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Case Report

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Unusual complication of conventional septoplasty: cerebrospinal fluid rhinorrhea and pneumocephalus

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ABSTRACT

Cerebrospinal fluid (CSF) rhinorrhea (r) is an uncommon but a challenging medical condition to treat. Especially, CSFr following corrective septoplasty can be a devastating complication for both the patient and surgeon. In this article, a case of CSFr from sphenoid sinus and pneumocephalus after corrective septoplasty is reported. The cause and location of CSFr make this case apparently rare.

Keywords: Septoplasty, Cerebrospinal fluid rhinorrhea, Pneumocephalus

INTRODUCTION

Septoplasty is one of the most commonly performed operations in otorhinolaryngology practice to treat the nasal obstruction caused by septal deviation.[1] Complications, with a rate of 5-60% in different series, are not observed frequently when surgery is performed meticulously with good anatomical knowledge.[2]

Various complications have been reported. Some of these complications are common such as hemorrhage, septal hematoma, septal abscess, septal perforations, saddle nose, widened nasal base, loss of tip projection, infection and anosmia. The rare but more serious and life-threatening complications include skull base and intracranial injury including traumatic cerebrospinal fluid (CSF) rhinorrhea (r), meningitis, pneumoencephalus, subarachnoid hemorrhage, subdural abscess, brain abscess, cavernous sinus thrombosis, visual loss, hemiplegia and carotid cavernous fistula.[3]

Although skull base injury and CSFr are uncommon complications of septoplasty, it is known that nasal surgery is one of the most common causes of CSFr.[4,5] In this article, a case of CSF rhinorrhea from sphenoid sinus and pneumocephalus after corrective septoplasty is reported. The cause and location of CSF rhinorrhea make this case apparently rare.

CASE REPORT

A 48-year-old female patient was referred to our clinic with a complaint of headache and rhinorrhea symptoms appeared just after the removal of nasal packing that was applied during the nasal septal surgery. According to the referral chart, during the surgery, bilateral septal mucoperichondrial and mucoperiosteal flaps were elevated and cartilage and bony deviations were corrected by excision with the help of chisel and forceps. Neurologic examination was normal with no symptoms and signs of meningitis. Blood pressure was 120/80 mmHg, pulse was 60/min and respiration was normal. Complete blood count revealed 14 g/dl hemoglobin, 38.4% hematocrit and 10200/µl leucocytes.

There was near constant drainage of clear fluid. Nasal endoscopic examination revealed also some drainage which had the chemical characteristics of cerebrospinal fluid.

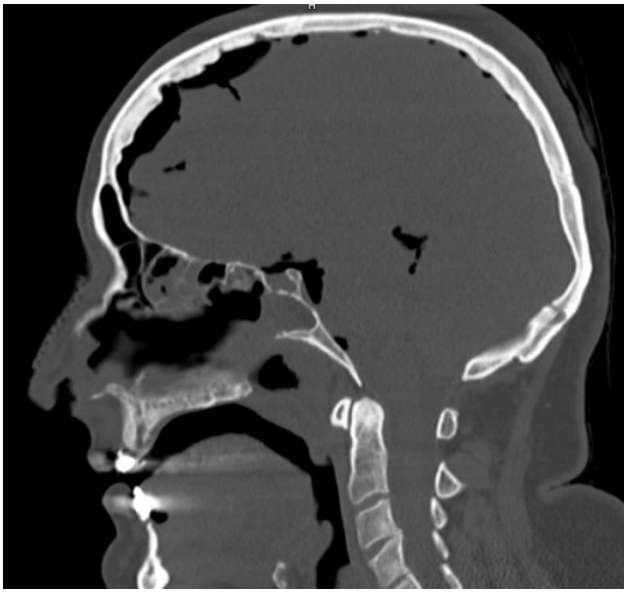

Figure 1: Sphenoid sinus showed a comminuted fracture at the posterior wall of sphenoid sinus with CSF-density fluid extending into the sphenoid sinus.

