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DIVING MEDICINE

ONE OF THESE IS NEAR DROWNING. WHEREAS MANY DIVERS WILL GO THROUGH LONG CAREERS AND NEVER SEE A CASE OF DECOMPRESSION ILLNESS IN THE FIELD, MOST OF US WILL AT SOME STAGE ENCOUNTER A SITUATION WHERE THE DIAGNOSIS OF NEAR DROWNING IS A DISTINCT POSSIBILITY.

The term 'drowning' implies suffocation due to water aspiration during immersion. 'Near drowning' describes a situation in which the victim narrowly escaped this fate, but may have aspirated some water into his or her lungs. The management of a 'drowning' situation requires few difficult decisions: by definition the victim needs CPR and emergency evacuation to a comprehensive medical facility. In contrast, the management of 'near drowning' often entails making tricky decisions over the correct way to manage your patient. This is especially so when some management strategies (such as

evacuation) can impact on other divers; on charter trips for example. In this article I will introduce some guidelines to help with decision making in such situations.

To begin though, I present an example of exactly the type of situation to which I refer. This was a real event that I was involved in several years ago. It illustrates some important aspects of the cause, symptoms, and management of near drowning. These issues are subsequently discussed in more detail.

A number of buddied pairs were diving at the Poor Knights Islands in perfect conditions. Through an unfortunate mix up during their descent, one diver became separated from his designated buddy and latched on to the tail of another pair. The first his new companions knew of this diver's presence was when he emerged from behind them and seemed to be having trouble with a slipping weight belt. At this point they had been submerged for approximately 17 minutes at 15 - 18 metres. Confused by the appearance of the obviously agitated third diver, one of the pair went to help him with his weight belt and in the process they sank down to 40 metres where it took several minutes to sort out his problem. He was eventually coaxed back to approximately 15 metres where he was seen to panic, spit out his regulator, and become unconscious. His tank was later found to be empty. One of the buddy pair, a rescue diver, immediately began to take him to the surface and probably made it in less than a minute. However, the victim ended up in a face down position on arrival at the surface and the rescuer had considerable difficulty turning him over. He probably remained face down for a further 30 seconds to 1 minute before being turned over. Luckily, when the air hit his face he gasped and began to breathe again.

At this point I was on the surface after my own dive, and I saw what was going on. I swam over and took the now conscious sick diver in tow, and got him back to the boat. He was recovered aboard and laid down, seemingly a little groggy but looking progressively more alert all the time. Within a minute he was denying that anything was wrong, saying he felt tired but otherwise well. He was not experiencing any symptoms typical of decompression illness. A brief neurological examination was

DISCUSSIONS ON DIVING MEDICINE USUALLY FOCUS ON THOSE DIVING ILLNESSES THAT ARE RELATIVELY UNIQUE TO THE SPORT; PROBLEMS SUCH AS DECOMPRESSION ILLNESS, AND VARIOUS FORMS OF BAROTRAUMA. BUT THERE ARE A NUMBER OF MEDICAL PROBLEMS OF WHICH DIVERS SHOULD BE AWARE THAT CAN OCCUR IN A VARIETY OF WATER SPORTS, AND THAT ARE NOT DESCRIBED WELL IN TRAINING COURSES EVEN AT DIVEMASTER OR INSTRUCTOR LEVEL.

normal. The episode of unconsciousness had begun before the ascent and was most likely caused by hypoxia after running out of air. The diver had begun breathing spontaneously without resuscitation and it seemed as though he'd had a remarkably close call, but had gotten away with it without serious consequence. It was one of those situations where it most definitely would not have been clear to a non-medical person exactly what should be done.

However, while talking to him, I noticed that he looked a little blue about the lips, and on examining his tongue, it looked blue too. Putting him on oxygen restored his tongue to its normal pink colour. Take him off it, and he went blue again. This made it perfectly clear what should be done. We picked up the anchor and headed for Tutukaka, and I evacuated him to the Naval Hyperbaric Unit at Devonport by helicopter.

So what had happened to this man that made me worried enough to initiate the evacuation? Well, when someone gets into difficulty in or under the water, it is possible that they will inhale water into their lungs. This is highly likely if the patient becomes unconscious underwater as this man did. The physiological consequences of water in the lungs are complicated and have been argued about for some time. A lot was previously made about the difference between drowning in fresh or salt water, but this is of questionable significance. To cut a long story short, water in the lung causes collapse of the small air spaces (alveoli), and some of the body's own fluid may leak into the lung (a phenomenon known as pulmonary oedema).

