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POST-TRAUMATIC RECURRENT CSF RHINORRHOEA

ABSTRACT:

Traumatic cerebrospinal fluid (CSF) leak is seen in 2% of all head injuries and 12-13% of cases with skull base fractures [1]. Management of traumatic CSF leak is challenging because of multiple sites of leak, distorted anatomy and due to its high chances of recurrence. Prompt identification and meticulous management of these leaks is required to prevent complications. Here, we report one such interesting case of post-traumatic recurrent CSF rhinorrhea which was diagnosed after having recurrent meningitis secondary to CSF rhinorrhea. The patient was evaluated with CT-PNS and MRI cisternogram to identify the defects and surgical repair of the defects was done using multilayer technique. Immediate postoperative period was uneventful and he had no recurrence in a 12-month period followup.

Keywords: Traumatic CSF leak, Meningitis, Recurrent CSF rhinorrhea

INTRODUCTION:

CSF rhinorrhoea is due to abnormal communication between subarachnoid space and the nasal cavity. High velocity trauma like road traffic accidents can cause large and multiple skull base defects which leads to CSF rhinorrhoea. Majority of CSF leaks resolve spontaneously with conservative management. Surgical repair is indicated when there is a persistent leak. In rare cases, CSF rhinorrhoea can recur after an endoscopic repair, such patients often present with recurrent meningitis and the CSF leak is detected during the work up for recurrent meningitis.

CASE REPORT:

A 30-year-old man was referred to us by neuro-physician with a diagnosis of recurrent meningitis secondary to suspected CSF rhinorrhoea. On detailed ENT evaluation, he gave the

history of intermittent watery nasal discharge from left nostril 4 years ago after an incident of road traffic accident. He was diagnosed as traumatic CSF rhinorrhoea and after 10 days, he underwent endoscopic repair elsewhere. 2 months post-surgery, he developed fever, headache, vomiting, neck rigidity and was diagnosed as pyogenic meningitis and was treated. 4 years later now, he again developed similar complaints of meningitis along with watery nasal discharge. The discharge was non-blood stained, cannot be sniffed back and aggravated on bending forward.

On clinical examination, active leak was noted from the left nasal cavity on bending forward. CT-PNS was advised, which revealed multiple defects (Fig 1). A Large defect noted extending from the right frontal sinus to posterior ethmoidal sinus, and a small bony defect 4.5 mm noted involving the roof of the right sphenoid at the spheno-ethmoidal junction. MR cisternogram reveals defect seen from the posterior table of frontal to posterior ethmoid sinus and at roof of sphenoid sinus seen as an inferior extent of fluid signal (Fig 2).

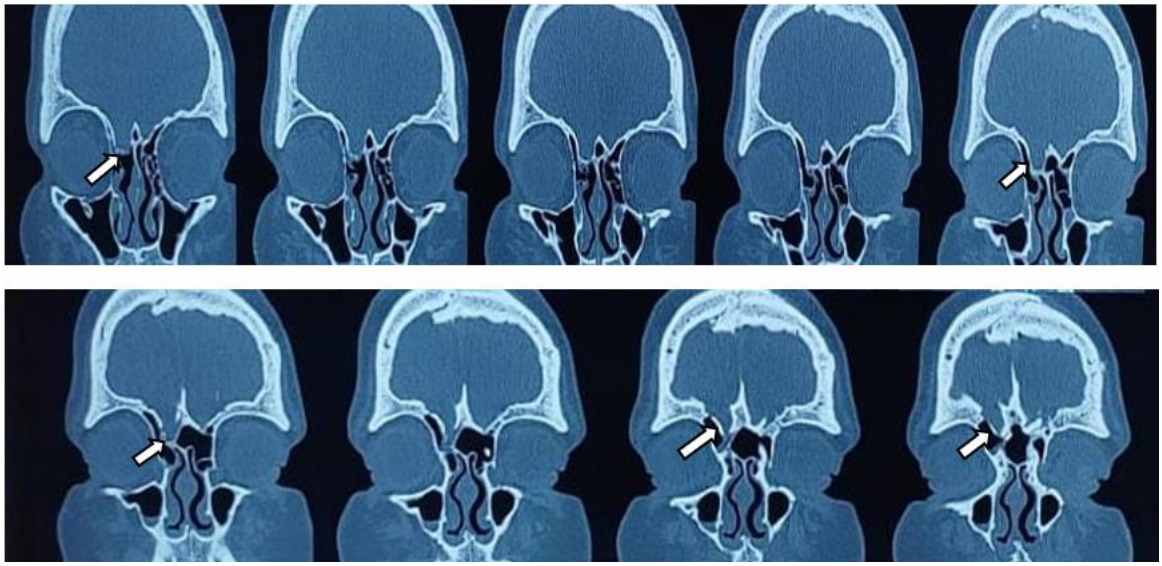

Fig 1: CT-PNS, showing the large defect in right frontal sinus extending into the posterior ethmoids

