

Diving Medicine Articles

Asthma & Diving

By Guy de Lisle Dear, M.B., FRCA, DAN Assistant Medical Director

One of the most frequently asked questions DAN's medical department tackles each week involves asthma and diving. Specifically, DAN medics are often asked to explain why there may be problems for a person with asthma who wishes to dive.

In this short article, DAN describes the nature of asthma and some aspects of its treatment as well as a review of current thinking on this issue in the dive medicine community. Keep in mind, however, this is still a hot topic — with a substantial amount of controversy — even among diving medical specialists.

Whether you have asthma or another medical condition, the consideration and acceptance of the risks involved in scuba diving should be an informed decision. This article provides basic information on where you can obtain additional guidance on asthma — for yourself, for prospective divers and for personal physicians.

— Joel Dovenbarger, DAN Director of Medical Services

Overview

The topic of asthma and diving has long been a controversial subject in the recreational diving community. Traditionally, divers with asthma have been excluded from diving.

Asthma is a disease characterized by narrowing of the breathing tubes (bronchi) in response to a variety of stimuli. It is not a fixed response, and a patient can have a sudden worsening in lung function, called an "attack." An asthma attack can be triggered by pollen and other so-called "allergens," cold air, irritants in the atmosphere, colds or flu.

The bronchial narrowing in asthma has two effects: one is to decrease the amount of air that can be moved in and out of the lungs. This can reduce exercise capacity — especially for a diver, who already has reduced breathing capacity due to the external resistance of his breathing apparatus and the increased internal resistance due to higher breathing gas density at depth. Secondly, reduced airway caliber could cause trapping of gas in the lung during ascent. If trapped gas expands at a rate greater than it can be exhaled through the narrowed airways, lung rupture can result, causing arterial gas embolism or pneumothorax (collapsed lung).

Another related concern with asthma and diving has been the increased propensity of airways in asthmatics to narrow when exposed to the conditions implicit in diving: inhalation of cold, dry air and/or sea water (the latter by losing the mouthpiece or from a leaky regulator). Dr. Mark Harries from the British Medical Olympic Center has pointed out that asthmatics who dive are at risk from exercise limitation, not just peripheral gas-trapping. While exercising on land it is easy enough to stop, rest and catch one's breath; this may not be possible underwater.

Discussions on Diving With Asthma

What do dive physicians think about diving with asthma? This subject has generated much discussion worldwide, and many physicians hold opposing viewpoints.

Perhaps the most liberal guidelines are from the United Kingdom, which states that well-controlled asthmatics may dive — within two guidelines:

- provided they have not needed a bronchodilator within 48 hours; and
- if they do not have cold-, exercise- or emotion-induced asthma.

In Australia, the most conservative country in this respect, all divers are expected to pass a spirometry (lung function) test, to exclude asthma, prior to certification.

As a general overview, DAN statistics show that several divers with asthma have died. It is unclear, though, from examination of their accident reports whether asthma was actually the cause of death or merely an unrelated finding. Data from the British Sub Aqua Club (BSAC) indicate that few divers die with asthma or as a result of asthma.

In addition to DAN's own research, the issue of diving with asthma was discussed at the 1995 annual meeting of the Undersea and Hyperbaric Medical Society (UHMS), the international organization comprised of diving physicians from around the world. The symposium "Are Asthmatics Fit to Dive?" was an important agenda item at that meeting.

On the general assessment of the risks of diving with asthma, the South Pacific Underwater Medical Society (SPUMS) has stated that diving may precipitate an asthma attack. Asthmatics are at risk of shortness of breath, panic and drowning on the surface.

Information from the DAN database on divers with asthma suggests that there may be a slight increase in the risk of decompression illness, but there are insufficient numbers as yet to assess the risk accurately.

