



# An Extraordinary Case of DCS

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## Introduction

Unique Cases of decompression sickness (DCS) such as occurring with

- Breath-hold diving
- Shallow dives
- Very brief bottom times

warrant presentation as case reports

Our case report involves none of the above

However, it's "extraordinariness" deserves reporting for four reasons including :

- Information sharing
- Optimizing management
- Legal ramifications
- Measures taken to prevent future events of this kind

## Background

A healthy 72 year old healthy Hispanic female was transferred by ambulance from her home area about 180 miles from our facility because of suspected DCS/gas embolism

Delayed onset symptoms including lower extremity paralysis and abdominal pain occurred about 4 hours after an unusual hyperbaric exposure

Although her symptoms remitted completely, she was transferred to our 24/7 hyperbaric facility for evaluation and management

## History & Findings

**Circumstances of the Exposure:** The patient decided to receive a "dive" in a hyperbaric chamber her son fabricated in his garage. It seems her son got interested in using hyperbaric pressure for treating ailments such as aches & pains and patients with cancer.

The son learned about hyperbaric chambers from hearing of athletes using them to recover from injuries and used his ingenuity to construct one in his garage. He ordered the steel hulled chamber to be manufactured to his specifications in Mexico and then special fitted compressors, valves, etc. here in the US.

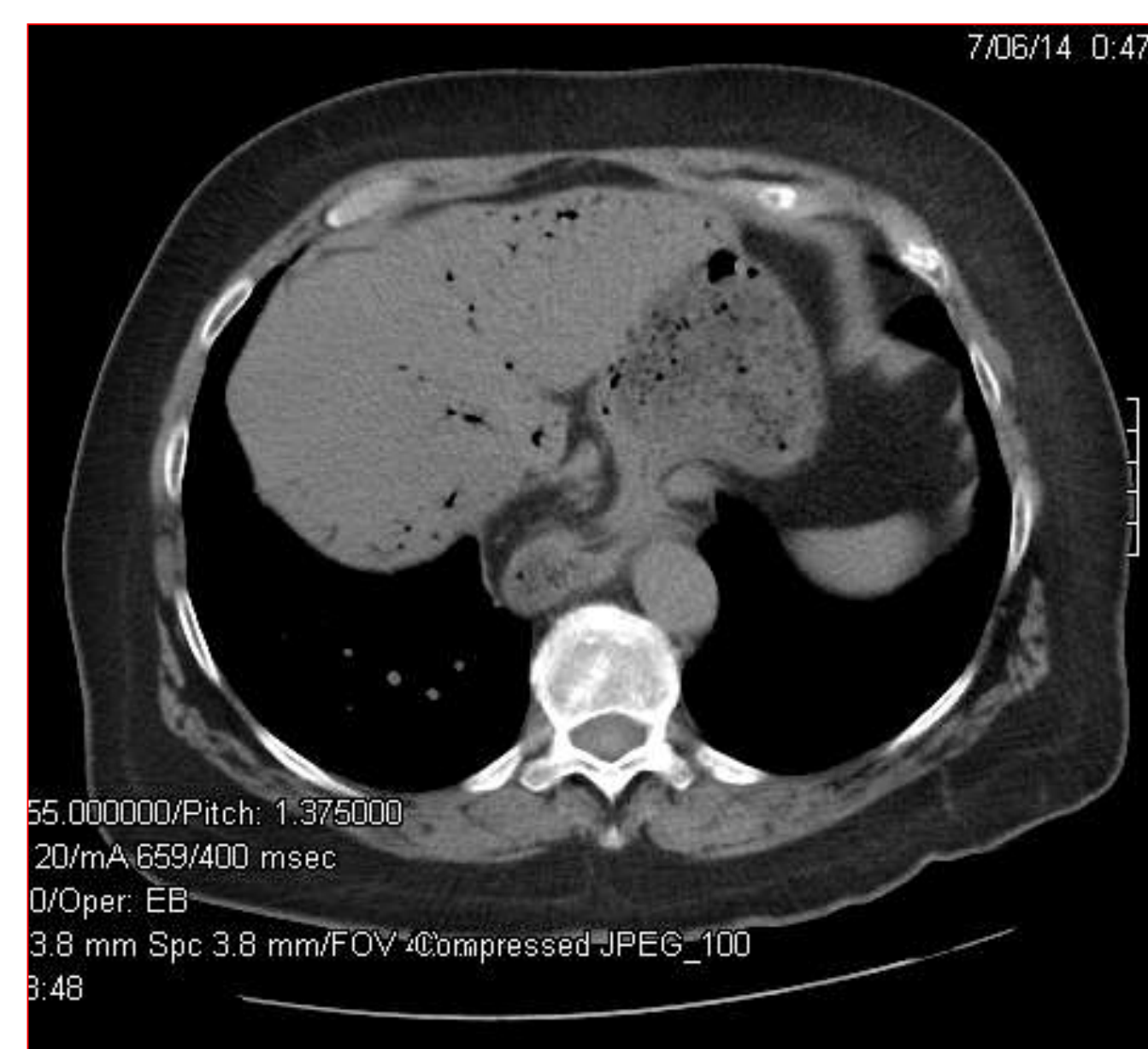
**Reason for Treating his Mother:** The son decided to give his mother a hyperbaric treatment because of her history of arrested breast cancer.