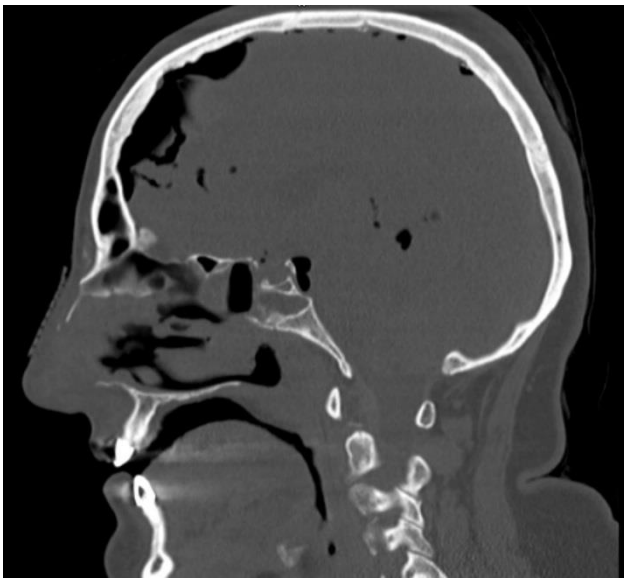

Figure 2: Diffuse pneumocephalus which was intensely localized at the subdural space.

High-resolution computed tomography (CT) sections through the sphenoid sinus showed a comminuted fracture at the posterior wall of sphenoid sinus with CSF-density fluid extending into the sphenoid sinus (Figure 1). And also diffuse pneumocephalus which was intensely localized at the subdural space compressing the frontal lobes was observed (Figure 2). Angiography wasn't performed due to the lack of any evidence of vascular laceration.

The CSFr was treated with a standard endoscopic endonasal transsphenoidal approach using paraseptal route via the right nostril. The procedure was performed with informed consent of the patient under general anesthesia. Used endoscopes were rigid scopes with 4 mm in diameter, 18 cm in length, equipped with zero and 45-degree lenses, according to different steps of the surgical operation.

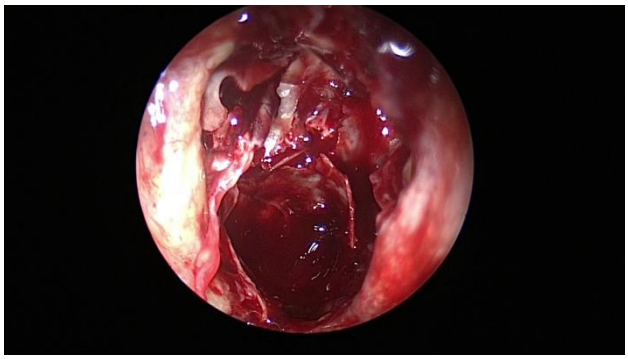

Figure 3: Pulsatile draining CSF was observed.

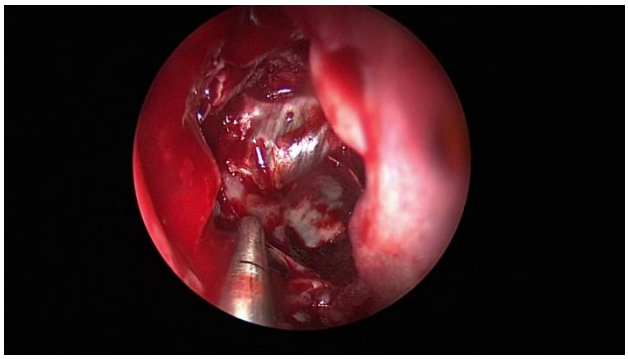

Figure 4: Indradural patch was done by fascia lata and bone defect was reconstructed by bone fragment.

