

happened so we sent him home the next day. Perhaps his Blue Ringed octopus gave a “dry” bite.

### STONEFISH, CONUS SHELLS AND BLUE RINGED OCTOPUS

Struan K Sutherland

#### THE STONEFISH

The Stonefish is found on nearly two-thirds of the Australian coast. It is the only stinging fish which has been known to kill people but there are no recorded deaths in Australia. The fish has 13 venomous spines but does not use its venom for collecting its food but more for protection. It is a very solidly built creature and if stood on the venomous spines may go deep into the sole of the foot. Not only is venom spurted in but actual parts of the venom gland enter and this causes extreme pain. As the fish is usually buried right up almost to its eyes in sand and coloured algae it is very very hard to see. Bob Endean says one can pick them up and put them down in their natural environment and spend half an hour trying to find them again. Some people say that a Stonefish is a bit like a politician. It sits round doing nothing all day, has a big mouth and is highly venomous if you try and shift it!

Severe local damage and extreme pain is produced by the Stonefish venom. Experimentally there is some evidence that it can effect cardiac muscle but I am not sure that this has been shown in humans.

#### Management of Stonefish Stings

We know that antivenom will quite dramatically reduce the pain and prevent necrosis but often one is in a situation where there is no immediate access to antivenom.

#### First-Aid

There is no place for restricting the movement of this venom because it is causing severe pain and tissue damage. The venom should be encouraged to move away to dilute itself, so do not apply pressure immobilisation. Never apply a tourniquet. Use warm water for pain relief of the injuries. Bathing the foot or hand in warm water increases the circulation of blood through the area. Some marine toxins are very heat labile and perhaps warm to hot water helps detoxify them. Getting hot water might be a problem but usually one can use cooling water from an outboard or inboard motor for this purpose. Often pethidine or morphine do not relieve the pain of a severe Stonefish sting. A severe case may need surgery to clean the injury up, so under such circumstances consider a regional nerve block with, say, bupivacaine to give the patient lengthy relief of pain. This will also allow debridement of the injury.

#### CONUS SHELLS

There are many Conus shells, three of which are known to

be highly dangerous to man. One species, *Geographis*, is the most dangerous. Conus shells are more or less sea going snails that produce very toxic venom. They have developed tiny harpoons which are soaked in venom. When a little fish that they would like to eat swims past, this harpoon soaked in venom is moved up to the front of the mouth and pushed into the fish which quickly becomes paralysed. Then the creature can open its mouth and quietly cover the fish and eat it. The harpoons are exquisitely made. They are only about a centimetre long, and the barb is different in each species. They are hollow and are only used once and are designed for the type of prey that the Conus shell likes. When a human is stung the harpoon can penetrate quite deeply. The toxin is unique. The *Geographis* has a little polypeptide of ten amino acids which acts postsynaptically and acts very very quickly. There is no antivenom for that particular toxin but the suggestion is that it would wear off in time like the octopus toxin. For Conus shell it seems reasonable to use pressure immobilisation for first aid. The main thing of course is not to pick them up because they can bring their mouth parts and harpoon almost to the other end of their body.

#### THE BLUE RINGED OCTOPUS

There are two species, the northern one and the southern one. I get the impression the southern one is far more common than the one found in tropical waters. Fully grown it is about 5 inches long, and carries enough toxin to paralyse perhaps 10 men. As far as I know it only bites people if they pick it up and hold it against their skin and restrain it. We had one person bitten under water and that was when he saw an octopus go into a hole on a pier. He stuck his finger in and I think any octopus has got every right to bite someone who does that! It seems reasonable to say that underwater the octopus poses no threat at all to the sensible diver who leaves it alone.

The anatomy of the octopus is quite fascinating. Where the arms join there is a little parrot-like beak. Its oesophagus goes upwards between its eyes, through its brain, and its stomach sits up on top. That is why it is called a cephalopod, head to foot. Near the stomach are two kidney shaped salivary glands, which produce the toxic saliva. The saliva flows down a duct to be released through the mouth. The octopus normally uses the toxin to paralyse crabs. It has a very delicate skin so it does not like getting in and fighting. If it sees a nice juicy crab it can swim over and just spray some saliva around the crab. When the crab gets ataxic and partially paralysed the octopus settles down and eats it. It is only if humans pick it up and annoy it, that it will sink its beak into the human. It is interesting that it is mainly adults who have been bitten.