**Exposure Duration and Depth:** An early evening hyperbaric air exposure was done at an equivalent depth of 72 feet for about an hour. A pounds per square inch gauge was used in lieu of a depth gauge. The descent took 30 minutes because of the small compressor and the patient had some difficulty clearing her ears. The bottom time was said to be 30 minutes. The ascent to the surface was done over a 20 minute period. This was the protocol the son regularly used for his friends and neighbors.

**Immediate Response & Comments:** Decompression occurred without an incident. The patient said she felt "great" after the hyperbaric exposure.

**Delayed Onset Symptoms & Findings:** After returning home eating and eating a "hearty" meal the patient experienced abdominal pain and was unable to move or feel sensation in her lower extremities. The symptoms appeared approximately 4 hours after completing the pressurization.

**Initial Management and Responses:** The Emergency Medical System (911) was activated and the patient was transferred to a local hospital by ambulance. A CT scan of the abdomen showed gas in the liver vessels and the pelvic veins.



Transverse CT section through the mid liver level

Note multiple gas filled vessels in the liver parenchyma

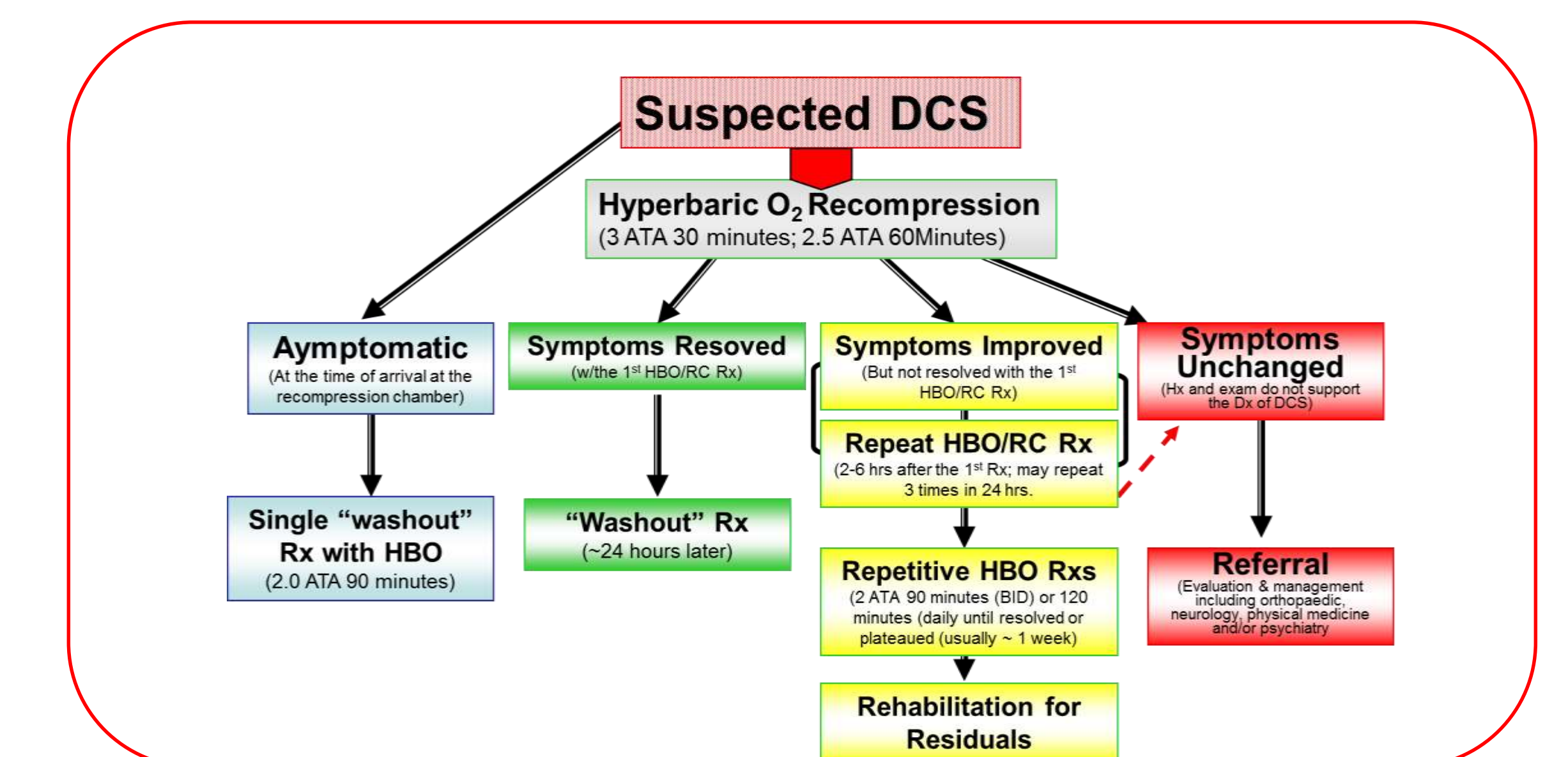
Over the next couple of hours with oxygen breathing her abdominal pain cleared completely and gradually sensation and active movement returned to her lower extremities.

