

Post-Traumatic Fronto-Ethmoidal & Orbital Encephalocele- A Rare Entity

Rajul Rastogi*, Prabhat Kumar Bhagat, Yuktika Gupta, Sagar Parashar, Pankaj Kumar Das, Mohini Chaudhary and Vijai Pratap

Teerthanker Mahaveer Medical College and Research Center, Moradabad, UP India

*Corresponding author: Rajul Rastogi, Teerthanker, Mahaveer Medical College and Research Center, Moradabad, UP India, E-mail: eesharastogi@gmail.com

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Abstract

In the present era of increasing road-traffic accidents, facial trauma of variable severity is being frequently encountered involving the orbits and sinuses. Post-traumatic, fronto-ethmoidal and orbital encephaloceles are rare entities requiring early intervention to prevent complications. Cross-sectional imaging by computed tomography and magnetic resonance imaging play a pivotal role in early detection of these entities. Hence in this article, we are describing a rare case of post-traumatic encephalocele with fronto-ethmoidal and orbital components with its clinical presentation which was diagnosed confidently by magnetic resonance imaging affecting the final management.

Keywords: Post-traumatic; Fronto-ethmoidal; Orbital; Encephalocele

Introduction

Encephaloceles following trauma have been described in the medical literature. They are classified according to their location. Among them fronto-ethmoidal and orbital types are usually secondary to craniofacial trauma with latter being uncommon. Early detection is imperative for early institution of appropriate management.

Case report

A 45-year old male with 2-3 days history of clear-fluid discharge from right nostril came to our department for magnetic resonance imaging (MRI) of brain and orbits. As the discharging-fluid revealed a high content of beta-2 transferrin, the clinical diagnosis of CSF-rhinorrhea was made.

Patient gave a history of significant facial injury secondary to road traffic accident 3-4 weeks back with severe facial & orbital swelling on right side which subsided within 2-3 weeks. No past history of similar episode or sinonasal disease or any other significant disease was given. Rest of the laboratory tests and noncontrast computed tomography of brain performed in a peripheral imaging center were unremarkable without obvious signs of intraparenchymal or calvarial injury.

Non-contrast MRI brain and orbits performed for evaluation of CSF-rhinorrhea revealed fracture through the cribriform plate & medial wall of orbit on right side of midline with herniation of intracranial contents (small anteroinferior part of right frontal lobe) through the bony defect in to the fronto-ethmoidal and orbital region producing slight proptosis of right eye as well. Note was also made of collection in nearly all the sinuses with presence of fluid-fluid levels in the sphenoid sinus (Figures 1-3).

No evidence of any obvious signs of intraparenchymal brain injury or intraorbital foreign body was noted. Based on the clinico-radiological findings, post-traumatic fronto-ethmoidal and orbital encephalocele on right side of midline was diagnosed. The patient was then referred to the higher, dedicated neuro-intervention center.



Figure 1: T2W axial MR image shows fracture through medial wall (thick solid arrow) causing reduction in volume of right orbit with proptosis of right eyeball and collection in sinuses with fluid-fluid level in sphenoid sinus (hollow white arrow).

Discussion

Encephalocele is defined as extracranial herniation of brain parenchyma through a defect in bony skull. It may be congenital or acquired with latter being most commonly secondary to trauma & uncommonly idiopathic or secondary to tumor [1].

Post-traumatic encephaloceles may be iatrogenic or secondary to craniofacial trauma with latter presenting clinically with CSF-rhinorrhea within days to month following trauma and is also associated with a potential risk of life-threatening complications including meningitis which may develop up to 3-8 months post-trauma [1-3]. Presence of beta-2 transferrin is diagnostic for CSF-rhinorrhea.

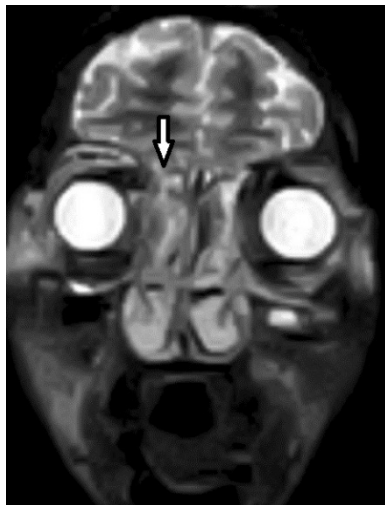


Figure 2: Fat-suppressed T2W coronal MR image shows fracture through cribriform plate & medial part of right orbital roof (arrow) with herniation of intracranial contents into the right orbital & fronto-ethmoidal region.

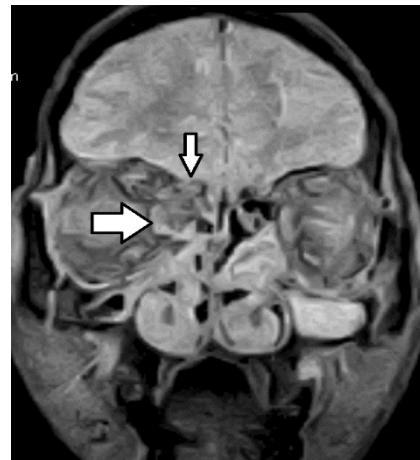


Figure 3: T2GRE coronal MR image shows fracture through cribriform plate & medial part of right orbital roof (small arrow) with herniation of intracranial contents into the right orbital (larger arrow) & fronto-ethmoidal region.

Encephaloceles are classified according to their location as occipital, head-dome, fronto-ethmoidal and basal. When it extends in to the eyelid or orbit, it is known as blepharocoele or orbital encephalocele respectively. Orbital encephalocele is a very rare entity that presents with proptosis, restricted movement of eye or diminished vision with less than 30 cases reported till date [4,5].

The main complication of orbital encephalocele is optic nerve compression either directly or due to raised intraorbital pressure causing secondary congestion of draining veins including retinal vein leading to its atrophy & subsequent blindness [4,6]. Hence, our index case is unique as it reveals a combination of fronto-ethmoidal and orbital encephalocele requiring team-effort and a dedicated neuro-ophthalmological team consisting of ophthalmic & neurosurgeon for best outcome.

Until recently, the diagnosis of CSF-leak required CT or radionuclide cisternography. But with the advent of multislice CT with isotropic resolution and high-resolution MRI, the bony defects with herniation of intracranial contents and advancing CSF-fluid pouch can be adequately demonstrated as seen in our index case [7].

A small defect may be treated conservatively but a larger one may require surgical approach [1,3]. Following the evacuation of herniated brain through frontobasal approach, the defect can be closed either by temporalis fascia which is natural & cheaper or by artificial material that are expensive like titanium mesh, bone powder, fibrin glue, etc. [4].

Conclusion

Through post-traumatic fronto-ethmoidal and orbital encephaloceles are uncommon neurological entities yet adequate attention to them is needed during cross-sectional imaging in the first instance to aid in early diagnosis and management preventing life-threatening complications.

These may occur as separate entities or in combination; latter requiring a team of surgeons for best outcome that is aided by a cross-sectional examination and radiological opinion.

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