The toxin from the Blue Ringed octopus is in all probability tetrodotoxin which is of course found in Puffer fish and Toad fish. The same toxin is also found in the Californian newt and in certain South African frogs. Tetrodotoxin acts specifically on the sodium gates in nerves. By stopping the movement of sodium, it very promptly blocks the movement of action potentials and hence produces a flaccid paralysis within a few minutes. Tetrodotoxin has a molecular weight of 319, and it is heat stable.

### Management of Bites

If possible, the pressure immobilisation type of first-aid should be applied to the bitten area. Paralysis will wear off and the patient fully recover if adequate artificial ventilation is promptly instituted. This may have to be maintained for some hours.

Finally, there are still many venomous creatures that should be investigated. There are many Australian venoms that we know nothing about, such as some of our ant venoms. I hope that if anyone gets a chance to encourage collaboration and local research into the venoms in his area, he (or she) will do so.

### Question

Is topical local anaesthetic any good for relieving pain in sea wasp stings?

Dr John Williamson

In our experience, no. The pain is much too severe to respond to that sort of application. We did ask the College of Dermatologists what they thought about the routine application of lignocaine as a cutaneous treatment for stings and they reacted violently. They thought it was a bad idea because a percentage of the population is allergic to lignocaine which has toxic actions of its own. That is a very conservative approach. Anyway with box jelly fish stings lignocaine does not seem to help at all.

With other minor stings, it does seem to help. But we do know that in the treatment of any marine sting, particularly jelly fish stings, the placebo effect is quite profound. We believe that that is why methylated spirits held its own for so long. As long as somebody sees and feels that something is being done, they feel a bit better about it. This particularly applies naturally to the parents of stung children. There is no doubt that in the single blind studies we have done, the placebo effect of treating a sting is quite profound. That is a legitimate approach, because it is cheap and it does no harm, but you have got to exclude the placebo effect when you are evaluating treatment.

### Question

Could Dr Sutherland give us his views on the potential toxicity of the Toowoomba Funnel-webb. During the summer months, this spider can be found in quite large numbers in the Toowoomba Range. In the last two years, I have managed three bites. On two occasions, the spider had to be actually prised off the finger or the toe that it had bitten. In none of these cases did the patient come to any harm. In fact, talking to colleagues who have been in Toowoomba for some time, I have not been able to find any documentation or medical records to suggest that anyone in the Toowoomba area has come to harm as a result of one of these bites.

Dr S Sutherland

Only one in ten people, or it might be one in five, that are bitten by a male Funnel-webb gets sick because it has usually lost its venom. We have done some work on some of the Toowoomba spiders that have been identified and classified. The venom seems to be particularly toxic and we know the Sydney Funnel-webb antivenom neutralizes it.

I do not wish it on the Toowoomba people but you will get a case of envenomation in time and that is why you hold the antivenom. You might get a case tomorrow, or you might not get one for five years. Incidentally no-one knows why the Funnel-webb venom is only effective against the primates.

### DECOMPRESSION SICKNESS

#### CASE REPORTS

J Orton

I have two cases of decompression sickness to present. One was definitely decompression sickness and the other suspected. The famous American Catholic speaker Bishop Fulton Sheen once told his flock, "There is no pleasure without pain". His theological comments were not actually directed at anything we are talking about today but they may well have been directed at sports diving.

The first case was a 29 year old, fit fellow who was PADI trained with no significant past history, who developed obvious neurological decompression sickness following repetitive diving. He had about 70 hours experience diving. He had been on a weekend diving trip where he had really pushed himself right to the limits of the tables and in addition there were a lot of other contributing factors. He did four dives on the Saturday, none over 60 feet, that is day one, and two dives on the Sunday, one to 60 feet and one to 80 feet. Both these dives were within the US Navy tables no decompression (no stops) limits, but they were only just within. He was obviously pushing it a bit. Using the Royal Navy system, he was beyond the limits of the tables for repetitive dives and he should have done a stop on the first day. Now consider the additional factors. There had been a lot of merry making the day before with a bit of alcohol involved. Significantly, he did not even go to bed the night before his first day's diving. He was up all night, Friday night. He was taking Sudafed (pseudoephedrine) tablets for what he said was "blocked ears". He had a very vigorous approach to the whole weekend's diving. He was always in the water, always swimming and he did a lot of snorkelling between the dives. There was also a lot of vigorous activity while he was in the water doing his tank dives as well.

During the ascent on the last dive he became disoriented. He got vertigo and felt quite weak. He got up to the surface and had a rest and improved a bit but still felt weak. However he was able to help stow the gear. He had some difficulty passing urine after that last dive. There was some hesitancy and dribbling. On the way back, he