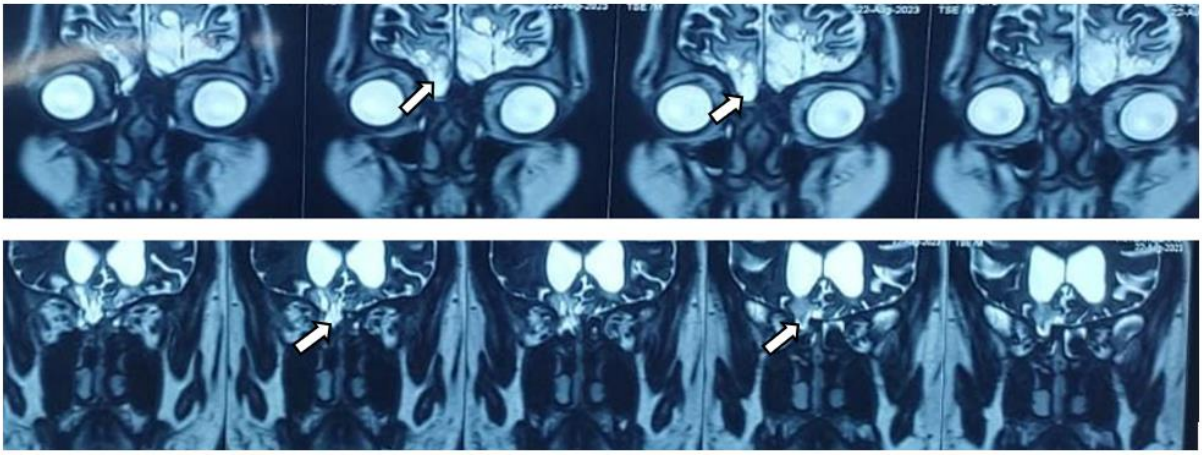

Fig 2: MRI-PNS, showing the defect seen from the posterior table of frontal to posterior ethmoid sinus and at roof of sphenoid sinus seen as a inferior extent of fluid signal.

The patient was planned for revision endoscopic CSF leak repair surgery. The frontal sinus was drilled, and the frontal sinus ostium was widened. Two defects with active leak were noted: one large defect in the right cribriform area, extending from the posterior table of the right frontal sinus to the posterior ethmoidal region, and another small defect just posterior to it near the sphenoid sinus (Fig 3A, B). Stripping of frontal sinus mucosa all around the defects was done followed by obliteration of the defects in a multilayer fashion; a muscle graft harvested from the vastus lateralis muscle was pushed into the defect and snuggly fit as in a bath plug technique. Fascia lata was placed over it and reinforced with fibrin glue followed by a posterior septal flap in an overlayed fashion. This was supported by Surgicel and gel foam, followed by a nasal pack (Fig 4A, B). The immediate postoperative period was uneventful.

Lumbar drainage was done on postoperative day-1. Patient was followed-up for 12 months and there were no signs of recurrence.

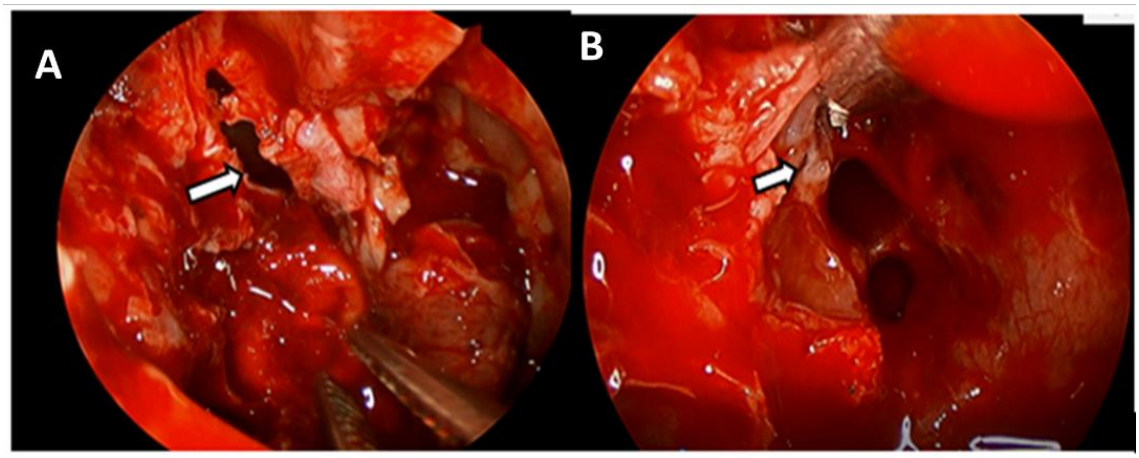

Fig 3: A) showing a large defect noted extending from the posterior table of frontal sinus to posterior ethmoidal sinus,B) a small defect near the sphenoetmoidal junction in the sphenoid sinus.

