A Case Of Fluid In The Right Occipital Condyle Secondary To Persistent Increase In Intracerebral Pressure

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Citation

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Abstract

In a case of Cerebrospinal Fluid (CSF) leak from the ear, radiological investigations are mainly performed to examine and evaluate the mastoid bones. Occipital condyles are often overlooked. The usual causes for CSF to leak into the ear are related to factors that cause an increase in intracerebral pressure. Similar factors may also be responsible for the formation of a pneumatocele and subsequent pneumatisation of the mastoid and occipital bones. Pneumatization in the skull is normally confined to the mastoid process. Pneumatization in bones other than the temporal bone such as the occipital bone is exceptionally rare and has very few cases reported so far. It has been postulated that occipital pneumatization is a consequence of communication between the temporal and occipital bones. Persistently increased intraluminal pressure has been proposed as a mechanism of pneumocele formation which later progresses to pneumatisation of occipital bones. Fluid in the occipital bones following increased intracerebral pressure has not yet been reported. Isolated cases of pneumatocysts within the occipital condyle however have been documented. If the cause for such pneumatisation or fluid accumulation is left untreated then complications such as spontaneous intracranial epidural accumulation of air, fracture of C1 and the occipital bone, spontaneous subcutaneous emphysema and pneumatocele formation can occur leading to severe morbidity and mortality. We present a case of CSF Rhinorrhea and Otorrhea in a 41 year old male secondary to a space occupying lesion in the right lateral ventricle of the brain with fluid in the right occipital condyle with a review of relevant literature.

INTRODUCTION

In a case of Cerebrospinal Fluid (CSF) leak from the ear, radiological investigations are mainly performed to examine and evaluate the mastoid bones. Occipital condyles are often overlooked. The usual causes for CSF to leak into the ear are related to factors that cause an increase in intracerebral pressure. Similar factors may also be responsible for the formation of a pneumatocele and subsequent pneumatisation of the mastoid and occipital bones.[1, 6] Pneumatization in bones other than the temporal bone such as the occipital bone is exceptionally rare and has very few cases reported so far. Fluid in the occipital bones following increased intracerebral pressure has also not yet been reported. If left untreated it can lead to severe morbidity and fatal consequences such as spontaneous intracranial epidural accumulation of air, fracture of C1 and the occipital bone, spontaneous subcutaneous emphysema and pneumatocele formation.[10] We present a case of CSF rhinorrhea and otorrhea in a 41 year old male secondary to a space occupying lesion in the right lateral ventricle of the brain with fluid in the right occipital condyle and review of relevant literature.

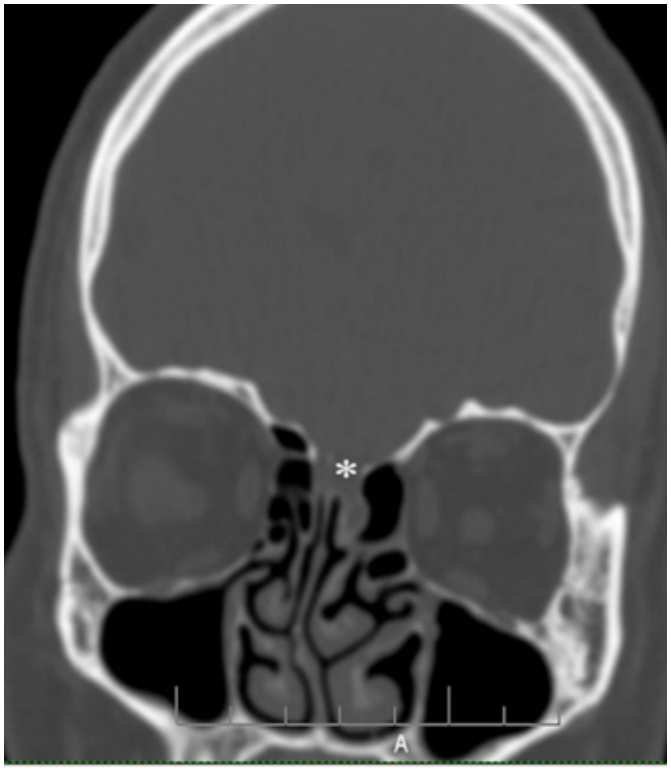
CASE REPORT

A 41 year old male was referred to the ENT Outpatient department of a tertiary referral centre in Bangalore, South India with a history of watery nasal discharge from right nasal cavity since 3 months and watery discharge from the right ear since 1 month.