**Transport and Definitive Management:** Because of the potential seriousness of the problems the patient was transferred by ambulance, a four hour ride, to our facility, the nearest one available for an emergency HBO recompression treatment. She arrived at our facility 12 hours after finishing the "dive" in the home hyperbaric chamber.

## Our Roles

**Initial Care:** Initial screening in our emergency department showed mild dehydration, tachycardia and hypoxemia with breathing room air. Her WBC was mildly elevated.

**Hyperbaric Recompression:** Next the patient was treated according to our management algorithm (using the green permutation)



**Initial Outcome:** After completing the first HBO exposure, the patient's hypoxemia cleared and all residual weakness and sensation losses resolved. A "washout" treatment was given the next day and the patient was discharged. The patient was advised not to undergo "perk-up" pressurizations again.

**Explanation for Delayed Onset Symptoms:** We postulated that this "undeserved" case of DCS was explained by our gradient-perfusion (see accompanying posters) model. The patient's finite blood volume was not sufficient to off-load gas from her tissues and digest her hearty meal simultaneously. In this case the deficient perfusion and sufficient gradient were enough to allow autochthonous bubbles to form in her liver and pelvic veins.

**Possible Legal Ramifications:** Although no laws were broken, we sought legal counsel as how to advise the patient's son. He was advised in writing to learn about chamber safety, chamber standards and indications for HBO therapy. References such as NFPA and UHMS manuals were cited. Shortly, thereafter, at a chapter UHMS meeting the patient's son was in attendance.