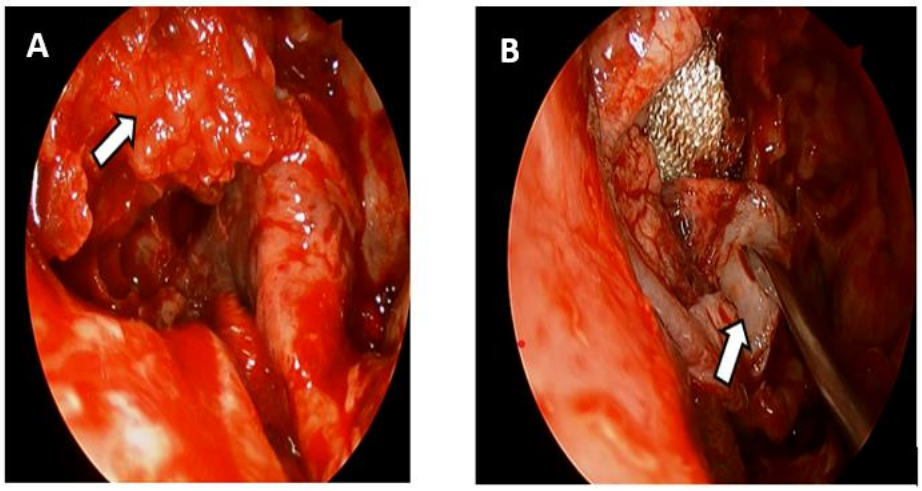

Fig 4: showing the closure of the defect in multilayer fashion supported with (A)muscle layer,fascia lata,posterior septal flap and supported with (B) surgicel and gelfoam

DISCUSSION

Post traumatic CSF leak comprises about 80-90% of all CSF leaks [2], they occur as a result of high velocity trauma like road traffic accidents which can cause large and multiple skull base defects.12-13% of skull base fractures land up in CSF rhinorrhoea and carries about 10% risk of developing meningitis [3]. Fractures of the skull base can rupture the dura and can cause CSF leak that provides a route for microorganisms through defect, so these patients are at high risk for acute bacterial meningitis. For its precise management, it is essential to know the exact anatomy of the skull base.

A thorough assessment of CSF leaks is crucial in cases of traumatic cause, as the origin of the leak is not necessarily limited to a single site but can be from multiple sites. Fracture at the junction between cribriform and fovea ethmoid were most common cause of traumatic CSF rhinorrhoea. The presence of CSF leak is readily suspected if patient complains of a persistent, clear unilateral discharge from the nose after a head injury. It is important to recognize that, there are some instances where patients may exhibit recurrent episodes of post-traumatic meningitis even in the absence of an active leak.

HRCT-PNS is the best radiographic method to identify the extent of the defect but it is unable to identify or locate the sites of the leak. HRCT is useful in showing the bone details of fractures. To identify and confirm anatomical sites for CSF rhinorrhoea, Cisternograms (CT, MRI) are the gold standard tests and its accuracy in diagnosing active CSF rhinorrhoea is about 90%.

Most traumatic CSF leaks (80-95%) resolve spontaneously within the first 24-48 hours. Conversely, when dealing with large and multiple defects, surgical repair is recommended in which there is a high chance of getting meningitis due to ascending infection [4]. The preferred approach is through endonasal endoscopy, due to its benefits of minimal morbidity, shorter

hospital stays, and olfactory preservation. The naso-septal flap, based on the posterior septal branch of the sphenopalatine artery, is well suited for the reconstruction of large skull base defects.

For large fractures involving the frontal sinus and extending till the posterior ethmoids is managed by meticulous stripping of sinus mucosa, followed by packing the sinus cavity with muscle to prevent mucocele and recurrence of CSF leak.Fibrin is the mostly used sealant in this day which is an amalgamation of Fibrinogen, Thrombin, and Ca cofactor[5]. This provides a non-permanent closure and fabricates an additional barrier to CSF leakage at the time of healing of wound and fibrosis.

Lumbar drain is still a controversial choice. And over drainage may create a resultant pneumocephalus. Since increased intracranial pressure may cause graft displacement, in some cases lumbar puncture may be required postoperatively. The success of the procedure depends on the surgeon and the patient's post-operative care[6]. Our patient has been on a frequent follow-up and is now doing well with no recurrence.

CONCLUSION:

Post-traumatic CSF leakage through the skull base is a serious condition that results in fulminating pyogenic meningitis and serious complications if not treated properly.

Declarations

Funding: There was no source of funding for the study.

Conflict of interest: The authors declare no conflict of interest.

Compliance with Ethical standards: The Ethics Committee at our institute has confirmed that no ethical approval is required.

3 **Financial interest**: Authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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