Computerised Tomography (CT) Cisternography revealed a bony defect in the right cribriform plate measuring approximately 3.6 mm noted anterior to the bony attachment of the middle turbinate. This defect showed fluid out pouching inferiorly and lateral to the middle turbinate. Post intrathecal contrast injection, contrast material was noted in the bony defect and extending inferiorly with minimal contrast mixed fluid in the right nasal cavity. The right tegmen tympani was eroded with fluid noted in the right mastoid air cells, middle ear cavity and in the basiocciput extending right down to the right occipital condyle on the plain scan. On intrathecal contrast injection, the entire fluid was seen to be mixed with contrast. The middle ear ossicles and tympanic membrane were intact. (Figure 1, 2, 3)

Figure 1

Figure 1 – Computerised Tomography of the Para Nasal Sinuses performed in a Bone Contrast algorithm using pre and Post intra thecal ionic non iodinated contrast on a GE Bright Speed (16-slice) machine with 0.625 mm thickness helical cuts shows



Axial view – *Plain pre contrast CT showing a break in the cribriform plate on the right side (3.6 mm) with an out pouching of CSF into the nasal cavity.

Figure 2

Figure 2 – *Intrathecal contrast seen leaking into the nasal cavity via break in the cribriform plate.

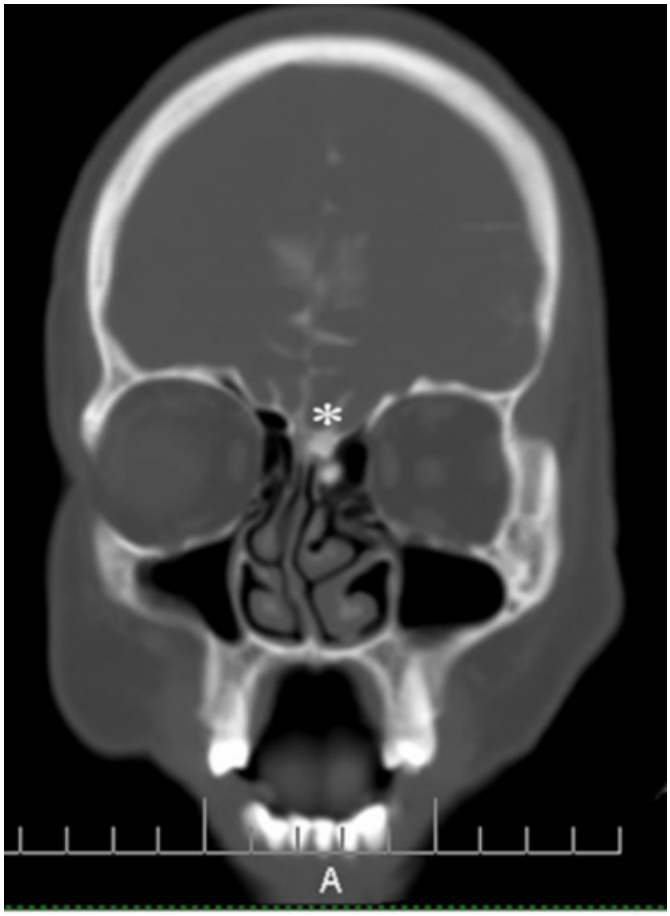
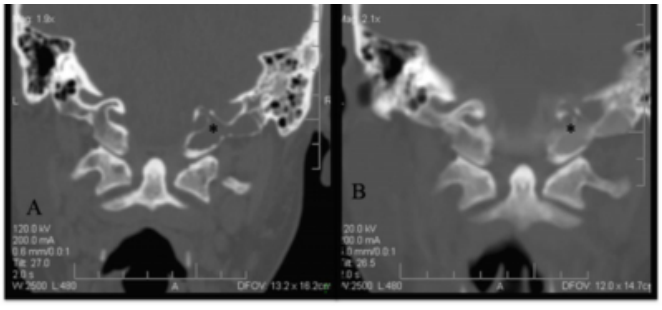