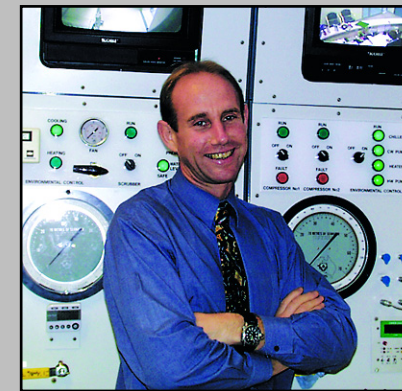
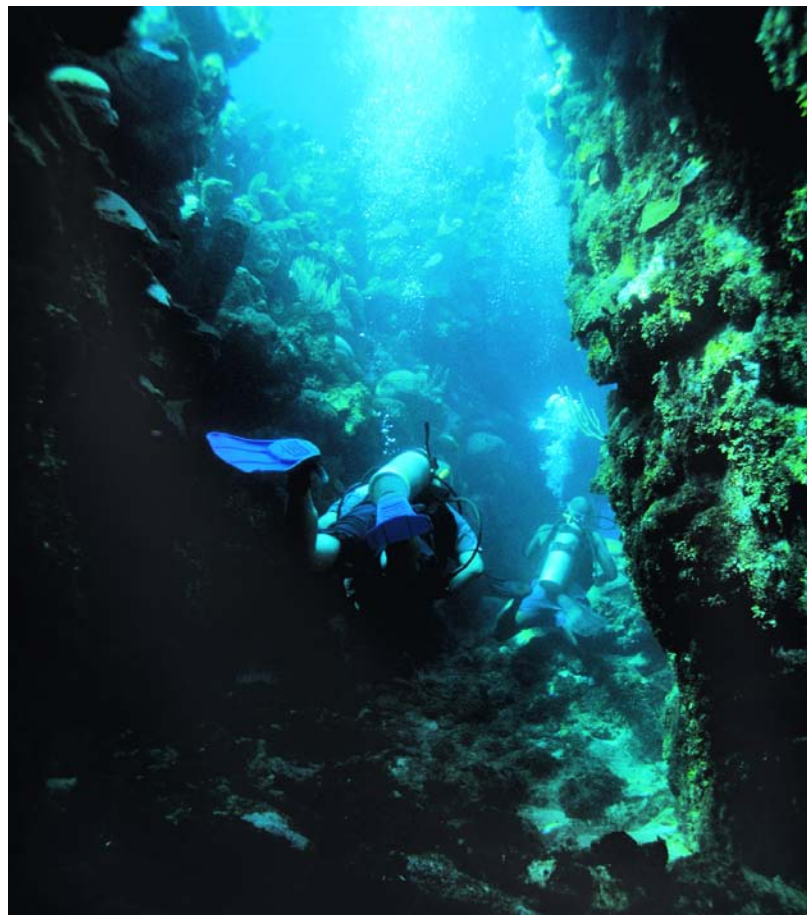
The net result of these processes is that the lung no longer

exchanges gasses as efficiently and there is reduced oxygenation of the victim's arterial blood (hypoxia). The patient may look blue (cyanosed) because of increased amounts of deoxygenated haemoglobin in the blood, and this is most significant if it involves the tongue (the skin of the extremities of a perfectly normal person may look blue if it is cold!). Other possible symptoms and signs are: cough (which may be productive of frothy sputum); a feeling of shortness of breath; pain behind the breast bone; rapid breathing; rapid pulse; wheezy or rattly breathing; and reduced consciousness. An insidious danger of near drowning is that the small airway collapse and fluid leakage mentioned above may not be immediately apparent. Indeed these processes may cause the patient to become dangerously hypoxic many hours after the accident; a process sometimes referred to as 'secondary drowning'. A big problem for rescuers is that it is not easy to tell in the early stages which patients are likely to progress to this point.

It follows that water sports people need some sensible guidelines as to the sort of circumstances in which they should refer someone for examination by a doctor after a 'close call' in the water.

To begin with, if anyone gets into difficulty in the water and then exhibits any of the symptoms or signs listed above, they MUST be evacuated to a hospital as quickly as possible for assessment. Oxygen administration during such an evacuation may be life saving.

In some incidents there will only be suggestive circumstances with no symptoms. I suggest that the patient needs medical assessment as soon as possible, irrespective of their apparently good outcome if those circumstances include: loss of consciousness in the water;



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a period in the water in which the patient was not breathing; or if any sort of resuscitation was required.

Patients who have experienced head immersion in a panic state or apparent choking on water may not need evacuation but must be carefully watched. If any of the near drowning symptoms mentioned above arise, then the patient must be evacuated as quickly as possible.

Divers suffering near drowning do not necessarily need to be seen at a hyperbaric unit unless there is concomitant evidence (or high risk) of decompression illness. Indeed, general hospitals are as well, if not better equipped to handle cases of water aspiration. In the case of the diver described above, I chose to evacuate him to a hyperbaric unit as a precaution because he was brought to the surface while unconscious (and was therefore not breathing normally during the ascent), and because he had a rapid ascent at the end of a time / depth profile that was moderately provocative for decompression illness. As it turned out, he was not recompressed and made a good recovery after 24 hours on supplemental oxygen.

Finally, this discussion of near drowning highlights another good reason why divers should get trained in oxygen administration through one of the oxygen provider courses offered by DAN, and even consider owning their own oxygen administration equipment.

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