

Airplane headache in pediatric age group: report of three cases

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Introduction

Headache disorders in children and adolescents are common disabling problem with a significant impact on the quality of life of both children and parents [1, 2]. Airplane headache (AH) is a rare form of headache disorders associated only with airplane travel; in particular, with an onset of the pain during taking-off or landing or both [3]. In the literature, AH cases have been reported only in adults so far. Currently, we represent three AH cases in pediatric age group with their clinical manifestations, treatment strategies and 12-month follow-up results.

Cases

Case 1

A 12-year-old girl suffered from headache attacks triggered only by airplane descents with a mild onset in the right or

left periorbital and orbito-frontal region for the last 10 months. They were pulsatile in character and then became severe in a couple of minutes. Duration of these attacks were 10–20 min, and her parent mentioned that she felt completely comfortable 15–20 min after the plane had landed.

Her past medical history indicated that she had had allergic rhinitis starting from age 10 years and had allergy to polens. Paranasal sinus tomography (PST) and cerebral magnetic resonance imaging (MRI) showed nasal mucosal wall thickening and inflammation. She was recommended to take only a single dose of Ibuprofen, 10 mg/kg/dose, 1 h prior to airplane landing. In addition, antihistamine and nasal decongestant were given to the patient as a prophylactic treatment. She was invited to control visits after her airplane travels.

She experienced three airplane travels more and performed headache-free landings without any complication after the treatment.

Case 2

A 13-year-old boy had described headache attacks triggered by both airplane ascents and descents for the last 2 years. During these flights, he suffered from pulsatile severe headache attacks with a location in the right or left orbital and orbito-frontal region. His attacks started when the airplane began ascending, continued during ascent and lasted for 10–15 min after the airplane reached to a constant altitude. But again, his headache attacks started during descending of the airplane and got worse in a couple of minutes and lasted for 15–20 min after the airplane had landed. He was symptom free during the daytime.

Adenoidal and tonsillar hypertrophy were detected in his ear–nose–throat examination. Both PST and cerebral MRI

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studies supported this diagnose. He underwent adenotonsillectomy surgery. After recovery, he performed two more airplane travels without any complaints.

Case 3

A 14-year-old girl who had a history of 11 airplane travel without any complication for the last 4 years has described headache attacks associated with her last two flights. When the airplane started descending, she suffered from headache attacks with a mild onset in the right periorbital and orbito-frontal region. Her headache attacks were pulsatile in character, continued 10–15 min and lasted for 20–25 min after the airplane had landed.

PST and cerebral MRI studies showed acute sinusitis of the ethmoid, right frontal and right maxillary sinuses. She was given antibiotic and antiinflammatory treatment and was followed-up until she recovered completely. After the recovery, she experienced two airplane travels more and reported that she performed headache-free landings without any complication.

Discussion

Many mechanisms have been suggested to disclose the complex mechanism of AH, but it still remains uncertain. However, many etiologic and causative factors have been revealed in this process. Nasal septum deviation, acute frontal intraparenchymal pneumatocele, concha hypertrophy, edema and inflammation of nasal mucosa, polypoid mass of frontal sinus have been detected in patients who experienced headaches during airplane [4, 5]. Pfund et al. have suggested that impaired sinonasal ventilation and sinus barotrauma due to mucosal inflammation create a base for not only the AH, but also for the prolongation of symptoms. Effective therapy with antihistamine and nasal decongestant supports the theory that sinonasal barotrauma plays a triggering role in the pathophysiology of AH [6]. Our first case also confirms this theory.

The most viable hypothesis is that the sensory nerves of the paranasal sinuses and nasal mucosa which are the branches of the trigeminal nerve (TN) may play a major role in AH. The fact is that the cabin pressure (CP) of an airplane is not strictly constant and it is affected by the ambient pressure during ascents and descents of the airplane. The adaptation capability of the arteries of the cranium to rapid CP changes may vary in the population. Conceivably, disadaptation to the CP changes during ascents or descents or both can induce changes in the

diameter of the ethmoidal and other intra/extra-cranial arteries. This condition may act as a triggering stimulus on the nociceptors of ethmoidal artery and then lead to a headache in the orbital and/or supraorbital area via the the trigeminovascular system [4, 7].

The ambient pressure rapidly increases most commonly during the airplane descent and exposes paranasal sinuses to barotraumas. If the pressure in the obstructed sinus(es) remains relatively low, there will be a vacuum effect which is also named as “the squeeze” resulting in an injury and edema of the mucosal layer of the sinus(es). Pain then rises from the TN as a result of this pressure-induced injury. Conversely, paranasal sinuses may also be exposed to barotrauma during airplane ascent. Decrease in the ambient pressure results in relatively increased pressure in the paranasal sinus(es) which is also named as “reversed squeeze”. This positive pressure in the sinus(es) may cause mucosal edema and inflammation resulting in pain rising from the TN [8, 9].

Barotrauma due to nasal mucosal inflammation, adenoidal and tonsillar hypertrophy and sinusitis is found to be responsible for AH in our cases. These three cases indicates that for the children, especially presenting with the first episode of sudden severe headache during an airplane flight, the complete evaluation for the evidence of barotrauma should be performed. In addition, treatment options should be taken into consideration upon the etiology of AH.

Conflict of interest None.

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