Figure 3

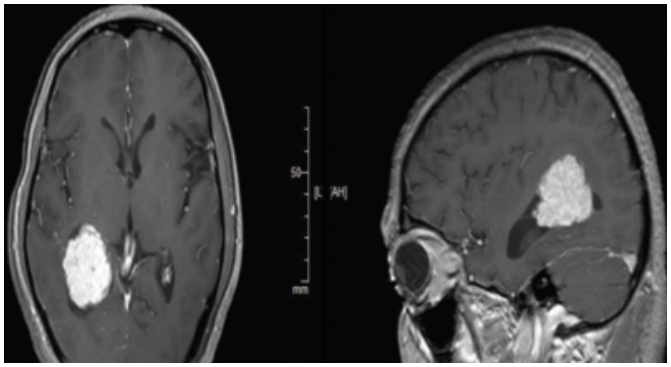
Figure 3 A Â– Pre contrast Â– *Fluid in the right occipital condyle. Hypodensity on the right side compared to the left occipital condyle. B Â– Post contrastÂ– *High density fluid (Intrathecal contrast) noted in right occipital condyle. Contrast also seen in sub arachanoid space and base of skull.



A Magnetic Resonance Imaging (MRI) of the brain dated two months ago revealed a space occupying lesion in the lateral ventricle on the right side suggestive of an intraventricular cystic lesion.(Figure 4)

Figure 4

Figure 4 – MRI brain – T1 Weighted image showing a hyperintense space occupying lesion in the right lateral ventricle of the brain.



No other co morbidities were present. A diagnosis of Cerebro Spinal Fluid (CSF) Rhinorrhea and Otorrhea secondary to the intraventricular lesion in the brain was considered.

He was admitted for a preoperative evaluation prior to leak repair. On examination he was conscious and oriented with no signs of meningeal irritation. Active CSF leak from the right nasal cavity was noted and was confirmed with a positive reservoir sign and CSF Fluid analysis. An otoscopic evaluation of the right ear showed an intact Tympanic membrane with no active CSF leak.

CSF Leak closure was carried out in the right ear under general anesthesia. The tympanic membrane was visualized under a microscope and an anterior tympanotomy was performed. A gush of CSF under unusually high pressure from the middle ear was seen filling the external auditory canal. Pressure was applied to control the flow. Following this a cortical mastoidectomy was performed and the possible site of leak in the tegmen tympani was identified and sealed with bone wax and soft tissue. Subsequently nasal endoscopic leak repair for CSF rhinorrhea was carried out. A bony defect was noted in the right ethmoidal roof which was closed with fat and fascia lata. A nasal pack was kept in the right nasal cavity for 72 hours.

Post operative period was uneventful with no recurrence of CSF leak. He was followed up under neurosurgery for management of the intraventricular lesion in the right ventricle. He was operated for it and is now on regular follow up.

