

A number of other topics are also discussed at the workshop and several recommendations were made for future studies on the subject, but space does not allow for discussion of these things here. They will be detailed in the forthcoming workshop report. In the meantime, though, a detailed bibliography of essentially everything that has ever been written in the English language on the subject of nitrogen narcosis is available from the Undersea Medical Society.*

* Nitrogen Narcosis - A Bibliography with Informative Abstracts. Undersea Medical Society, 9650 Rockville Pike, Bethesda, Maryland 20814, USA. US\$8.00

AIR EMBOLISM OR DECOMPRESSION SICKNESS?

A CASE FOR DIAGNOSIS

John Knight

A 27 year old male diver with the proper training was diving at a sinkhole. He states that he did a dive to 34 m for 14 minutes which he said was within the USN No-decompression limits. He went to between 110 and 120 feet, 33-36 m, and should have used the greater depth which means that he overstayed the USN no-decompression limit by 2 minutes. However he did a 5 minute decompression stop at 3 m as a precaution, which took him inside the USN requirements for his dive. He said that he felt stressed by the dive and the water was cold (12°C). As soon as he was out of the water he stripped off his wet suit and went to stand in the sun to warm up.

10 to 15 minutes after surfacing he noticed that his "peripheral vision was dark" (his own words). Within 15 minutes his vision had returned to normal.

Interestingly he commented that an instructor acquaintance of his had noticed this phenomenon on more than one occasion after diving in sinkholes.

When seen and examined a month later he had no neurological deficit. He had worked out this his symptoms were due to cerebral anoxia and wanted to know whether they were due to air embolism or decompression sickness.

Retrospective diagnosis of a transient symptom is always difficult. Here we have to decide between two potentially lethal diagnoses, one of which would bar further diving.

I think that he did not suffer an air embolus due to pulmonary barotrauma. He made a normal ascent, with a decompression stop, and was breathing in and out all the time. His symptoms came on when he was rewarmed, at least 10 minutes after getting out of the water, if his story is correct. So I think that pulmonary barotrauma is very unlikely.

However, there is no doubt that he did have cerebral circulatory insufficiency for a while. Again his normal ascent and decompression stop makes arterial bubbles due to a rapid ascent unlikely, and if he had generated arterial bubbles by rapid ascent one would expect the immediate onset of cerebral symptoms, not a delay of 10 to 15 minutes. Perhaps he could have developed bubbles in his brain which compressed blood vessels leading to ischaemia of the visual pathways, but that does not seem very likely.

My bet is that as he warmed up he restored the circulation to his limb muscles and fat, which had closed down, in response to the cold stress of his dive, after he had loaded these tissues with extra nitrogen early in the dive because he was nervous and overbreathing. As a result bubbles formed in his limb capillaries and were carried to his lungs. Some bubbles bypassed the lung capillary filter, entering arterio-venous shunts and reached the left ventricle and so the aorta and the cerebral circulation.

This would then be a case of decompression sickness presenting as cerebral ischaemia.

Have any of our readers got alternative explanations? If you have please put pen to paper or finger to typewriter.

UNSCRAMBLING HELIUM SPEECH

A group of scientists at Edinburgh University, under their director Dr David Milne, have developed a range of "helium speech unscramblers" capable of taking the diver's "quacking" noises and converting them into recognisable speech on the ship, an invaluable service to the Dive Supervisor and his team. Dr Milne reports that the unscrambler has been tried out in the North Sea work situation for over a year. There are at present two systems in use, a big system for use by a diving company and a smaller system. The former has seven unscramblers, loudspeakers, and tape decks for entertainment circuits and costs about \$35,000. The alternative system provides divers' radios which contain a simple unscrambler and a three-person communication, cost about \$4,000.

Dr Milne is also working on the development of a through-water, diver-to-diver communication system. This project will employ a more advanced technology than the unscrambler both being based on special circuits which use commercial "charge coupled" devices. Essentially both do the same thing, taking the distorted "helium speech" and storing it for a few milli-seconds before playing back the corrected speech sounds. He is certain that the through-water systems will become increasingly important as they become more sophisticated and flexible. The potential market is large for use in both civil and military diving. Manufacture is now in the hands of Findlay Irvine and sales through Underwater Instrumentation of Aberdeen and London.