

Trans-Septal Approach to Sphenoid Sinus CSF Rhinorrhea Repair

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Abstract- Spontaneous sphenoid sinus CSF leak is relatively rare entity. Sternberg's canal is a bony defect in lateral wall of sphenoid sinus which is a common site of spontaneous CSF leak. Here we present a case of spontaneous CSF rhinorrhea from lateral recess of sphenoid sinus. Site of leak was approached endoscopically with trans-septal approach as it gives excellent access to lateral recess sphenoid sinus defects. Closure of defect was done with bathplug technique with graft threaded on the same thread to ensure central placement of the graft over defect. Obliteration of sphenoid sinus is not mandatory if complete mucosa is exenterated and anterior wall is drilled adequately.

Index Terms- Sphenoid sinus, CSF rhinorrhea, Trans septal approach, Bath plug technique

I. INTRODUCTION

CSF rhinorrhea is the leak of CSF through communication between subarachnoid space and nasal cavity. The etiologic classification of CSF leak was given by Ommaya et al^[1]. Of all CSF rhinorrhea cases, spontaneous CSF rhinorrhea contribute about 3-4 %, while majority are post traumatic cases which are about 80-90 %^[2]. Spontaneous sphenoid sinus CSF leak is relatively rare entity. Sternberg's canal is a bony defect in lateral wall of sphenoid sinus which is a common site of spontaneous CSF leak. In last 3 decades transnasal endoscopic approach has achieved high success rate with minimal morbidity. Trans-sphenoidal approach, transethmoidal-sphenoidal approach (TESA) and trans-septal approach of endoscopic repair of sphenoid leak have been described in literature. Multilayer closure of defect and obliteration of sinus is the most preferred method for sphenoid sinus leak repair. Here we present a case of spontaneous sphenoid sinus CSF rhinorrhea with encephalocele approached endoscopically with transseptal approach. Closure was done with bathplug technique with threaded graft without obliteration and disturbance of other sinuses.

II. CASE REPORT

A 55 Years old female patient presented with left sided nasal watery rhinorrhea since 2 months. She also complained of aggravation of rhinorrhea on bending forward. There was not any previous history of trauma or history suggestive of meningitis. Patient had diabetes and hypertension and was on the medications for the same. On examination, patient had left sided active watery rhinorrhea. On anterior rhinoscopy, septal deviation was towards left side. The presence of CSF was confirmed with β transferrin detection. CT cisternography was

done which was suggestive of bony defect in lateral wall of sphenoid sinus and leak of dye into sphenoid and posterior ethmoid sinus through the defect. Filling of the rostrum of sphenoid with dye was also noted.

Patient underwent endoscopic repair of CSF rhinorrhea. As dye was filling rostrum of sphenoid, we preferred trans-septal approach in this case. Endoscopic septoplasty was done and pneumatized rostrum of sphenoid opened which was filled with collected CSF. An encephalocele was seen in lateral wall of sphenoid. Encephalocele was reduced with bipolar cautery. The bony defect was approximately 4-5 mm. Sinus mucosa was completely exenterated. A small fat bath plug was used and fascia lata graft threaded over the bath plug to ensure that graft cover the defect all around. Fibrin glue was used. Thus sinus obliteration was avoided in this case. Postoperatively patient was under follow-up for 3 months and was asymptomatic.

III. DISCUSSION

Miller in 1826 reported first case of CSF rhinorrhea which was a spontaneous CSF leak due to high pressure^[3]. Sphenoid sinus is a rare site of CSF leak^[4]. Spontaneous CSF rhinorrhea is CSF leak without previous history of trauma, tumour, surgery or radiation. Developmental conditions such as persistent Sternberg's canal (craniopharyngeal canal) and extensive lateral pneumatization of the sphenoid sinus together with pathological conditions such as intracranial hypertension and arachnoid pits are the underlying causes of spontaneous CSF rhinorrhea^[5].

