

AN ANALYSIS OF A CASE OF DECOMPRESSION SICKNESS IN A DIVER

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ABSTRACT

The paper presents an accident of a diver in classic equipment. After several hours of hard work underwater, shortened instead of extended decompression was applied. The staff disregarded the symptoms of type I decompression sickness reported by the diver, and therefore the treatment was started with a significant delay. The use of recompression treatment - therapeutic decompression resulted in permanent and complete resolution of symptoms.

Keywords: classic equipment, improper decompression, ignoring symptoms, skin and joint form of decompression sickness.

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INTRODUCTION

In accordance with the Anglo-Saxon classification, cases of decompression sickness are divided, depending on the patient's condition, into Type I ("mild"), covering only pain in one or more joints of varying severity (the accepted international term "bends"), and Type II ("severe"), covering other symptoms, primarily neurological (sensory disorders, paresis, paralysis), as well as cardiopulmonary symptoms [1,2,3].

Statistical reports show that about 90% of all cases of decompression sickness (DCS) are acute osteomyo-arthralgia [4,5,3]. The risk of DCS is assessed variably. On average, it occurs in 5% of hyperbaric exposures. The duration period of latency in DCS differs, however, the prevailing opinion is that within up to

6 hours after decompression, 90% of cases develop symptoms [6,7,2].

The only causal treatment of DCS is therapeutic recompression. In doubtful cases, recompression should be used as a "pressure test", and the occurrence of a sudden improvement usually confirms DCS [1,6,2,3].

Table I illustrates the factors influencing the decompression process [8].

The cases of DCS are growing in connection with the increasing number of individuals practicing diving unsupervised, unprepared, disregarding the basic principles of diving safety and physiology, not observing decompression rules and tables [6].

Below I present a case of DCS in a diver resulting from failure to observe decompression principles.

Tab. 1.

A case of DCS in a diver resulting from failure to observe decompression principles.

Physiological	Environmental	Technical
Age	Gas environment	Ascent rate
Gender	Aquatic environment	Decompression profile
Body build	Pressure	(gradual, continuous)
		Distance between stations
Adipose tissue content	Type of breathing mix	Activity during decompression
General fitness	Exposure time	
Specific fitness	Temperature	Body position
		Trips from plateau
Fatigue	Time of day	Repeated exposures
Cooling		Mix change
	CO2 concentration	Use of oxygen
Overheating	Humidity	Type of equipment and its characteristics
Psychological (anxiety)		
Sleep	Chemical and biological contamination	
Historic diseases		
Historic injuries	Noise	
Diet	Ionisation	
Smoking	Sea condition	
Drinking alcohol		
Prescription drug addiction		
Motion sickness		

CASE STUDY

On 12.08.1982, senior diver J.P., age 44, dived from 9.00 to 13.45 in typical equipment to a depth of 12-15 m. The meteorological conditions in the diving area were described as good; air temperature 25°C, water temperature 16°C at sea level 2 on the Beaufort scale. He performed hard work under water, removing silt from the bottom. The layer of silt was at times one and a half meters deep. The silt was solid and hard. He used an air injector, the so-called "mammoth" pipe, to carry out this task. His decompression was carried out at a depth of 3 m for 15 minutes.

About 2 hours after the dive, the diver suffered from pain in the shoulder and knee joints, numbness in the right lower limb and persistent itching in the chest and abdomen. He informed his colleagues about these

ailments, but they only "sympathised" with him without offering any specific help. At home, he noticed a spotted rash near his abdomen, accompanied by itching and the feeling of stinging all over his body. The numbness of the right lower limb subsided. The joint pains, initially mild, intensified and became unbearable. A temporary relief was provided by energetic rubbing of the joints. His neighbour, a neurologist, advised him to immediately go to the decompression chamber.

On admission, the OSNiPWP doctor found the following:

- Breathing acceleration up to 20/min and heart rate up to 100/min,
- RR-130/80,
- Spotted, mottled rash in the abdominal area, where the skin took on the appearance of marble,

- Pain in the shoulder and knee joints. Nature of pain - deep and drilling.

Movements in a given area did not influence the pain. Neurological examination showed no abnormalities. On the basis of the above mentioned ailments and interview, a type I pressure disease was diagnosed and therapeutic recompression according to table two was applied - highest pressure 0.5 MPa [9].

During recompression (at 0.15-0.2 MPa), the pain in the shoulder and knee joints became dull, and at 0.3 MPa the pain disappeared completely. Under this pressure, the skin symptoms also disappeared. After 30 minutes exposed to a pressure of 0.5 MPa, no abnormalities were found in the subjective and objective examination. During decompression below 0.1 MPa oxygen therapy was applied in the chamber. The total duration of stay in the decompression chamber was 26 hours and 11 minutes. No relapses occurred during decompression or after completion of treatment. No abnormalities were found after the treatment. Specialist examinations (internal medicine, laryngology, neurology and additional examinations) were carried out, the results of which did not deviate from the norm.

DISCUSSION

The above case is an example of disregard for the rules of diving. After a dive lasting a few hours, incorrect decompression was applied. The decompression was performed without the use of any tables, with the depth at which the diver was staying not measured accurately.

According to "Decompression and recompression tables for divers" Mar. Woj. 860/81 from 1982, following this kind of exposure, the diver should make two stops during decompression (the first at

a depth of 6m for 10 minutes, the second at a depth of 3m for 16 minutes), whereas he made a single stop at a depth of 3m for just 15 minutes. Moreover, the decompression should have been additionally prolonged owing to the fact that the diver performed very hard physical work under water.

What is most surprising, however, is the fact that when the diver had symptoms typical of decompression sickness - none of the "safety" divers thought of a decompression incident and, apart from "expressions of sympathy", no measures were taken to help him.

A serious deficiency in the observed case was the negligence of the organisational type, and above all the lack of adequate medical protection, which undoubtedly resulted in a significant delay in the decision to treat the diver after the accident, and at the same time could have had serious consequences for both the health and life of the injured person.

The application of therapeutic recompression in the case in question, despite the passage of a few hours from the completion of the dive and the occurrence of symptoms, proved to be correct and a complete recovery was achieved.

CONCLUSIONS

1. The organisation of dives should be carried out in accordance with the diving service regulations.
2. The depth of each dive should be accurately measured prior to the dive.
3. In cases of diving in unfavourable conditions (performing very strenuous physical work), extended decompression should be used.

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