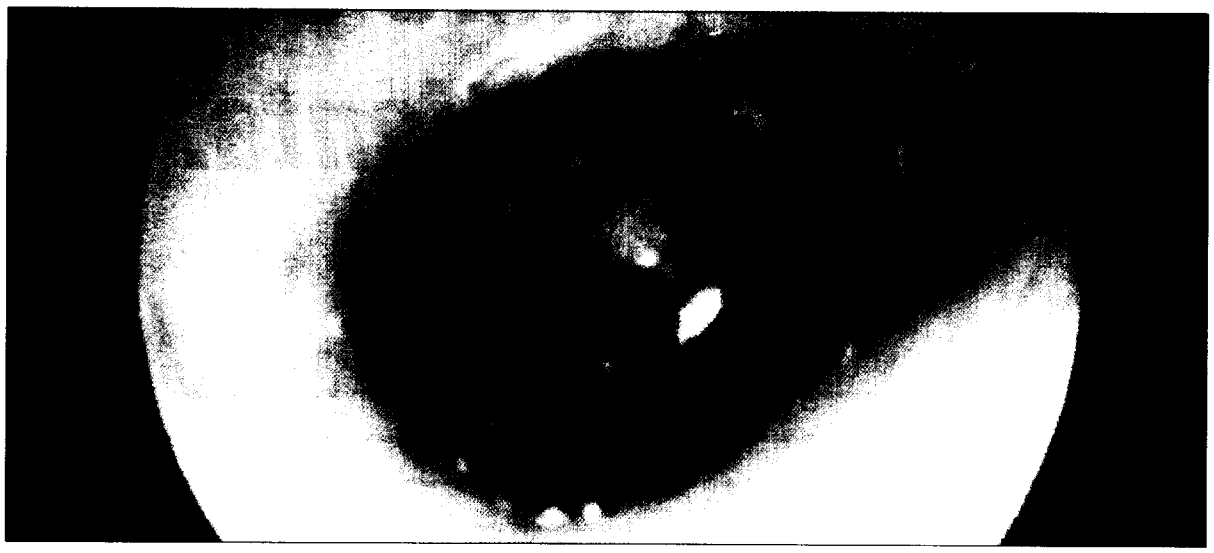
Otitic barotrauma in a nurse attending a patient receiving hyperbaric treatment



A previously fit and healthy 24-year-old female nurse experienced trauma to the middle ear while accompanying a patient in a hyperbaric chamber. Prior to entering the chamber, a senior otolaryngologist had confirmed that she had a normal nasal airway and ears. As soon as the pressure in the chamber was increased, she noted severe discomfort in her left ear; the pain was not relieved by Valsalva manoeuvre. Tank pressurisation was slowed but the pain persisted and by the time pressurisation was complete, her hearing was impaired. A pressure of 2.4 absolute atmospheres was maintained for 90 minutes during which time the pain in her ear remained unchanged. Depressurization brought about some reduction in the ear pain but no change in the hearing impairment. One week later, the otalgia had ceased but the deafness persisted. The above photo was taken at this time and shows an intact drum and blue discolouration of the tympanic membrane, characteristic of traumatic middle ear effusion due to barotrauma; no surgical intervention was required. The nurse did not attend the hyperbaric chamber again. One month after the initial episode, her ear and hearing had returned to normal. Middle ear complications have frequently been noted in patients having hyperbaric oxygen therapy and some require ventilation tube insertion to alleviate severe discomfort and allow treatment to continue. Discomfort should be actively treated to avoid further pain and perforation of the tympanic membrane. Topical vasoconstriction in the nose using oxymetazoline appears effective in reversing the process. Predicting who will develop barotrauma requires measurement of eustachian tube function. Valsalva manoeuvre is the most crude way to achieve this but is unreliable. Measuring middle ear pressure tympanometrically is a useful guide to the degree of barotrauma once it has occurred, but it cannot accurately predict those who will develop barotrauma. Patients should be instructed in the Valsalva manoeuvre and should administer topical nasal decongestants as needed, to avoid the development of otitic barotrauma.

This case demonstrates that otitic barotrauma can occur in an individual with normal ears and a normal nasal airway. The nurse only developed unilateral symptoms and it is likely that the two eustachian tubes had differing opening pressures. On performing a Valsalva manoeuvre, she was able to open only the one tube with a lower opening pressure. This highlights the importance of establishing eustachian tube function in both ears prior to entering a hyperbaric treatment chamber and that tubal function and middle ear pressure should be monitored during therapy in both patients and their escorts. If there is any suggestion of developing barotrauma, topical nasal decongestion may rapidly reverse the problem. If this fails, ventilation tube insertion may be required to allow the treatment to be completed.—*Submitted by PMJ Scott, JKS Woo, CA van Hasselt, Department of Surgery, Division of ENT, The Chinese University of Hong Kong, Shatin, Hong Kong.*