"COMMERICAL DIVING INJURIES: THE PSYCHOSOCIAL AND ECONOMIC FACTORS THAT CHALLENGE APPROPRIATE MANAGEMENT"

Murillo IF, LeGros TL, Murphy-Lavoie H, and Wyatt HA
LSU Department of Medicine, LSU UHM Fellowship, New Orleans, Louisiana.

INTRODUCTION

Commercial diving is a thriving industry that attracts many young men and women. However, matriculating through dive school and the expenses related to diving equipment and licensing are significant. Commercial diving is also dangerous. Exposure to increased ambient pressures, sea life, hypothermia, equipment failure, and hostile environments are continual hazards. Socially, the men and women who work as commercial divers are very physically active, hard-working and enjoy a very close camaraderie common to this type of difficult and specialized work.

When these divers are injured, a multitude of factors may influence a diver to minimize or deny injury, including: fear of job loss or banishment, self-denial, misplaced motivation, ignorance, financial loss, and embarrassment. The culture of commercial diving may perpetuate the dangerous practices of divers to under-report or fail to report injury symptoms related to decompression sickness (DCS) or other injuries.

CASE PRESENTATION

The diver's symptoms began 5 ½weeks prior to consultation, performing a clean dive (surface-supplied air) to **161 fsw (bottom time of 35 minutes).** He had a controlled ascent to 90 fsw, then climbed on a diving bell to perform his required in-water stops on the way to the surface. However, the bell malfunctioned and the diver was **propelled to the surface in 1 minute.**

Realizing the diver had **omitted decompression,** the dive supervisor recompressed him with a USN TT6 (surface interval of 4 minutes). The diver reported he was **"fine"** following treatment. He currently reports he **withheld symptoms** of severe, persistent, pounding bitemporal headaches experienced shortly after surfacing.

The diver spent the next 3 days performing grueling 12-hour shift deck work. During this time, he felt **"exceptionally tired"** and was always **"trying to catch his breath."** He did not report these symptoms.

He then performed a **second dive to 161 fsw (bottom time of 32 minutes)** and worked a rigging and engaged a lever on an EOT Diamond saw. He remained fatigued and short of breath but completed the mission. He made all his in-water stops during his ascent on the bell. He then climbed the stage wire to the surface and the ladder to the vessel deck. He had difficulty negotiating the ladder because he felt **"exceptionally tired"** and was **"always trying to catch his breath."**

The diver was sprayed down (surface interval of 4 minutes) and recompressed to 60 feet on a 170/40 **surface decompression schedule.** He again reported that he was "okay" when he surfaced and following his decompression. **Ninety minutes later, he suddenly felt "off" and developed multiple neurologic symptoms and passed out.** He was immediately recompressed with USN TT6 (2 extensions) that resolved all of his symptoms. On-shore, he continued to deny any symptoms to the company diving physician.

INITIAL WORK-UP

- **DMO Diagnosis:** DCS Type II; probable PFO
- **PFO Testing:** significant shunting with Valsalva

PATIENT RESPONSE TO WORK-UP

After being told he could return to work only when completely asymptomatic and following PFO repair, he "confessed" to actually experiencing a whole gamut of symptoms since the first dive (omitted decompression). Suspecting secondary gain, the DMO sent the diver to LSU for a second opinion.

PHYSICAL / NEUROLOGICAL EXAMINATION

- **GEN:** W/D, W/N, AAOA X 4, appears stated age
- **VITALS:** 136/80 67 14 97.7 5'11" 196 lbs
- **HEENT:** NCAT, PERRLA, canals clear with TMs normal
- **CHEST:** BS CTA bilaterally; no subQ air or crepitence
- **CV:** RRR no m/c/g
- **ABDOMEN:** soft, NT, ND, benign
- **EXTREMITIES:** intact pulses; no trauma noted; scar on dorsum of foot; tattoos on left arm
- **NEURO:** CN I-XXII intact; sensory, strength and DTRs intact throughout; station and gait - slight lean towards right; Romberg - equivocal; cerebellar - normal thumb/index tap, foot tap, FTN, HTS, jumping one foot in place; **abnormal cerebellar - slow and uncoordinated alternating thigh-hand slap; mental status exam revealed significant difficulty with serial 7s,** with 4/5 item recall at 5 minutes (other items wnl)

TREATMENT AND EVALUATION

- **HBO_2 Treatment:** 100% O_2 @ 2.4 ATA / 90 min X 3 d (2 air breaks); then 100% O_2 @ 2.0 ATA / 90 min X 2 d (2 air breaks)
- **Treatment Halted:** due to symptom progression

CONCLUSIONS

DCS is a complicated injury, and the correct diagnosis may be hampered by fear of job loss, secondary gain issues, as well as psychological or social stressors. Additional factors include incomplete documentation, contradictory histories, and liability interests. These factors cloud the diagnosis and delay treatment, risking significant and permanent disability.