CT cisternography is useful in patients with active CSF leak. It identifies the presence of an active CSF leak and dural fistula, the precise anatomy and localization of the bony defect. MR imaging technique offers noninvasive method of imaging of CSF leak and is indicated in patients with possibility of encephalocele, meningoencephalocele or in cases with meningitis. Herniation of brain parenchyma or meninges through the bony defect may be difficult to differentiate from collected CSF in sinus on CT scans but is obvious on MR images^[6].

An approach for repair of sphenoid sinus leak is a controversial topic. Initially transcranial approach was popular for repair of lateral recess of sphenoid leaks^[7]. This approach requires retraction of brain leading to increased morbidities associated with it. Endoscopic transnasal repair has got advantages over transcranial approach as it is associated with less morbidity and early recovery. Endoscopic assisted transseptal approach had been successfully used in past. Study by Mahendale et al. showed advantages of transseptal approach due to wide access to the entire sphenoid sinus and laterally pneumatized regions within the sphenoid sinus^[8]. Other approaches for

sphenoid sinus include endoscopic transsphenoidal (TS), transethmoidal-sphenoid (TESA), transethmoidal-sphenoidal-pterygoid (TESPA) approach. These approaches got popularity due to better results. In patients with lateral pneumatization with lateral defect TESPAs is preferred^[5].

The bath plug technique was described by Wormald which consists of introduction of a fat plug with a secured vicryl suture into the intradural space and placing traction on the suture to seal the defect^[9]. He used this technique for the repair of anterior skull base defect with success rate of 94% for primary repair and 100% for secondary closure^[10]. We used this technique for repair of defect of lateral wall of sphenoid sinus but with a graft treaded over same suture to ensure complete coverage of the defect from all the sides. Main challenge in repair of lateral recess is to reach site of defect. Graft placement is not always adequate. Trans-septal approach gives a wide accessibility to lateral recess area. Usually surgeons prefer to remove lining mucosa completely and obliterate sphenoid sinus during repair of defect. Abdominal fat, muscle, hydroxyapatite cement, or acellular dural grafts can be used for obliteration^[11]. But with obliteration, even small left over mucosa can lead to mucocele formation. Wide removal of anterior wall of sphenoid laterally and repair of defect avoids chance of delayed mucocele formation^[12].

IV. CONCLUSIONS

Endoscopic trans-septal approach gives excellent access to lateral recess sphenoid sinus defects. The bath plug technique can be successfully used for sphenoid sinus defect closure. Use of threaded graft over plug ensures its central placement and adequate coverage of defect. Obliteration of sphenoid sinus is not mandatory if complete mucosa is exenterated and anterior wall is drilled adequately.

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Figure 1 – CT PNS showing bony defect in lateral wall of sphenoid sinus



Figure 2 – CT cisternography showing filling of sphenoid sinus and rostrum of sphenoid

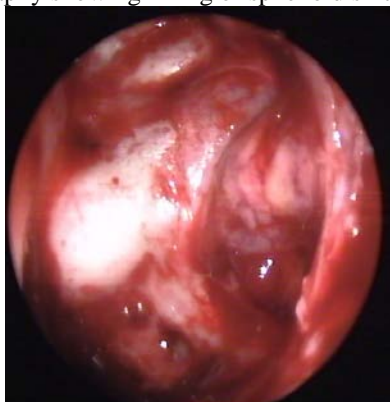


Figure 3- Sphenoid sinus with encephalocele from left lateral wall

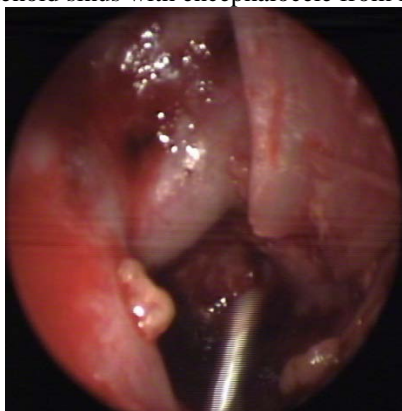


Figure 4 – Bath Plug with threaded graft covering defect