocysts are inactivated by vinegar within 30 seconds. Usually pain is relieved by simple pain-killers such as paracetamol and further treatment is unnecessary. However there are unconfirmed reports of respiratory depression and marked prostration and so the victim should be carefully monitored.

### JIMBLE (*Carybdea rastoni*)

Looks like a small *Chironex* except it has only the single tentacle in each corner. It may be up to 3.5 cm diameter across the bell and the tentacles may extend to 30 cm.

#### Sting and symptoms

It produces a painful welt with no general effects.<sup>1,9</sup>

#### Treatment

Vinegar neutralizes the tentacles although they are not usually adherent. Ice is the best for the relief of pain. There have been no reported systemic effects. The weal may sometimes break down in the centre a week or so later and these ulcers occasionally become infected.

## MULTI-TENTACULAR CUBOMEDUSANS

### CHIOPSALMUS QUADRIGATUS

The North Australian variety looks fairly similar to *Chironex* except that it is smaller, has finer more thread-like tentacles which are usually fewer in number

than *Chironex* of a similar size, and the pedalum, the corner of the box from which the tentacles arise, has a different configuration in the central canal. Inside the bell are smaller, more rounded gonads.<sup>11</sup> Probably it is not lethal but it causes severe localized pain and weals that look similar to *Chironex*.

The South East Asian variety is very similar to *Chironex* in size and appearance. It causes deaths in the Philippines, up to 30-50 per year, and probably elsewhere in South East Asia (reports from trips by Fenner and Williamson to the area in September 1985).

Differentiation between this species and *Chironex* is even more difficult and probably only noticeable to the trained observer. From personal observation they include the finger like gonads compared to the grape-like configuration of the gonads of *Chironex*, and the more gentle hook-shape central canal, more like a volcano, present in the pedalum.<sup>10</sup>

## UNKNOWN CUBOMEDUSANS

We do not know of all types of box jellyfish. There are probably many others and in the last few years we have had reported a couple of new ones about which nothing is known. One is a cubomedusan where the pedalum is divided into two with tentacles off each part. It was found in a juvenile form by Phil Alderslade, Director of Coelenterates of the Northern Territory Museum in June 1985. The other looks similar to the *Irukandji* (*Carukia barnesi*) or the *Jimble* (*Carybdea rastoni*) and was discovered by Bob Hartwick several years ago in Alma Bay, Magnetic island. It attaches to structures with a suction cap and has been responsible for several stings to divers although no systemic effects have been reported.

## OTHER COMMON JELLYFISH

### HAIR JELLYFISH (*Cyanea capillata*)

This is the world's most common jellyfish which may grow up to 2 metres diameter in the Arctic.<sup>1,8,11</sup> Fortunately it is much smaller in Australian waters although commonly specimens are found up to 35 cm in diameter. There were many around in north Queensland in the 1985/86 summer season. Described as a "mop hiding under a dinner plate" they have a centre cone of thick tentacles underneath the "blubber" and many fine tentacles trailing behind for several metres. They have a characteristic fishy smell from mucous produced by the tentacles.

#### Sting and symptoms

A florid sting with many white weals surrounded by a vivid red flare which fortunately looks worse than it actually is! After the initial fear associated with the sting and then the look of the skin the patient actually only complains of a mild local discomfort and has no real systemic symptoms.

#### Treatment

Usually there are no adherent tentacles but if any are present they should be washed off with sea water as recently vinegar has been shown to cause the

nematocysts of this species to discharge. However this is of little practical importance as the sting is not serious.<sup>12</sup> No other treatment is usually needed although ice applied locally may help the irritation.

#### **LITTLE MAUVE STINGER** (*Pelagia noctiluca*)

This is common worldwide but seems to be rare these days in north Queensland waters although there have been reports of two possible cases from Hamilton Island recently.