The patient was taken to the operating room to perform an endoscopic examination and CSF fistula repair. In the endoscopic examination, there was no anterior wall of the sphenoid sinus and the superior turbinate in the right side. The sphenoid sinus was full hemorrhagic and clear fluid that suggests CSF. All of the secretions were aspirated. After all of the sphenoid sinus walls were clearly visible, on right posterior wall of the sphenoid sinus, a comminuted fracture, which was thought to occur due to a trauma by chisel during septoplasty and pulsatile draining CSF was observed (Figure 3). Bone fragment was carefully removed and the dural defect was localized at same location. It was approximately 5 mm size dural tear was visualized. The site of leak was confirmed with Valsalva maneuver and the CSF was flowed from the defect. The margins of dura were clearly defined. Multilayer reconstruction was performed for defect using fat graft, fascia lata, absorbable hemostat (Surgicel®), fibrin glue and bone fragment. Fat tissue and fasia lata were obtained by nearly two-centimeter superiolateral thigh incision as needed. The rent in the dura is plugged snugly with fat tissue intradurally after removal of the mucosa of the sphenoid posterior wall. Indradural patch was done by fascia lata and bone defect was

reconstructed by bone fragment. Extradural patch also was done by fascia lata (Figure 4). The repaired area was supported with previously harvested fat fixed with Surgicel®. Last step was augmented with fibrin glue. Finally, the sinus was filled with fibrin glue and held in place by a surgical nasal pack. The nasal cavity wasn't packed. After the operation management consisted of measures to reduce high intracranial pressure. These included bed rest, head end elevation, avoiding lifting of heavy weights. Laxative was given to decrease the strain and increase in intracranial pressure associated with bowel movements. Appropriate antibiotics were used in order to prevent the development of any infection.

The postoperative course was uneventful and the patient's condition recovered successfully and discharged to the hospital after four days. The CSFr disappeared, with no recurrence for more than 1 year following surgery.

DISCUSSION

Septoplasty is a frequently performed surgical procedure and anatomical reference points are well established. Nevertheless, it can be associated with serious complications.[1-6] CSFr and pneumocephalus are rare but life-threatening complications of septoplasty. Most of the cases of CSFr and pneumocephalus seen after a septoplasty procedure resulted from the cribriform plate injury at anterior cranial fossa.[7,8] According our knowledge, 2 cases of sphenoid sinus injury during septoplasty reported in the literature. Even, one of these cases was resulted in patient mortality due to bilateral carotid artery injury.[4]

The sphenoid sinus anterior wall is related to the posterior ends of the perpendicular plate of the ethmoid and vomer. Sphenoid sinus injury could be a result of the posterior nasal septal correction, resulting from uncontrolled use of a bone chisel during the septoplasty operation. Aggressive manipulation and resection of the ethmoid and vomer can cause fracture of the intersphenoidal septum and sphenoid sinus roof.[2] The operative findings of the case showed a possible injury due to uncontrolled use of the chisel during the removal of posterior bony septal deviation. Therefore, resections of the deviations at these sites should be performed after a good exposure is established and excisions with elevators or chisels should be performed preferably after cutting with scissors.

Identification of a CSFr during septoplasty requires immediate repair intraoperatively. However, in case of a postoperative CSF leak, if there is only a low output fistula, conservative management should be the choice of treatment.[9] But if there is pneumocephalus or persistent CSF leakage, surgical repair is the choice of treatment preferably by endoscopic approach. In this case, since the rhinorrhea and pneumocephalus continued significantly still at postoperative third day, the patient was suffering from severe headache and a significant bone defect was also determined in CT, repairing the defect by endoscopic approach was preferred instead of conservative approach. The main advantage of the endoscopic approach is providing a minimally invasive approach alternative to traditional transcranial procedure.

Successful surgical repair of CSFr depends on an accurate preoperative diagnosis and localization of the defected site. High-resolution CT provides very distinctive axial and coronal images which enables good definition of bony structures. Nevertheless, CT scans have been reported to be able to identify the defects in 35-81% of the cases.[10]

CONCLUSION

Septoplasty is a relatively simple, frequently performed, and usually uncomplicated operation. But its intracranial complications, although very rare, can be very serious. Severe headache after septoplasty should alert the surgeon to investigate possible intracranial complications. Avoidance can be achieved by a careful surgical technique and good anatomical knowledge.

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