The incidence of asthma in the general population is approximately 4-5 percent. Records indicate that about the same percentage of the diving population has asthma, whether or not they admit so on their diving medical forms. It appears, then, that a percentage of divers with asthma are diving safely. Bear in mind that this only represents divers who took up diving against medical advice, and who probably have mild asthma only. The true risk for all asthmatics may well be significantly higher than is currently appreciated by the statistics.

The treatment of the four forms of asthma is relevant in determining its severity (see below) and therefore the associated risk of diving.

According to UHMS discussions, the first three types of asthma (mild, intermittent, and mild-to-moderate persistent asthma), if well-controlled, may allow carefully selected divers to continue diving.

Categorizing Risks

The next question involves assessing a diver with asthma, with these two qualifications:

- Is the asthma of a mild nature; or
- Is the treatment working sufficiently to prevent an acute asthmatic attack while underwater or on the surface?

If the treatment regimen can return the pulmonary function tests to normal, especially those taken post-exercise, divers may be safe to dive and undergo the severe exercise they may need to perform while diving. Potential divers with asthma should undergo both an assessment of lung function and an exercise test to gauge asthma severity. A physician knowledgeable in diving as well as the treatment of asthma might be in a position to offer the best advice.

One consistent theme from all the medical agencies involved was the lack of good information about asthma and diving. DAN is presently working on an assessment of the whole issue. We hope to develop guidelines as to whether individuals with asthma can dive safely and under what circumstances. The best source to help you decide on the issue of diving and asthma for yourself is your physician.

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Classifications of Asthma in the United States

Some new classifications have come from the National Institutes of Health (NIH) on the diagnosis and treatment of asthma. Originally presented by Dr. A.J. Torre, a member of the National Faculty of the National Asthma Education Program (a NIH program) to the UHMS, the NIH classifications include these four categories.

Mild intermittent asthma

Signs & symptoms: Clinical features occur less than once a week and are associated with less than a 20 percent decrease in peak flow (the maximum rate of air flow during expiration). This type of asthma shows brief increases in the severity of symptoms (called exacerbation), lasting a few hours to a few days. Nocturnal symptoms occur less than twice monthly, and between acute attacks the patient should be asymptomatic, with normal lung function.

Treatment: Intermittent use of short-acting bronchodilators on an as-required basis.

Mild persistent asthma

Signs & symptoms: Peak flow should be near normal, with less than 20 percent variation, symptoms occur more than once weekly.

Exacerbation affects sleep, with nighttime symptoms often appearing more than twice monthly.

Treatment: Short-acting bronchodilators during the day and long-acting at night.

Moderate persistent asthma

Signs & symptoms: Symptoms, even a cough, can occur daily and often interfere with activities or sleep. Persons with moderate persistent asthma may require a short-acting bronchodilator. Peak flow is generally between 60 and 80 percent. Ironically, many patients with these symptoms do not believe they have asthma. Coughing with exercise or at night is an important symptom and a very likely indicator of this type of asthma.

Treatment: Daily medication, usually inhaled steroids, is required and may require short-acting bronchodilators for acute episodes.

Severe persistent asthma

Signs & symptoms: Persons with this type of asthma have continuous symptoms and peak flows of 60 percent of normal or less. An increase in symptom severity occurs frequently, limiting physical activity, and nocturnal symptoms occur frequently.

Treatment: Long-acting bronchodilators, oral steroids are required as well as bronchodilators in the acute episodes.

Obtain additional information from:

UHMS "Are Asthmatics Fit to Dive?" Workshop Report April 1996; UHMS 10531 Metropolitan Ave., Kensington, MD
UK Sports Diving Medical Committee Report 1995 British Sub-Aqua Club (BSAC), Telford's Quay, Ellesmere Port, South Wirral, Cheshire L65 4FY

South Pacific Undersea Medical Society Workshop Report (SPUMS) 1995; SPUMS c/o Australian and New Zealand College of Anaesthetists,

630 Saint Kilda, Melbourne, Victoria 3004 Australia

Global Initiative for Asthma 1995 Report (NIH 95-3659)

From the January/February 1997 issue of *Alert Diver*.