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Delayed Otitic Barotrauma

(A Case Report)

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A case of delayed Otitic Barotrauma leading to perforation of tympanic membrane is reported. The trauma occurred almost after 18 hours of flying. Breathing 100% oxygen from take-off to landing, appears to be the predisposing factor in this case.

Case Report

Fg Offr RM F(N) of a bomber squadron flew for an air test sortie at 0810 hours on 27 Sep 85. The sortie was of 40 minutes duration. After take-off, aircraft climbed to 40,000 feet at the rate of 3000 feet/min. Certain test procedures were carried out at that altitude for about 10 minutes, following which, he descended to 20,000 feet and then rejoined circuit to land. The rate of descent was 3000 feet/min. There were no complaints of any nature during the sortie. He breathed 100% oxygen through out the sortie right from the ground level. After landing, the navigator did his routine work during rest of the day and went to sleep at 2300 hours. At 0230 hours on 28 Sep 85, he suddenly woke up with severe pain in his left ear. He tried to sleep again but could not do so, due to persistence of pain in the ear. The pain abruptly disappeared at 0630 hours and he was able to sleep for few hours. He reported to authorised medical attendant at 0930 hours. He had no history of cold or upper respiratory tract infection or any other predisposing factor.

Examination of left ear revealed a linear tear in posteroinferior quadrant of tympanic membrane with haemorrhage. The clotted blood was also seen in the external auditory canal. Blood vessels along the handle of malleus were engorged.

He was treated with antibiotics, decongestants and antihistaminics. The perforation healed in about a week and haemorrhage resolved in about two weeks. His eustachian tubes were patent and he was considered fit for flying after a routine profile of ear clearance test in the aircraft.

Discussion

This aircrew suffered from a typical attack of otitic barotrauma almost 18 hours after the sortie.

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This form of delayed otitic barotrauma is comparitively uncommon.

The MK 17-E oxygen regulator used in Canberra aircraft has been permanently adjusted to ensure 100% oxygen delivery Oxygen will enter the middle ear with each valsalva manoeuvre done to equalise the pressure during descent. This oxygen in due course is absorbed creating a negative pressure which is the cause of delayed otitic barotrauma The pressure gradient will be higher with 100% oxygen in the middle ear as compared to oxygen enriched air. Thus an aircrew flying with regulator at 100% oxygen is more prone to delayed otitic barotrauma. The period of absorption varies anywhere between 6-12 hours, but the delay was 18 hours in this case. The extent of damage varies from pain to haemorrhage and rarely perforation of tympanic membrane.

Judicious and prompt medical attendance enabled aircrew to return to flying within 2-3 weeks. Any kind of ear drops in the affected ear are contra indicated.

Conclusion :

100% oxygen breathing from take-off to landing is a predisposing factor to delayed otitic barotrauma. The extent of damage to the middle ear can range upto perforation of tympanic membrane. Proper medical attendance will enable an early return of aircrew to flying.