Recognition is Essential

The Diver

The diver was an experienced 48-year-old female with more than 300 lifetime dives. Her medical history included hypertension that was well controlled with a single medication. She also took a prescription drug to manage her cholesterol. Her general health and fitness were otherwise good.

The Dives

The diver was on a trip at a popular Caribbean island. The first four days of diving consisted of two morning dives each day. None of these dives was deeper than 24 mt, and all bottom times were within her computer's no-decompression limits. Her second dive each day was to 18 mt or shallower, and she breathed air on all the dives. On the fifth day, her first dive was a multilevel one to a maximum depth of 26 mt for a total time of 40 minutes. The dive was uneventful, and she exited the water at approximately 11:30 a.m.

Within five minutes of surfacing, the diver began to feel slightly short of breath while she was removing her equipment. This was followed by soreness in her middle and upper back. As she was moving her equipment she noticed reduced strength in her right arm. Almost simultaneously both of her feet began to tingle, and the sensation progressed up both legs to her waist. Fatigue accompanied all these symptoms.

She reported the situation to the dive boat crew. They did not act alarmed and suggested that oxygen was not necessary because the reported weakness in her right arm resolved on its own within 15 minutes. The diver chose not to participate in a second dive. The other divers were in the water for an hour. During that time her symptoms seemed to resolve, except for the tingling in her feet.

Back at the resort the symptoms did not return, but the tingling in her feet remained unchanged. She did not engage in any vigorous physical activity that afternoon and, after dinner, retired for the evening at approximately 9:45 p.m.

The Complications

At 11:30 p.m. the diver awoke due to acute discomfort in her bladder. She discovered that she was unable to urinate and upon reflection realized she had not urinated since the dive that morning. She took a warm shower, during which she became aware of unusual sensations in her feet and patchy sensitive areas on her legs. She reported that her legs also felt rubbery. As her concern grew she contacted DAN and spoke with the medic on call. Based on the evolution of signs and symptoms she reported, the medic recommended that she be evaluated at a nearby medical facility immediately. She spoke with the resort manager, who transported her to the local clinic.

As the clinic staff began their evaluation, the first priority was to empty the diver's bladder, and they promptly did so using a urinary catheter. The staff recognized the possibility of a decompression injury and began making arrangements with the local hyperbaric facility. They also placed the diver on high-flow oxygen (15 liters per minute via a nonrebreather mask). Due to staffing issues the diver was not transferred to the hyperbaric facility for another two hours, but she did continue breathing high-flow oxygen during her time at the clinic and during transport, which was uneventful.

The Evaluation

Upon arrival at the chamber facility the diver was fully alert and oriented and able to provide the treating doctor with a detailed account of the events and the evolution of her symptoms. The physician conducted a neurological exam and discovered no problems with the diver's right arm. Strength in her arms was equal, and reflexes were normal. The soreness in her middle and upper back had not returned.

Neurological evaluation of the lower extremities revealed reduced strength in the right hip-flexor muscles compared with the same muscles on the left side. There was also reduced sensation in the left leg and patchy areas of altered sensation in the right leg. Perception of hot and cold stimuli was altered in both feet. The diver was unsteady while attempting to walk heel to toe, she found it difficult to stand on one leg, and she reported that her legs still felt rubbery. The treating physician diagnosed her with decompression sickness (DCS) Type II with spinal cord involvement.

The staff initiated a U.S. Navy Treatment Table 6 (TT6). About halfway through the treatment the diver reported improvement. Following the treatment, a repeat neurological evaluation revealed marginally improved strength in the right leg. The diver also reported improved sensation in her feet. She was helped back to the resort, where she slept for a few hours before returning for an additional treatment. During a shower she noticed improvement in her ability to distinguish hot and cold sensations. The diver's ability to walk heel to toe was also improved, and she had less trouble standing on one leg. The doctor decided to administer a second TT6, after which an evaluation showed further improvement.

The next day the diver was evaluated again and treated with a U.S. Navy TT5 (a shorter chamber treatment), again with incremental improvement. Three additional shorter U.S. Navy TT9 treatments were provided. The diver had reached a clinical plateau, showing no further improvement after the second and third TT9, so no further treatments were administered. Some slight sensory decrements were still present, but the physician's opinion was that the diver would continue to improve. After waiting the recommended 72 hours, the diver flew home and experienced no worsening of her symptoms during the flights. Two weeks later she reported continued daily improvement with only mild sensory alteration remaining in her feet.

The Discussion

It would be easy to criticize the boat crew for their failure to act; they had probably seen people dive those profiles without incident many times and were thus lulled into complacency. Further confounding this case was the spontaneous resolution of most of the diver's symptoms. Such resolution of symptoms is typically a response to breathing oxygen, but in rare cases it may even occur in the absence of oxygen first aid. Although not all of this diver's symptoms resolved, the improvement of most of her symptoms made this situation appear much less severe than it actually was.

It is important to remember that the signs and symptoms this diver exhibited can be considered profound, but even subtle signs or symptoms warrant at least an informal conversation to determine the extent of problems. Any loss of muscular strength should prompt immediate evaluation and intervention. The On-Site Neurological Assessment for Divers course provides knowledge and skills for recognizing and assessing potentially injured divers; no matter what training you have, don't hesitate to recommend that a diver seek professional medical evaluation. Regardless of whether symptoms that appear after a dive are subtle or obvious, if they resolve with oxygen first aid — or even without it — don't discount the possibility that they will return.

On-Site Neurological Assessment for Divers course

This course is an advanced-level program that provides additional training for those individuals who have successfully completed the DAN Oxygen First Aid for Scuba Diving Injuries course within the past two years (24 months).

Course Objective

The DAN On-Site Neurological Assessment for Divers Provider (“DAN On-Site Neuro Provider”) program is designed to:

- Refresh the knowledge of the warning signs of a dive emergency
- Identify when it is appropriate to conduct an on-site neurological assessment
- Conduct an on-site neurological assessment