

TONY LIDDICOAT DIVER OF THE YEAR
MANAGEMENT OF A CASE OF SEVERE SPINAL
DECOMPRESSION SICKNESS UNDER SEVERELY
ADVERSE CIRCUMSTANCES

Kendall McDonald

Tony Liddicoat was deactivating an army scuba-diving Adventure School when informed that a helicopter was on its way with a seriously ill diver with symptoms of spinal decompression sickness. A storm was about to break and the nearest recompression chamber was about 1,400 km distant "as the crow flies". He had one experienced companion, a Gemini inflatable, a number of scuba tanks and a British Joint Services Diving Manual. The action he took, in the absence of desired facilities, are described.

The date: Wednesday, August 5, 1981. The place: Chapel Cay, off the coast of Belize. The weather: the still that comes before a tropical storm ...

Dick Alba, the 53-year old proprietor of Dyna-Sea Inc., a commercial diving company of Harvey, Louisiana, USA, is finning slowly upward along the wall of the reef. He is taking part in his favourite holiday diving occupation - he is filming fish.

This is his second dive of the day with a resort diving firm. His first dive was to 20m. On his second he touched bottom at 24m. He is experienced enough to note both depths carefully. He is, however, about to suffer a massive attack of the bends.

Within a short time of surfacing he is paralysed down his left side and completely immobile below the waist. He can only burble words and to his horror he hears what he knows to be the bends diagnosed as a heart attack.

Plans are made to airlift him to the nearest hospital, the British Army Hospital in Belize. He is given the last rites by a Catholic priest ...

The same day 15 miles away in the shallow water near the British Army Adventure School on St George's Cay, another island off the coast of Belize, Staff Sergeant Tony Liddicoat does two 10m dives instructing beginner divers. When that diving is over, many of the empty cylinders have their pillar valves removed. The Adventure School is closing down for a week's maintenance.

At six pm Tony Liddicoat feels he has earned a beer and starts walking towards the only little bar there is on the island. The palm leaves are rustling ominously as the dark clouds out at sea, outlined against the sunset, begin to deliver their wind. A storm is coming.

Dick Alba, in the British Army Hospital, is worse. He is now 75% paralysed. The British doctors have discarded the heart attack theory. They diagnosed a spinal bend but there are no recompression facilities at the hospital.

There is only one chance for Dick Alba and that lies in a 15-

minute helicopter ride away at the Adventure Training School. His chance is Staff Sergeant Tony Liddicoat. The radio crackles and a breathless squaddie stops the Staff Sergeant on the way to his beer.

Tony Liddicoat now had an equipment problem. While they waited for the helicopter, he assembled what full cylinders they had, found that only one Gemini inflatable and engine were serviceable, and grabbed the most experienced diver he could find to help him.

The most experienced man on the island, next to Tony, was Vic Butcher, a 36-year old Army Physical Training Corps Warrant Officer. He had just passed his BS-AC Third Class.

Dick Alba, as he never stops saying today, had at that moment found a piece of luck. Because 33-year old Tony Liddicoat was not going to hesitate about doing what he knew had to be done.

Tony Liddicoat is one of the Army's most experienced divers with over 2,000 logged dives. A senior diving instructor with the Royal Engineers, he has been diving professionally for 17 years and instructing on all aspects of commercial diving for 12.

He made his first dive in 1965 as a boy soldier in Dover Harbour. He'd been a diving instructor at the Kiel Diving School in North Germany. In 1974, he'd been a guest of Jacques Cousteau on an expedition to the "Blue Hole" off Belize, and had dived the Blue Holes many times.

He'd played a big part in running Army sub-aqua clubs. Underwater photography is his hobby. He likes diving enough to do it for pleasure even though it is his work. He'd taken any diving experience where he could find it. He'd served in the Outer Hebrides, blasting deepwater channels for trawlers and constructing pipelines.

In 1977 he was off to Mombasa as part of the Joint Services Expedition to excavate a wrecked galleon. In 1979 he went back to the wreck again with the Royal Engineers Diving Team.

And now, in 1981, he had been seconded to the Adventure Training centre on St George's Cay as diving supervisor and instructor. He'd been trained as a chamber operator and had picked up even more therapeutic decompression knowledge in the North Sea.

His experience was vital because out here, with the nearest chamber hundreds of miles away, there was only one place you could carry out decompression - the sea. But even with all his experience Tony Liddicoat knew he faced a daunting task. He had to find deep water despite the storm.

