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CASE REPORT
Cosmetic

A Rare Complication of Septorhinoplasty

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Summary: Septoplasty and septorhinoplasty are common procedures. A 28-year-old woman underwent the procedure and presented postoperatively with headache and vomiting and had developed a large pneumocephalus. We describe the case in detail and analyze the possible causes and ways to prevent such a complication. *(Plast Reconstr Surg Glob Open 2014;2:e273; doi: 10.1097/GOX.0000000000000224; Published online 23 December 2014.)*

Septoplasty is the most widely performed operation in the treatment of nasal obstruction caused by septal deviation. Septoplasty can have (1) aesthetic complications related to cartilage weakness due to overresection (saddle nose, widened nasal base, loss of tip projection) or dislocations and (2) frequent functional complications like hemorrhage, septal hematoma/abscess/perforation, infection, and anosmia.[1,2] Rare but life-threatening complications include skull base/intracranial injury including traumatic cerebrospinal fluid (CSF) rhinorrhea, meningitis, pneumoencephalus, subarachnoid hemorrhage, subdural abscess, brain abscess, cavernous sinus thrombosis, and toxic shock syndrome.[3] Intracranial aeroceles were first described at autopsy by Chiari and later named pneumocephalus by Wolf. Radiographic diagnosis was first made by Lucket. Pneumocephalus is a pathology characterized by intrusion of air into intracranial region and of 2 types: tension, an easily reversible but potentially life threatening, and nontension, a benign complication that is usually asymptomatic and regresses spontaneously.[4]

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CASE REPORT

A 28-year-old healthy woman presented with complaints of nasal deformity and obstruction. She had a deviated nasal septum (bony) to the left and a wide nasal dorsum with bulbous tip. She was diagnosed as having a nasal deformity with deviated nasal septum and scheduled for open septorhinoplasty.

She underwent routine laboratory tests and photography before surgery. After local infiltration, the procedure was started with an inverted "V" columellar incision connected to bilateral marginal incisions and flap elevation below the superficial muscular aponeurotic system layer. Open technique septoplasty was done, and posterior bony deviation of the maxillary crest and vomer was removed using Becker double action septum scissors and nibbler. Then, remainder of the rhinoplasty was completed and closure was done. Her surgery was uneventful and so was her recovery. She was discharged the following day with Silastic sheets inside her nasal cavity.

Four days postoperatively, she was presented to emergency room with complaints of frontal headache. She gave history of cough and excessive sneezing from second postoperative day. The Emergency Room physician examined her and saw no obvious reason for headache except the Silastic nasal splints. He advised her stronger pain medication and asked her to return if there was no improvement. The patient returned the following day with unbearable headache, 2 attacks of projectile vomiting. No fever, visual problems, nasal discharge, postnasal drip, or other neurological complaints. Her Silastic sheets

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were removed, emergency computer tomography scan was done showing frontal lobe pneumocephalus (Figs. 1, 2), and emergency neurosurgical consult was taken, who decided to place a lumbar drain. The patient was admitted under the neurosurgery care and a lumbar drain was put and she was placed in semirecumbent position. No CSF leak was seen on diagnostic endoscopic examination.

The following day a revision computer tomography scan showed a significant decrease in the airspace, and over a period of 3 days, the pneumocephalus was resolved and the drain was removed along with the dorsal splint from the nose.

DISCUSSION

Septoplasty is one of the most widely performed operations. Skull base injury due to nasal surgery generally occurs at the lateral lamella, that is, the junction between the cribriform plate and the ethmoid labyrinth, where bone is quite thin and dura is tightly adherent.[5] A high bony deviation is the reason for manipulation of bony septum at the inferior part of the skull base. The sphenoid sinus anterior wall is related to posterior ends of the perpendicular plate of the ethmoid and vomer and may be damaged during excision of a deviation. The posterior wall of the sphenoid sinus is both thicker and further from the surgical field than the anterior wall. Aggressive manipulation and resection of sphenoid rostrum can cause fracture of intersphenoid septum and sphenoid sinus roof.[6]

