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Clinical Records

Recurrent facial nerve palsy on flying

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Abstract
We report a case of a patient who experienced transient recurrent facial nerve palsies during flights on commercial aeroplanes. Although this condition is well recognized in divers, only six cases have been reported to occur on flying. The pathophysiology of this condition is discussed.

Key words: Facial Paralysis; Barotrauma

Case report

A 38-year-old man presented with a history of recurrent transient incomplete facial nerve palsy, that had occurred on six occasions over a seven-year period. Each episode occurred during ascent in flights on commercial aeroplanes. The patient described the inability to close his eye fully and drooping of the mouth on the same side on each occasion. Independent observers on the flight had confirmed this. On each occasion the paralysis resolved spontaneously 20 to 30 minutes after onset. Apart from an added sensation of a 'blocked ear', the patient denied any other otological symptoms. The patient denied any past history of otological problems, or symptoms of eustachian tube dysfunction preceding the flight. In between those episodes he has been asymptomatic. Tympanometry carried out in between episodes has shown normal shaped curves with peaks at minus 16 and 20 daPa in the right and left respectively. He had no risk factors for cardiovascular disease and on examination there were no audible carotid bruits. He has now undertaken more than 10 flights since he had ventilation tube insertion three years ago without any recurrence of his facial nerve palsy.

Discussion

Aural barotrauma is caused by the difference between the pressure in the middle ear and that in the external or inner ear. Facial baroparesis is the term used to describe facial nerve palsy secondary to barotrauma.[1] Facial baroparesis has been previously described in divers,[2] and our literature search has revealed only six previous reports occurring on aeroplanes.[2–4]

The cabin altitude in a commercial aircraft cruising at 35 000 feet, which is normal for overseas flights, is approximately 8 000 feet. If the flight starts at sea level then the theoretical maximum pressure difference between the middle ear and the cabin atmosphere at cruising level would be 266 cm H_2O (26.1 Kilo-Pascals), which greatly exceeds the mean capillary blood pressure.[2] Under normal circumstances equilibrium would be achieved by gas escaping from the middle ear through the eustachian tube to the nasopharynx because of the large pressure gradient. Any delay in this equilibration may result in elevated pressures within the middle ear.

Although reduced conductivity and neuropraxia due to extremely elevated hydrostatic pressure have been demonstrated in isolated nerve preparations,[5] other evidence suggests that facial baroparesis is due to ischaemic neuropraxia. In studies carried out on guinea pigs to assess the effect of increased middle-ear pressure on blood flow to the middle and inner ear, it has been noted that blood flow to the middle ear is lowered, but blood flow to the inner ear is unchanged.[6] Blood flow to the facial nerve also decreased if middle-ear pressure transmitted through a dehiscent facial nerve canal. In a large study of 535 human temporal bones dehiscence of the fallopian canal was found in 55 per cent of temporal bones.[7]

It is puzzling that in most cases, unlike this case, the palsy only occurs once in a lifetime in spite of regular diving or flying.[2] This has led to speculation that certain conditions must coexist to precipitate the palsy. These include eustachian tube dysfunction,[1] hypotension,[8] or a 'subclinical infection' with one of the 'neurotropic viruses'.[9] In divers, however, it appears that the condition is under-reported, or even concealed by the diver.[2]

Most cases of facial paralysis associated with air flight resolve spontaneously. If recurrent, the palsy can simply be prevented by ventilation tube insertion.

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