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## Spontaneous pneumomediastinum in a scuba diver

### 一名水肺潛水員出現自發性縱膈氣腫的病例

Pneumomediastinum usually occurs following an airleak from the lungs, or from a perforated oesophagus. We report on a 30-year-old man who developed pneumomediastinum after scuba diving. The patient presented with acute onset of throat pain, odynophagia, and hoarseness of voice. The literature is reviewed for this condition.

縱膈氣腫通常因空氣由肺部或被穿破的食道洩漏所引致。我們報告一名三十歲男性在水肺潛水活動後出現縱膈氣腫。他病發時出現急性喉嚨痛和吞嚥痛，聲音嘶啞。我們亦就此情況回顧文獻紀錄。

#### Introduction

Pneumomediastinum usually occurs as a result of a pulmonary airleak that is induced by a variety of conditions. One important differential diagnosis is perforated oesophagus. We report on a patient who presented with pneumomediastinum after scuba diving.

#### Case report

In August 2004, a healthy 30-year-old man who was a professional scuba diver presented with acute onset of throat pain after diving to a depth of around 40 feet. He also complained of odynophagia and hoarseness of voice. He had no fever, chest pain, or dyspnoea and his pulse rate was 69 beats per min and blood pressure was 154/81 mm Hg. Subcutaneous emphysema was detected in his right neck and upper chest wall. Air entry to both lungs was equal and satisfactory. Laboratory analyses showed mildly elevated white cell count ( $11.6 \times 10^9 /L$ , with neutrophil predominance,  $7.9 \times 10^9 /L$ ) and normal liver and renal functions.

Lateral neck radiograph revealed an abnormal gas shadow in the retropharyngeal area and subcutaneous emphysema. Chest X-ray revealed pneumomediastinum without evidence of pneumothorax. This was confirmed on computed tomographic scan (Fig). A subsequent contrast swallow study ruled out oesophageal perforation. The patient was treated conservatively and was discharged on the third day after radiograph confirmed complete resolution of the pneumomediastinum.

#### Discussion

Spontaneous pneumomediastinum, first reported by Hamman in 1939,<sup>1</sup> is an uncommon self-limiting condition that predominantly affects young, tall, thin, and healthy men in the second to fourth decades of life and, occasionally, pregnant women. It has been reported in patients undergoing mechanical ventilation, following ecstasy abuse, women in labour, hyperemesis gravidarum, diabetic ketoacidosis. Occurrence has also been linked with underlying pulmonary conditions such as asthma, idiopathic pulmonary fibrosis, severe acute respiratory syndrome, and with sporting activities such as weightlifting,<sup>2</sup> football,<sup>3</sup> basketball, and volleyball.<sup>4</sup>

Diving-related diseases include decompression sickness, baro-sinusitis, perforated tympanic membrane, temporo-mandibular joint dysfunction, arterial

#### Key words:

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**Fig. Computed tomographic scan showing obvious pneumomediastinum**

gas embolism, and hyperbaric-triggered migraine.<sup>5</sup> Up to 2.3% of experienced divers have been reported to develop permanent disabilities such as balance disorders, hearing loss, and tinnitus.<sup>6</sup> Pulmonary airleaks may result from pulmonary barotrauma sustained during scuba or compressed air diving, with rupture of the terminal alveoli secondary to increased intrathoracic pressure. Air tracks along the peri-bronchial vascular sheaths towards the hilum of the lung and spreads through the tissue plane, causing subcutaneous emphysema, pneumoperitoneum, pneumothorax, and even pneumopericardium. The incidence of diving-related pneumomediastinum is nonetheless unknown.

Diagnosis of pneumomediastinum is largely based on clinical findings and imaging. In most cases, it can be demonstrated on routine chest X-ray, although the diagnosis may be missed in up to 30% of cases, especially when

it is mild. Computed tomography of the thorax increases the chance of diagnosis and provides additional information about any co-existent pathology.<sup>7,8</sup>

Pneumomediastinum is not usually fatal although cases of tension pneumomediastinum have been reported.<sup>9</sup> Pneumothorax can be fatal when it occurs under water and may rapidly progress to a life-threatening tension pneumothorax when the diver surfaces (much more rapidly than on land because of Boyle's Law). Other diving-related problems can also be serious. When simple pneumomediastinum is diagnosed, prompt recognition of the underlying condition and exclusion of potentially life-threatening conditions with similar symptoms (such as dissecting aortic aneurysm, angina pectoris, and mediastinitis) remain the first priority. Divers may continue to dive despite medical contra-indications. Physicians should thus be aware of the possibility of pneumomediastinum, its differential diagnoses, as well as other potential complications that arise from scuba diving.

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