



Trigeminal Autonomic Headache Secondary to Submucosal Hemorrhage of Frontal Sinus Caused by Barotrauma

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Introduction

Headache attributed to airplane (AH) travel was formalized in International Classification of Headache Disorders III Beta Edition (ICHD III-B) in 2013 and in the past few years, several cases of this condition have been reported. In this condition, ipsilateral nasal congestion or tearing may occur in 5% of cases and usually magnetic resonance imaging (MRI) studies are normal but a small patient group shows inflammation and thickening of the mucosal wall in the sinuses.

Recurrence of the pain is required to fulfill diagnostic criteria for AH. In this case study we illustrate a patient with a similar clinical presentation to AH but with evidence of submucosal hemorrhage of the frontal sinus.

Objectives

1. Describe a case of headache with trigeminal autonomic characteristics due to submucosal hemorrhage of the frontal sinus secondary to barotrauma.
2. Describe the neuroimaging findings that suggested the diagnosis

Case Report

A 28-year-old male patient with no significant past medical history or prior headache history presents with abrupt sharp, severe pain above the right eye with its peak within seconds and lasting about 5 minutes, described as the “worst pain of life”. The pain was associated to ipsilateral trigeminal autonomic symptoms such as conjunctival injection, lacrimation, nasal congestion, rhinorrhea, and semi ptosis. Episode began while traveling during plane descent and improved minutes before landing persisting with just a subtle discomfort during the rest of the day. During the event, the patient was able to film by smartphone the autonomic features. Symptoms suggestive of upper airway infection or sinusopathy were absent. After the episode, subtle right semi ptosis persisted for about 4 days with progressive resolution and no specific treatment was needed due to the spontaneous improvement.

MRI and MRI angiography was performed three days after the headache and depicted T2/FLAIR and T1 hyperintense lesion in the right frontal sinus above the orbit without enhancement after contrast injection. SWI sequence showed hypointense signal. MRI angiography was normal. Noncontrast CT scan was performed which showed a soft tissue density lesion in the right frontal sinus.

Discussion

Based on clinical presentation and imaging findings, the diagnosis of headache secondary to submucosal hemorrhage of frontal sinus was made. The effects of pressure variations during the flight may cause inflammation of the paranasal sinuses resulting in a reduced ventilation of the sinuses and causing a “vacuum effect” that leads to barotrauma and submucosal hemorrhage. This mechanism may be predisposed by anatomical variations causing reduced patency of the nasal pathways and difficult to equalize the pressure between sinuses and atmosphere.

The hypothesis to explain the clinical presentation in this case is that the damage of the sinuses and nasal mucosa that receive sensory innervation from the trigeminal nerve may activate the trigeminovascular system leading to headache with trigeminal autonomic features.

In the author’s opinion, although the patient experienced a single episode and do not meet diagnosis criterion for AH the submucosal hemorrhage in this case may suggest that the pathophysiology of AH is related to minimum barotrauma, insufficient to be identified on neuroimaging.

Conclusion

This case report illustrates a rare presentation of frontal sinus barotrauma making differential diagnosis with trigeminal autonomic cephalalgias. Neuroimaging was essential to rule out other secondary causes of thunderclap headaches, especially posterior communicating artery aneurysm rupture in view of persistent semi ptosis. The correct diagnosis and explanation about this condition to the patient is essential due to the psychological implications, such as anxiety and fear of airplane travels.

Keywords: Trigeminal; Barotrauma; Thunderclap.