Underwater “Hot Flash”

I received a call one evening from a 51-year-old female medical professional. She had contacted Divers Alert Network for advice regarding an anxiety or paniclike episode underwater and, after consultations, was referred by DAN to me.

Trouble in Paradise

In late 2003, the diver in question and a friend were diving in Bonaire in calm conditions typical of the locale. An experienced diver, she was certified in 1985. She keeps accurate dive logs; she told me that this event occurred on dive number 358, the first check-out dive during this trip.

She was at a depth of 94 feet (29 m), which is rather deep for a first dive on the first day, but perhaps not for an experienced diver. The diver began feeling apprehensive and anxious: she had an overwhelming sensation that something was drastically wrong. Being a well-trained dive veteran, she checked all her gauges and instruments,. No readings indicated a problem, but the anxiety and discomfort persisted.

Later, her dive buddy confirmed that no conditions in the environment should have caused any concern. No one detected any equipment failures. The diver said her regulator was adjusted later that day, and no malfunction or problem was found.

She signaled to her buddy, and the pair made a slow ascent along the reef. She felt her heart beating rapidly, and she experienced a sensation of flushing in the face and neck, like the notorious “hot flashes” of perimenopausal women.

These symptoms resolved during her ascent, and after surfacing, she had no further issues. The event did not recur during the second dive of the day, nor on any of other dives during the week, some to maximum depths of 115 fsw (35 msw).

Some Diver History

The subject, a thin, healthy woman, weighs 110 pounds and is 5 feet 5 inches tall (Body Mass Index: 18). She reported her final menstrual period as Feb. 7, 2002; she has never taken estrogens or progestins. She reported no regular aerobic training, but participates in Tai Chi and Pilates* and has a physically demanding job.

She said that, since beginning menopause, she has experienced hot flashes, or vasomotor flushing (VMF), two to three episodes daily. She addressed the problem by taking a herbal extract called black cohosh,** 40 mg, twice daily. She claims that this has not reduced the number of flushes, but it has reduced the intensity and severity of the symptoms.

She has experienced other menopausal signs and symptoms related to sleeping. While she reported no night sweats or an inability to fall asleep, she complained of a decrease in sleep quality, with “lighter” sleep and frequent interruption of sleep during the night. She offered no personal or family history of anxiety or panic disorder, depression or obsessive compulsive disorder — psychiatric diagnoses that can predispose to anxiety, especially during a stressful exposure like the underwater environment.

What’s the Scoop?

So, what happened to her? We have these prominent features as part of this underwater event:

- Rapid heartbeat (tachycardia)
- Anxiety and apprehension

- Flushing

We also know that: 1) the symptoms resolved spontaneously and did not recur. In addition, 2) the subject did not have a big nitrogen load on board, this being the first dive on the first day of her diving holiday. 3) She also was not in transit to the surface when the anxiety and flushing occurred, so embolism and other "deco" problems are unlikely. Are these complaints part of a compression-related problem or a more generic type of complaint?

Thus, we need to make a list of in-water and outof- water disorders that might provoke symptoms like these.

Causes of Rapid Heartbeat

First, let's look at a list of events that may cause tachycardia:

1. Air embolism is associated with difficulty in breathing, chest pain and much more severe problems such as altered brain function and cardiopulmonary arrest. It may be associated with rapid heartbeat as well. It typically occurs after breath-holding during ascent, even near the surface or from uncontrolled ascent to the surface. With the diver in question, none of these symptoms were present, and she had no problem with her ascent.
2. Abnormal heart rhythm, known as an arrhythmia, could lead to symptoms like these. She has no history of arrhythmia, however, and has not had evidence of one since, but it could explain the events.
3. Carbon monoxide (CO) poisoning from a contaminated air fill can be associated with irregular heartbeat, but not typically tachycardia. Other symptoms include shortness of breath, nausea, headache, dizziness, impaired mental activity, confusion and other central nervous system problems. She had none of these symptoms; plus CO poisoning usually does not resolve as quickly as the diver's symptoms did. Without treatment, individuals affected with CO poisoning usually feel terrible for a long time. Plus, bad air rarely affects only one person in a group.
4. Nitrogen narcosis. Had the diver experienced the intoxication of increased nitrogen partial pressures? With increasing depths come increasing nitrogen partial pressures , which can produce cerebral symptoms.

What Can Cause Anxiety and Apprehension?

Symptoms of these stresses have several root causes.

