Valsalva Associated Hyperpneumatization of Skull Base Treated with Pressure Equalization Tubes

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Abstract

Objective: To describe a case of skull base hyperpneumatization associated with frequent Valsalva maneuvers which responded to bilateral pressure equalization tube placement.

Methods: The patient's clinical course, radiographic images, audiograms, vestibular testing, and relevant literature were reviewed.

Case Report: A 39 year old female presented with a five year history of progressively worsening dizziness, headache, aural pressure, and autophony. The patient frequently performed Valsalva maneuvers to relieve her aural fullness. A computed tomography (CT) scan did not demonstrate a semicircular canal dehiscence but did show massive aeration of the temporal bone, skull base, calvarium, and upper cervical vertebrae. Bilateral pressure equalization tubes were inserted which relieved her aural pressure and unexpectedly resolved her dizziness, headache, and autophony. A 4 month follow up CT scan demonstrated significant improvement of the hyperpneumatization.

Conclusions: Hyperpneumatization of the skull base is a rare condition which can result from chronic Valsalva maneuvers. The symptoms of this abnormality may be varied and mimic a number of disorders. Pressure equalization tube placement can improve both the symptoms and imaging findings of skull base hyperpneumatization.

Background

•Pneumatization patterns of the skull base are considerable different between individuals

•Craniocervical hyperpneumatization of the skull base without a history of trauma has been previously reported 7 times to our knowledge

•Hyperpneumatization has been associated with abrupt pressure changes, direct trauma, and frequent Valsalva maneuvers

Case Report

•39-year old female with a history of performing Valsalva maneuvers for over 5 years to relieve right sided aural fullness

•Presented with symptoms of vertigo, aural pressure, autophony, and headaches

•Vertigo and headaches were triggered by Valsalva maneuvers

•Audiogram, computerized dynamic posturography and videonystamography testing were within normal limits

•Imaging revealed vast pneumatization the clivus, sphenoid bones, temporal bones, C1, occiput, and calvarium

•Advised to stop habitual Valsalva maneuvers

•Returned 3 years later after being lost to follow up

•Despite cessation presented with exertional headaches and progressive pneumatization on CT imaging

•Bilateral pressure equalization tubes were placed

•Patient experienced nearly immediate relief of symptoms after tube placement

•Four months following surgery the patient had complete resolution of her symptoms

•Follow up CT and MRI at 6 months showed areas of previous pneumatized bone filled with fluid while other areas showed reversion to signal characteristics closely resembling blood products and/or red marrow

Discussion

•Hyperpneumatization of the skull base is a rare condition which can result from chronic Valsalva maneuvers

•Patients may present with vertigo, hyperacusis, aural fullness, subcutaneous emphysema, a cervical mass, and neurologic deficits related to epidural emphysema

•In cases of hyperpneumatization, the eustachian tube is thought to act a as ball valve in which air is forced into the middle ear cavity faster than it can escape

•Conservative management with cessation of Valsalva maneuvers and/or placement of pressure equalization tubes have been used to relieve symptom and reverse imaging findings

•In our patient, hyperpneumatization was associated with Valsalva maneuvers and managed with cessation of Valsalva and pressure equalization tubes

•A 2 year follow up MRI scan to evaluate the progression of possible marrow replacement of the pneumatized spaces is pending

References