DISCUSSION

Pneumatization in the skull is normally confined to the mastoid process.[3] Sometimes it can be noted in other areas as the extent and pattern of pneumatization is known to vary greatly among individuals.[1] Pneumatization in areas other than the temporal bone such as the occipital bone is exceptionally rare and has very few cases reported so far [.2, 4] Occipital bone pneumatization usually begins late in fetal life, accelerates at birth, and continues through childhood, and occasionally early adult life. It has been postulated that occipital pneumatization is a consequence of communication between the temporal and occipital bones and has been noted to occur unilaterally in men and on the right side.[2]

Our patient was a middle aged male who was on radiological evaluation detected to have fluid in the right occipital condyle. The only predisposing factor for this seemed to be the space occupying lesion in the lateral vertricle on the same side. It may be hypothesized that due to a long standing elevated intracerebral pressure the cerebrospinal fluid might have made its way through the mastoids into the occipital condyle. However , this may occur more likely if a pre existing pneumatisation of the right occipital condyle preceeded the bony invasion due to prolonged increase in intracerebral pressure.

A review of relevant literature reveals numerous possibilities for formation of occipital condlyle pneumatization. Asymptomatic idiopathic presentations due to extension of pneumatization into the occipital and parietal bones has been documented. These occur because of incomplete closure of the occipitomastoid synchondrosis and lambdoid and sagital sutures, which usually close in early adulthood and later, can occur upto the 3rd decade. Micro traumatic rupture of an occipital air cell during repeated valsava maneuvers or intra osseous pneumatocyst of unknown etiology in a vertebral body are also some of the postulated causes for occipital pneumatization.[5] Micheal et al have reported a ball valve mechanism occuring at the eustachian tube which causes air to be forced into the middle ear more rapidly than it could escape due to repeated coughing in chronic bronchitis. This increased the rate and pressure of air entering the middle ear which progressed to a mastoid pneumocele (air filled cell) formation leading to atlanto occipital pneumatization.[6]

Occipital bone pneumatization can present with a variety of symptoms. Mastoid hyperpneumatization fistulizing into the atlantoaxial joint has presented with an ipsilateral aural fullness that occurs mainly during contralateral head rotation and extension.[7] A single case report on “Flight-Induced” neurological symptoms due to undiagnosed craniocervical

bone pneumatization suggests that rupture of the thin mucosa of the eustachian tube can cause subsequent leak of air into the epidural space because of falling surrounding pressure during the flight .Neurological symptoms such as neck pain radiating to the upper extremities and upper limb paresis remitted on landing, because of rising surrounding barometric pressure.[8]Subsequent complications can occur if left untreated, such as spontaneous intracranial epidural accumulation of air, pathological fracture of C1 and the occipital bone, spontaneous subcutaneous emphysema and pneumatocele formation.[9]

Radiographic, CT, and MRI findings of previously reported cases include an apparent communication between the occipital condyle and the atlas air cells, best seen on CT coronal reconstructions. [1] Our patient presented with CSF rhinorrhea and CSF otorrhea possibly due to a raised intracranial pressure secondary to a space occupying lesion in the right lateral ventricle. Constant pressure exerted over the mastoid air cells could have lead formation of a pneumocele in the right occipital condyle which later could have progressed to spread of pneumatisation and subsequent entry of cerebrospinal fluid into the right occipital condyle. Persistently increased intraluminal pressure has been proposed as a mechanism of pneumocele formation which later progresses to pneumatisation of occipital bones.[1] Symptomatic relief of pneumoceles has been achieved with surgical decompression.[1] However studies have also shown relief in some cases with conservative treatment.[10]Our patient improved following surgical management.

CONCLUSION

To our knowledge this is the first case of fluid in the occipital condyle occurring secondary to increased persistant intraluminal pressure. This incidental finding of CSF within the occipital condyles in patients with CSF otorrhea and rhinorrhea highlights the need to radiologically examine skull bones for pneumatisation with specific attention to the occipital condyles instead of limiting the evaluation to mastoid bones only. By doing this dangerous complications such as spontaneous intracranial epidural accumulation of air, fracture of C1 and the occipital bone, spontaneous subcutaneous emphysema and pneumatocele formation can be prevented and patient can be educated to prevent predisposing factors appropriately.[10] This can avoid serious morbidity and mortality in the future.

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