Gradually the pile of full cylinders mounted in the boat. Then suddenly it was dark and the wind started going mad.

Eleven minutes later the Puma "chopper" landed on the volleyball court. "It dropped out of the dark," recalls Tony, "like a sack of potatoes!"

It needed six men to lift the paralysed 19-stone Dick Alba to the waiting boat. He had now been three-and-a-half hours out of the water since surfacing to the bends.

Now Tony had the boat, some full cylinders, a willing assistant, Vic Butcher, but he needed to know depths and times so that he could apply his therapeutic decompression knowledge. It was difficult to understand Dick Alba's burbled barely audible words, but finally Tony was convinced that he had got the truth as Dick Alba knew it. But was he under the influence of any drugs administered by the hospital?

He checked and checked again with Alba's wife Marcie, also a diver, and was finally convinced that he had got the right figures (20m for the first dive, then 24m for the second).

He calculated combined dive stops for a dive to two increments below his maximum depth and for a combined dive time for both dives plus two time increments for safety.

Then he went to the BR 2806 Diving Manual, as used by the British Joint Services and from Table II in Chapter 5 he worked out the following decompression schedule:

10 mins at 31m
5 mins at 12m
20 mins at 9m
30 mins at 6m
45 mins at 3m

Dick Alba was unable to help himself in any way and because of his paralysis there was no question of getting him into a wet-suit. So Tony and Vic made a seat out of a paddle and lashed him, still in his pyjamas, on to it.

Now they had to find deep enough water for the recompression. The only suitable place was two miles offshore.

"It was all we could do with the equipment we had", says Tony. "We set off within 15 minutes of him landing and got out into a very rough sea. Twelve-foot seas would be a conservative estimate, with very strong winds. The storm had arrived. We lowered the anchor. We were in 2,000 feet of water and the anchor was just going straight down.

We dressed him in an aqualung and rolled him over the side. I got into the water and caribineered him to the anchor line, so that when he descended he was strapped on the paddle-seat, dressed in pyjamas, fully kitted up. And down he went.

He went straight down to 31m and after about 12 minutes he started to get movement back in his legs. I had written in underwater chalk on the side of the boat for Vic the stops and where I wanted the cylinders suspended. I also had the same written on my fins. Thank God for Vic, otherwise I'd have had to keep bobbing up ...

After about 12 minutes Dick started to get some feeling back in his legs and in his spine. And the use of his hands, and he came to more openly, if you know what I mean, so he could do hand signals ..."

It says a great deal for Dick Alba that when he found himself surrounded by pitch black water, with only the light of Tony's torch for company, he did not panic. Tony Liddicoat was full of admiration for him, particularly when into that beam from that torch swam an eight-foot long blue shark.

"Fortunately", says Tony, "the shark was only curious and after giving us the once-over with that great big cold eye it swam away!"

Now they moved upward through the stops. Six times Vic Butcher sent down fresh bottles as the boat was blown in pouring rain towards the shore. Six times Tony changed Dick's air supply.

"There was only one moment when I had to come up and that was to ask "where are the f-ing bottles". What had happened was that the boat had drifted in so that the anchor caught on the reef and sending the bottles down meant that the anchor rope was at an angle compared to the shot line and they ended up some distance away from me."

As the decompression routine reached the shallower stops at nine, six and three metres, the movement of the boat in the big seas was making it inaccurate and as Dick Alba was suffering great discomfort from all the manhandling and jerking, Tony and Vic got him back into the boat. "I knew now that his life was not threatened, so we took him ashore and kept him under observation."

Now Dick Alba had some relief from symptoms - but he still had numbness, spasms, prickles, rash and blurred vision, and he was sore but Tony did not know how much of the soreness was due to the manhandling that they had been forced to give him during the boat ride and the decompression.

During the 30 hours that he was kept under observation he partially recovered, his left arm was completely restored, there was feeling back in his legs, but he was not strong enough to support his own weight.

It was then that Tony Liddicoat decided to recompress him again and give him this time the complete Table 81 therapy from the Joint Services Diving Manual. And as they started, another storm began to build up. But at least it was daylight and so down they went with Alba still in his pyjamas.

