



## Case of the Month

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**"A 34-year-old patient presented to the Emergency Department with paraplegia after a diving incident in Oman"**

A 34-year-old male patient was referred to the Emergency Department at Zayed Military Hospital from a private hospital with a 6-day history of lower limb paraplegia. The patient was scuba diving in Oman during which he dived at a depth of close to 40 meters for about one hour when he realized that the oxygen cylinder was close to being empty. In a state of panic, he subsequently ascended quickly without the adequate precautions, and on reaching the surface went into cardiac arrest. ROSC was obtained after a prolonged CPR of 60 minutes and consciousness was regained, though he was initially disoriented and unable to mobilize both lower limbs. He was treated with 2 sessions of Hyperbaric Oxygen therapy after a delay of about 48 hours. This improved his mental status but he still complained of lower limbs paraplegia. The patient then signed leave against medical advice and self-presented to a private hospital in Abu Dhabi following which he was transferred to Zayed Military Hospital.

### FINDINGS

Initial physical examination showed:

- Temperature: 36.8 C
- Heart rate: 77 beats per minutes
- Respiratory rate: 16 breaths per minutes
- Oxygen saturation: 98% on room air

The patient was conscious and oriented to time and place. A Foley's catheter was in place. Examination of cranial nerves was unremarkable. Upper limbs examination revealed a normal sensation and motor power of 5/5. Lower limbs examination revealed a decreased sensation bilaterally with negative Babinski sign. Lower motor power was 1/5 bilaterally with diminished reflexes. CT brain scan was normal and MRI spine reported normal findings (figure 1).

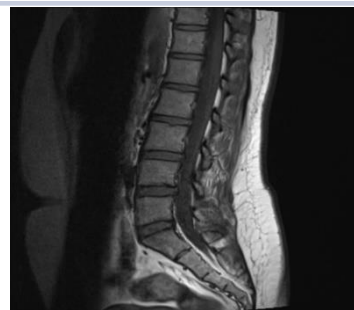


Figure 1: MRI T3 of lumbar spine shows normal study

### DISCUSSION

This was a case of Decompression Spinal injury post scuba diving as per clinical presentation. Paraplegia results from neurological type II decompression sickness due to the involvement of the spinal cord. DCS is caused by the production of nitrogen bubbles in the circulation. Three mechanisms have been postulated to explain the pathophysiology of spinal cord lesions:

- Arterial bubble embolism
- Epidural venous obstruction leading to infarction
- Autochthonous bubbles

The paramount difficulty in the attribution of spinal cord decompression sickness to arterial embolism has been the failure to recognize a natural disease of the spinal cord due to arterial micro-embolism. The patient had delayed Hyperbaric oxygen therapy which does not affect the disease prognosis. According to recent studies no difference exists in the outcome between early (within 24 hours' time) and delayed HBO therapy.

## **Decompression Sickness**

DCS is one form of dysbarism which is a general term applied to all pathological changes secondary to altered environmental pressure. DCS is caused by gas phase formed by a sufficiently rapid reduction of environmental pressure to cause supersaturation of the gases dissolved in the tissue. The principle component is most usually nitrogen. At normal altitude, nitrogen and other gases are exhaled or dissolved in the blood and tissues, However, during severe changes in altitude and air pressure, nitrogen forms gas bubbles. These bubbles block the flow of blood.

Haldane (1907) classified DCS into three categories: Type I, joint pain; Type II, systemic symptoms or signs, caused by the involvement of the CNS or the cardiopulmonary systems; and Type III characterized by convulsion and death. The first two part of classification are still the accepted standard internationally.

Type II is more common and on deep dives presents more frequently than Type I symptoms. It is obvious that joint pain is easier for a diver to recognize than symptoms affecting the nervous system. Cutis marmorata is a rare cutaneous manifestation of decompression sickness in which rash and pruritus may precede illness involving the central nervous system. Occasionally cutis marmorata is accompanied by other symptoms such as visual distortions, vertigo or mild cerebral dysfunction.

The majority of divers who have undertaken surface orientated dives experience symptoms within 3 hours of surfacing although the onset may be delayed for as long as 35 hours and even longer.

All cases of DCS should be treated initially with 100% oxygen until Hyperbaric oxygen therapy can be provided. It is beneficial to give fluids, as this helps reduce dehydration. The duration of recompression treatment depends on the severity of symptoms, the dive history, the type of recompression therapy used and the patient's response to the treatment.

### **CASE OUTCOME**

This patient was admitted under the Hyperbaric medical team at Zayed Military hospital Abu Dhabi and treated with HBO therapy twice daily for 6 days. Following this, he had a gradual resolution of paraplegia and was eventually discharged home.

### **REFERENCES**

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