1. Narcosis: The first answer that comes to mind is that the diver experienced narcosis. With the onset of nitrogen excess, lots of divers, rather than getting "drunk" at depth, feel anxious and paranoid. This person, an experienced diver, has been to depth before without the same kind of feelings, but there's always a first time. Narcosis symptoms tend to be repetitious: the way you experience it initially is most likely the way you will experience it again.
2. Abnormal heart rhythm can cause anxiety. Thyroid problems can do this, too, but they would not be so abrupt in onset and resolve so quickly.
3. Anxiety-phobia disorders are an obvious diagnosis, but, again, not likely as a new experience in such an experienced diver just out for an easy swim along the reef.
4. Drugs. The diver reported using no new drugs.

What Are the Reasons for Flushing?

Last, let's look at flushing (or, becoming red in the face). Flushing can be due to allergic reactions; tumors that secrete hormones; alcohol; drugs; and food reactions like monosodium glutamate (MSG) syndrome. None of these causes for flushing appear likely in this case, though. In fact, none of the causes listed

above for this diver's underwater hot flash appears likely.

And then there is menopause.

Can menopause explain her symptoms? Menopause is associated with daytime hot flushes that start with a sense of warmth, usually in the upper thoracic region. A rising flush moves across the chest and neck, usually spreading to the face. Similar symptoms can occur at night, causing generalized sweats.

Many menopausal women complain of a rapid, pounding heartbeat; chest pressure and shortness of breath are reported as well, but are somewhat less common. These are not generally recognized as typical menopause symptoms, however. Plus, heart palpitations usually generate anxiety. Think about it: you would be anxious, too, if it felt like your heart was jumping out of your chest!

This is likely a case of underwater hot flash. While menopause is not a disease, it is associated with signs and symptoms that can be disruptive and distressing.

Our Aging Dive Population

As our diving population ages, menopause and other age-related conditions will intrude into the assessment of symptoms and the management of diving disorders. In older divers, for example, does a facial paralysis indicate a mild stroke or decompression sickness – or, perhaps even middle ear barotraumas? *** In an aging adult, is chest pain the result of an overpressure injury like pneumothorax, or is it a heart attack?

This case is important since menopause-related vasomotor symptoms need to be included in the differential diagnosis of anxiety or panic in scuba diving injuries among females. This case raised several questions:

Does hyperbaric oxygen exposure provoke hot flashes?
Does nitrogen accumulation exaggerate hot flashes?
Does narcosis precipitate or exaggerate vasomotor symptoms?

We don't have the answers to these questions yet. This case provides another lesson for dive physicians as well as anyone who cares for an injured diver. One of my first clinical professors told us at the bedside on rounds in the hospital: "Always listen to the patients. They are trying to tell you what is wrong with them."

And that's what this diver did. Although I confirmed it, she had already decided she had experienced an underwater hot flash. Because she listened to her body, she made her own diagnosis and followed through by consulting DAN.

She continues to dive but pays special attention to her episodes of flushing and subsequent anxieties when they occur. She knows it pays to pay attention to her body's signals. And that DAN is just a telephone call away.

Editor's Note

While this story has a happy ending – there were no diving-related injuries like decompression illness, narcosis, carbon monoxide poisoning, as well as cardiac issues or negative drug- or food reactions – remember to mind your diving health. Listen to your body; heed its signals. If you have questions, call the DAN Medical Information Line weekdays, 0900 to 1800 CET. If you think you have a dive emergency, call the DAN 24-Hour Diving Emergency Hotline anytime: it's open to you 24/7.

Foot-notes

* Tai Chi is a comprehensive series of gentle physical movements, and breathing techniques, with mental

and spiritual intent, which allows the participant to experience a meditative state.
The primary focus of Pilates is on awareness of the spine, proper breathing, core strength and flexibility.

** The herb black cohosh, or Actaea racemosa (formerly named Cimicifuga racemosa), is native to North America. The roots and rhizomes of this herb are widely used in the treatment of menopausal symptoms and menstrual dysfunction. Studies have demonstrated that this botanic medicine, when standardized properly to the terpene glycoside fraction, appears to be effective in alleviating menopausal symptoms. Adverse effects are extremely uncommon, and there are no known significant adverse drug interactions. significant adverse drug interactions. (Kligler B. Black cohosh. American Family Physician 2003;68:114-116).

*** Molvaer O.I et al.; Undersea Biomedical Research,Vol 14, No. 3, May 1987, 277 – 295.