It took seven changes of air this time. The schedule was:

5 mins at 30m
45 mins at 30-20m
80 mins at 20-10m
60 mins at 10-0m

SPUMS ANNUAL SCIENTIFIC MEETING 1982THE RATIONALE FOR DRUG THERAPY IN
DECOMPRESSION SICKNESS

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To the disappointment of the men, Dick Alba showed little sign of further recovery or relief of symptoms. On Sunday August 9, 1981, his company sent a Lear jet to fly him at low level to a New Orleans hospital. After two-and-a-half months he was discharged and though he still walks with a stick he jokes about taking up jogging very soon. He can drive his car.

In January this year, Tony Liddicoat received a letter from Dick Alba, which says: "Due to your successful treatments of me at St George's Cay and my subsequent flight to New Orleans and admittance to JoEllen Smith Memorial Hospital, I am walking forever in your debt ..." The letter went on to invite him to be "Guest of Honor at the official opening of the new Hyperbaric Treatment Facility at the hospital on Wednesday, February 17".

The hospital had no doubt about the effectiveness of Tony's treatment. At best, without it, Dick Alba would have been a paraplegic. The hospital said that the decompression had completely removed the nitrogen from Alba's system and thus given him mobility despite the residual damage to the spinal cord.

Tony went to New Orleans and was feted "overwhelmingly ... almost embarrassing ..." But he was not embarrassed by Dick Alba's personal gift to him - an engraved Rolex helium diving watch.

In fact he looked long and hard at that watch when it was put to him that he took a risk in doing what he did. Finally he said simply: "There was no alternative, regardless of the weather and the lack of equipment - you had to do something. If I hadn't, he'd have died."

There was little doubt in anyone's mind about that. Least of all in the Army's reaction. Staff Sergeant Tony Liddicoat of the Junior Leaders Regiment, Royal Engineers, at Dover, was awarded the Queen's Commendation for Brave Conduct for his lifesaving action.

The announcement in the "London Gazette" says that his award was for "bravery, prompt action and skill when undertaking a complicated decompression programme in adverse conditions, in order to save the life of a man suffering from decompression sickness."

Which sums up why Tony Liddicoat is "Diver" magazine's Diver of the Year!

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COMMENT

SPUMS' members and other readers of this Journal will have recognised that this was a case for the Edmonds' Underwater Oxygen Therapy Apparatus. When the issue of DIVER containing this article was delivered to its readers, the SPUMS Annual Scientific Conference was discussing the treatment of decompression sickness without a chamber.

NOW READ ON...

Although decompression sickness (DCS) is a disease unique to changes in the pressure environment, data obtained over the past 20 - 25 years has led to the concept that DCS can be treated like many other serious diseases, using standard therapy developed for other purposes. Various clinical investigators, basic researchers, and a few non-medical diving engineers and supervisors conceived of recompression therapy for "diver's rheumatism" in the latter part of the 19th century. Recompression was probably first used for the treatment of caisson workers. Organized decompression and treatment tables for air appeared in the late 19th and early 20th centuries. Oxygen for decompression and for the treatment of DES appeared in the 1920-1935 period, and until recently, recompression and oxygen were the only means for treating DES. From the 1930's to the present time, a body of knowledge slowly developed which culminated in the understanding of DES as a process which triggers body wide inflammation, which can be treated like any other disease process that activates the inflammatory process.

Based on these newly developed approaches to the treatment of DES, one can outline a treatment strategy which, of necessity, begins with recompression and oxygen, but which also includes fluid therapy, the use of corticosteroids, consideration of anti-coagulants, the use of anti-platelet agents and of non-steroidal anti-inflammatory agents such as indomethacine or ibuprofen.

It is clear that the bubble-triggered inflammation which occurs in DES is not reversed by recompression, and although the ischaemic component is resisted by hyperbaric oxygen, use of oxygen and recompression will not halt the inflammatory responses already underway. The process of inflammation encompasses a collection of responses which act normally to counter invasion of the body by foreign organisms (eg. bacteria, viruses, parasites). To gain insight into the use of drugs in DES therapy, we will examine the components of inflammation and the drugs which affect them.

Permeability

The vascular system retains fluid by holding protein molecules in the blood vessels. The osmotic effect of the protein holds water in the vascular compartment. Occasionally, it is expedient for proteins to leave the plasma and enter the tissue spaces outside the blood vessels. The most important need is when antibody diffuses into tissues invaded by bacteria or other organisms. To move protein from the vascular system, a gating mechanism is present in the post-capillary venule. The endothelium in this region can contract, separate cell junctions and allow protein to leave the vascular system. Control of the gating mechanism is through the