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Barosinusitis

Jasdeep Kaur*
Balwant Rai, BDS,**
Maria Catalina***

ABSTRACT

Aerosinusitis, also called barosinusitis, sinus squeeze or sinus barotrauma is a painful inflammation and sometimes bleeding of the membrane of the paranasal sinus cavities, normally the frontal sinus. It is caused by a difference in air pressures inside and outside the cavities. Most cases occur in scuba divers and fliers, and is easily diagnosed when presented to physicians immediately after exposure.On the other hand, the problem may remain undiagnosed when the history fails to relate the symptoms to exposure to environmental pressure changes or if the focus is on other etiologies.This paper reviwed the sign and symptoms , diagnosis of barosinusitis Kay words- Barosinusitis, flying, pressure

INTRODUCTION

Barotrauma of the paranasal sinuses is a risk factor for anyone exposed to ambient pressure changes. These pressure changes most often result from travel through mountainous regions, flying, or diving. Barosinusitis is characterized by inflammation of one or more of the paranasal sinuses. Inflammation is caused by a pressure gradient, almost always negative, between the sinus cavity and the surrounding ambient environment.

INTRODUCTION

Barosinusitis: occurs in divers, pilots, and flight attendants; may occur in conjunction with severe rhinosinusitis on CT, although, in some cases, CT negative; recommendation-consider operating on grounded pilot with focal disease, negative CT, and disease pattern consistent with barosinusitis; in one study, 98% of pilots grounded for barosinusitis returned to work after functional endoscopic sinus surgery (FESS).

PATHOPHYSIOLOGY

The paranasal sinuses have rigid walls with relatively small ostia for gas exchange and mucus transport. Physical gas laws, particularly Boyle's Law, apply to this space. Boyle's Law states that at constant temperature, the volume of a gas is inversely proportional to the pressure placed upon it.

To show how Boyle's Law affects the sinuses, consider the case of an individual with normal sinuses exposed to pressure changes while flying in an unpressurized aircraft. As the individual transitions to higher altitude, the ambient pressure surrounding the sinus cavity decreases, and the air in the sinuses expands and equalizes through the natural ostium. Upon descent, ambient air pressure increases, the air in the sinuses contracts, and air moves into the sinus cavity, preventing a pressure gradient from developing.

Author's Affiliation *School of Dentistry, Oral Pathology and Maxillofacial Surgery, **MS Forensic Odontology, Health and asefety officer, crew- 78, Oral Imaging center, School of Dentistry, Oral Pathology and Maxillofacial Surgery, ***SPA - Space Port Academy SSA - NASA JPL Solar System Ambassador , NASA, USA

Reprint Request: Dr. Balwant Rai, MS, Crew-78 Health and Safety Officer,USA.

Email-drbalwantraissct@rediffmail.com

Now consider the same flight in someone who has an upper respiratory tract infection (URTI) with tissue edema and secretions blocking the natural sinus ostia. In this individual, tissue edema and debris will not allow free pressure equalization. Again, as the individual moves up in altitude, the ambient pressure decreases, and volume in the sinus cavity increases. A positive pressure develops in the sinus. With this positive pressure, tissue edema gradually decreases enough to allow debris and air to escape the natural ostium. Air pressure then equalizes. When the individual descends, the ambient pressure increases. Pressure cannot equalize across the nasal cavity to the sinus because of blockage at the ostium. Air volume decreases in the sinus cavity, creating a negative pressure.

At this point, a condition exists in which the volume of the sinus must be filled if the pressure gradient is to be eliminated. In mild-to-moderate cases, vascular engorgement and generalized submucosal edema occur. Over time, transudate and mucus fill the volume, reducing negative pressure and decreasing symptoms. In severe cases, especially with rapid onset, the sinus mucosa is stripped from the subjacent bone, resulting in severe pain and hematoma formation.

CLINICAL HISTORY

Differentiate sinus barotrauma from other causes of facial pain and headache. The history is particularly important in shortening the differential. In sinus barotrauma, a condition of barometric pressure change always exists either during or shortly after onset of symptoms.

1. With mild sinus barotrauma, the patient reports the following:
2. Mild pressure or pain over 1 or more of the sinuses that develops after return to sea level or starting point
3. Worsening congestion
4. Occasional epistaxis
5. With more severe sinus barotrauma, the patient notes the following possibly incapacitating symptoms:
6. Sudden onset of typically severe and sharp pain and pressure
7. Pain is typically in the forehead, mid face, or retro orbital.
8. Epistaxis

PHYSICAL

Physical findings may be relatively sparse in mild cases of barosinusitis. In severe cases, the patient may have marked pain in the forehead, face, and upper teeth. This pain is typically unilateral. Erythema, edema, congested mucous membranes, epistaxis, and tenderness to palpation of the face may occur.

CAUSES

The following activities and conditions place individuals at particular risk for barosinusitis:

1. Scuba and sport diving
2. Sky diving
3. Flying in military/high-performance air craft
4. URTI or sinusitis in persons exposed to pressure changes
5. Poorly controlled allergies or anatomic ab normalities of the nose and paranasal sinuses

Other Problems to Be Considered

Seasonal or perineal allergic rhinitis

Mucosal irritation from smoke or other environmental agents

Nasal polyposis

Nasal septal deviation

Concha bullosa

Infraorbital ethmoid cells

Benign or malignant sinus or nasal cavity tumors

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Differential Diagnoses

Allergic Rhinitis
Malignant Tumors of the Nasal Cavity
Malignant Tumors of the Sinuses
Nasal Polyps, Nonsurgical Treatment
Nasal Polyps, Surgical Treatment
Sinusitis, Acute, Medical Treatment
Sinusitis, Chronic, Medical Treatment
Sinusitis, Ethmoid, Acute, Surgical Treatment
Sinusitis, Frontal, Acute, Surgical Treatment
Sinusitis, Fungal
Sinusitis, Maxillary, Acute, Surgical Treatment
Sinusitis, Maxillary, Chronic, Surgical Treatment
Sinusitis, Sphenoid, Acute, Surgical Treatment
Turbinate Dysfunction