#### **Sting and symptoms**

The sting causes an irregular shaped weal looking like an allergic rash. There is often intense local pain at the site of the sting, and there may also be a cough and occasionally pain on breathing.<sup>9</sup>

#### **Treatment**

Normally there is no real danger to life. However an allergic reaction with near death has been reported from the eastern Mediterranean where these stings are common.<sup>13</sup> Ice should help the pain. The victim should be watched for signs of breathing difficulty. Vinegar is of doubtful value.

#### **BLUBBER** (*Catostylus mosaicus*)

This is fairly common around Australia. It has no actual tentacles. It has been described as "a mushroom wearing frilly knickers" and the "frills" sting!

#### **Sting and symptoms**

A mild sting with pins and needles only.

#### **Treatment**

The best treatment is locally applied ice.

#### **BLUEBOTTLE** (*Physalia physalis*)

This is not a true jellyfish (*Schizophoson*), but is a hydrozoan and is really a collection of animals rather than a single one.<sup>1</sup> One of the animals forms the floating air sac which is usually 3 to 6 cm in diameter but may grow to 15 cm. There are many intensely blue tentacles underneath and usually one of these is very long being up to several metres long. However there may be another species which has many long tentacles. Like everything else in the jellyfish world at present the taxonomy is in a state of flux.

#### **Sting and symptoms**

Usually these are lines of white, separate, weals with a surrounding red flare. There is quite marked localized pain and itching. Often there is quite a marked pain in the lymph glands draining the stung area.

Large stings may cause nausea and vomiting, drowsiness and occasional pain on inspiration.<sup>9</sup>

#### **Treatment**

Use vinegar to neutralize the nematocysts and then the tentacle can be removed. Local ice will reduce the pain of the sting and simple analgesics and rest may be necessary to help the pain in the glands.

## **REFERENCES**

1. Cleland Sir JB and Southcott RV. Injuries to man from marine invertebrates in the Australian region. Canberra: NNMRC, 1965; Special Report Series No. 12.
2. Hartwick RJ, Callanan V and Williamson JAH. Disarming the box jellyfish. *Med J Aust* 1980; 1: 15-20.
3. Southcott RV Tropical jellyfish and other marine stings. *Military Medicine* August 1959; 124: 8.
4. Barnes JH. Cause and effect in "Irukandji" stings. *Med J Aust* 1960; 2: 993-999.
5. Fenner PJ, Audley I and Williamson J. A newly recognized, and potentially serious effect of "Irukandji" (*Carukia barnesi*) venom. *Med J Aust* December 1986. Accepted for publication August 1986.
6. Fenner PJ, Rodgers D and Williamson J. Box jellyfish antivenom and "Irukandji" stings. *Med J Aust* 1986; 144: 665.
7. Southcott RV The "morbakka". *Med J Aust* 1985: 143.
8. Fenner PJ, Fitzpatrick PF, Hartwick RJ and Skinner S. "Morbakka", another cubomedusan. *Med J Aust* 1985; 143: 550-555.
9. Williamson J. *The Marine Stinger Book*. Brisbane: Surf Life Saving Association of Australia, 1985.
10. Barnes JH. *Chironex fleckeri* and *Chiropsalmus quadrigatus* - morphological distinctions. *North Queensland Nat* 1965; 32: 13-22.
11. Kramp PL. Synopsis of medusae of the world. *Journal Marine Biol Ass of UK*. November 1961; 40: 306-307.
12. Fenner PJ and Fitzpatrick PF. Experiments with the nematocysts of *Cyanea capillata*. *Med J Aust* 1986; 145:174
13. Togias AG Burnett JW, Kagey-sobotka A and Lichtenstein LM. Anaphylaxis after contact with a jellyfish. *J Allergy Clin Immunol* 1985; 75: 672-675.

Dr Peter Fenner's address is Ambrose Medical Group, PO Box 34, NORTH MACKAY QLD 4740, Australia.

For further information on this subject with colour illustrations of the jellyfish and their stings discussed in this article, the reader is referred to "The Marine Stinger Book" by Dr John Williamson. This is available from the distributors:

Queensland State Centre of Surf Life Saving  
PO Box 36  
NEWSTEAD QLD 4006  
Australia