

MEDICAL CERTIFICATION OF PILOTS FOLLOWING DECOMPRESSION ILLNESS (DCI)

CASE REPORT, BY CLIFTON M. NOWELL, DO

According to the Divers Alert Network, approximately 1,000 decompression-related incidents occur yearly.¹ SCUBA diving introduces an abnormal environment where pressure and gases play vital roles. Although not a common event, much research has gone into laying out ways to prevent decompression illness and how to effectively treat it when it occurs.

History

A 45-YEAR-OLD MALE AIRLINE transport pilot with 5,100 total hours of flight time applied for a second-class medical recertification 3 months following a barotrauma event that resulted from a rescue attempt of another diver.

The airman suffered barotrauma as a result of a rapid ascent from approximately 60 feet deep in 20 seconds. He made this ascent as he noted another diver, apparently unconscious, floating to the surface. Following the rescue, he entered the boat, feeling pain and heaviness in his right arm, and numbness in the right cheek. Approximately 3 minutes later, he experienced what was described as “pins and needles” over his entire body.

Upon arrival back in port, his symptoms had resolved and he returned home. Approximately 8 hours following the dive, his symptoms returned and he went to the emergency department. Initial evaluation in the ED suggested barotrauma, and he was started on treatments in the local hyperbaric chamber. He underwent 13 sessions of hyperbaric treatment, two sessions of United States Navy Treatment Table (USNTT) 6, ten sessions of USNTT 5, and one session at USNTT 9.

As a result of the barotrauma (decompression sickness Type II), the airman suffered flaccid paraplegia of the lower extremities and paresthesias of the upper extremities. Over the course of his treatments, the airman evolved from paraplegia of the lower extremities to being able to walk with the assistance of a cane or walker. His right lower extremity was the most severely affected with sensory and motor function loss, especially dorsiflexion. Following initial treatment, the airman transferred to another facility for rehabilitation and further hyperbaric treatments.

Aeromedical Issues

Decompression Illness is a term used to describe physiologic events that result from a reduction in ambient pressure around the body. This can occur when scuba diving or during a rapid decompression while flying in a pressurized aircraft. Divers are at risk of decompression illness resulting from the release into blood and tissue of inert gas bubbles previously dissolved within tissues.²

Decompression illness encompasses two diseases: decompression sickness and arterial gas embolism. The main difference between the two, as they both result from bubbles growing in tissue, is that decompression sickness affects the tissue in

the locale of the bubble, whereas arterial gas emboli enter the lung circulation, traveling through the arteries and causing tissue damage at a distance by blocking blood flow through the smaller vessels.³

Of greatest concern following a decompressing illness and flying is the sequelae that may ensue. Sudden incapacitation is not of great concern because the inciting event has passed, and the airman would have received proper treatment. Deficits, especially neurological, are a major concern. Evaluation of the airman’s ability to perform the tasks associated with flying is pivotal in the decision to issue/authorize an airman to resume flying duties.

An airman who intends to fly after scuba diving should allow sufficient time to be rid of excess nitrogen absorbed during the dive. The recommended wait time for flight going up to 8,000 feet is 12 hours for nondecompression diving. However, after a dive that required a decompression or controlled ascent, one should wait at least 24 hours to be safe.

Role of the AME

The general medical standards for medical certificates annotated in Title 14 Code of Federal Regulations (CFR) parts 67.109 (b), 67.209 (b), and 67.309 (b) include no other seizure disorder, disturbance of consciousness, or neurologic condition that the Federal Air Surgeon, based on the case history and appropriate, qualified medical judgment relating to the condition involved, finds (1) Makes the person unable to safely perform the duties or exercise the privileges of the airman certificate applied for or held.⁴ One may also make the case for using parts 67.113 (b), 67.213 (b), and 67.313 (b), which states an airman is disqualified for organic, functional or structural musculoskeletal disease, defect, or limitation that the Federal Air Surgeon, based on the case history and appropriate, qualified medical judgment relating to the condition involved finds (1) the deficit makes the person unable to safely perform the duties or exercise the privileges of the airman certificate applied for or held.⁴

The *Guide for Aviation Medical Examiners* outlines the examination that should be done to properly evaluate an applicant’s neurologic and musculoskeletal systems. The evaluation should include a thorough review of the applicant’s history prior to the evaluation.^{5,6,7,8} As a type II decompression involves the

spinal cord and subsequently leads to neurological deficits, it is important to have a working knowledge of any deficits that might have existed prior to the event, especially involving neuromuscular deficits. Once the pre-event history is obtained, a firm understanding of the precipitating event will lead you nicely into the physical examination.

Standard examination should note the presence of any musculoskeletal pain, weakness, paralysis, deformity, or motion coordination that leads to degraded performance. The neurological examination should include a history of or current disturbance of sensation, loss of coordination, or loss of bladder or bowel control. Emphasis should be placed on the 12 cranial nerves, motor strength, superficial reflexes, deep tendon reflexes, sensation, coordination, and mental status.^{5,6,7,8}

If the decompression illness results in residual deficit and ultimately leads to a Statement of Demonstrated Ability (SODA), then reissuance of the medical certificate should be based on evaluation of the deficit. If the deficit remains stable, then the AME should issue the medical certificate. If there is not a SODA, then a medical flight test (MFT) may be needed to evaluate whether the deficit will impede proper cockpit performance and the airman's ability to fly. The SODA can be issued if the airman passes the MFT.⁵

Outcome

Based on this airman's history and physical examination, four months following his decompression event he was authorized by the FAA Aerospace Medical Certification Division to perform a MFT. It was not until seven months after the event that he was able to successfully perform the MFT. He was granted a time-limited authorization and medical special issuance based on 14 CFR § 67.401 and § 67.23. After successfully completing the medical flight test, a SODA was granted, and the airman received his second-class medical certificate.

References

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