

Scanning for Blebs

DAN clarifies questions on testing divers who may have experienced pulmonary barotrauma

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Pulmonary barotrauma is a condition that usually happens at the end of a dive. The term refers to the rupture of lung air sacs, which generally occurs during ascent. Gas that leaks from a ruptured lung can enter one of three places:

- the area around the heart (causing pneumomediastinum or mediastinal emphysema);
- the pleural space between the lung and chest wall (causing pneumothorax);
- the bloodstream (causing arterial gas embolism).

Pulmonary barotrauma can be caused by breath-holding during ascent, by a rapid ascent or by certain lung diseases.

Lung diseases that can cause an increased risk of pulmonary barotrauma include those in which there is obstruction to gas flow, such as asthma that has not responded fully to treatment, and lung scarring or inflammation (such as sarcoidosis, eosinophilic granuloma or interstitial fibrosis).

The most common lung condition that predisposes an individual to pulmonary barotrauma is balloon-like extensions of air sacs (known as blebs or bullae). These sacs are believed to be caused by degradation

of elastic fibers in the lung due to inflammation. They are most frequently found in smokers, but they can also occur in non-smokers. Because these sacs are thin-walled, and during exhalation tend to empty their air slowly, pressure can build up during ascent and they may rupture. Dive physicians recommend specific testing for divers who have experienced pulmonary barotrauma before they return to scuba diving. The evaluation may include a set of breathing tests, a chest X-ray or computed tomography of the chest (CT or 'CAT' scan).

Some people experience pneumothorax while engaged in everyday activities (i.e. without diving). This is referred to as spontaneous pneumothorax. Most people (although not all) with this condition have blebs that can be detected using a CT scan.

Pneumothorax or gas embolism in divers can be permanently disabling or fatal. Furthermore, there is evidence that divers who have experienced spontaneous pneumothorax are at greater risk of either pneumothorax or gas embolism while diving. Therefore, most dive physicians recommend that individuals who have experienced spontaneous pneumothorax should not dive.

If, after dive-related pulmonary barotrauma, there is a satisfactory operational cause - an accidental rapid ascent, for example - AND if

specific testing, which may include CT scanning, reveals no evidence of underlying lung disease, then the diver can consider a return to diving. The final decision should be made in consultation with a physician.

Hence the most prevalent recommendation is that people with a history of spontaneous pneumothorax should not dive under any circumstances, even if testing or imaging reveals apparently normal lungs.