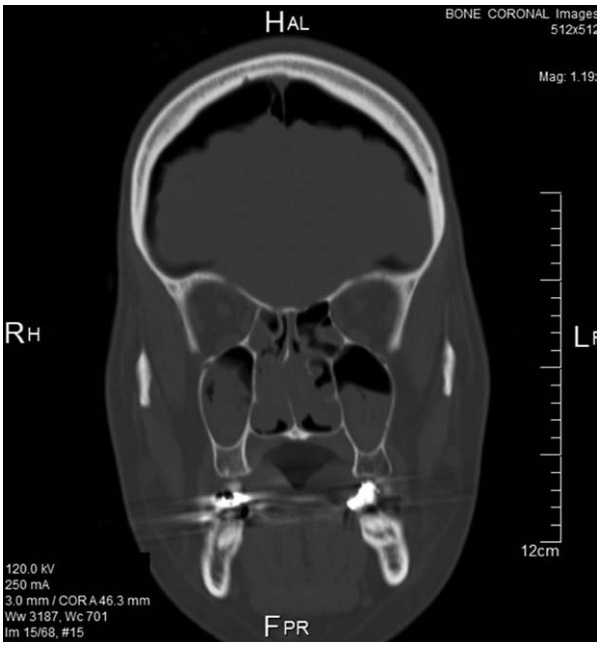

Fig. 1. Computer tomography view showing air in the frontal region of the cranial cavity.

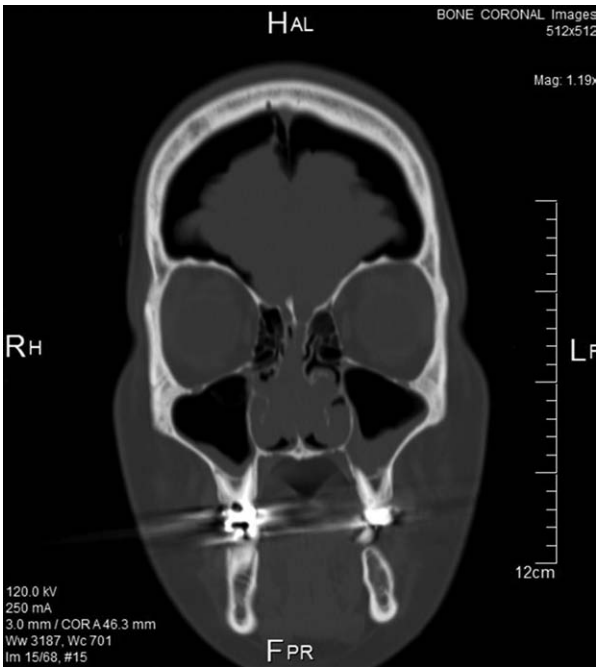

Fig. 2. Computer tomography view showing air in the temporal region of the cranial cavity.

Onerci et al[7] hypothesized that twisting movements made by the surgeon to fracture and remove perpendicular plate of ethmoid bone in the posterior bony septum may have led to injury of cribriform plate. Some, but not most, otolaryngology texts and surgical atlases do caution against the use of rocking and twisting movements on the perpendicular plate of the ethmoid bone, but it is only rarely emphasized that this may lead to injury of cribriform plate.[7] Rocking and twisting forces applied to the perpendicular plate of ethmoid bone would probably move the whole bone as a unit, with forces being transmitted to the extremely thin and delicate bone at the cribriform plate, leading to a possible microfracture at this site.[8] Multiple olfactory filaments perforate the cribriform plate, surrounded by a meningeal cuff containing CSF, which lies in direct communication with subarachnoid space. Shearing forces may cause fractures of the cribriform plate at its junction with perpendicular plate of ethmoid. In addition, ethmoid roof may be at different levels on right and left sides. This practice of rocking action may be unsafe and it would be safer to remove this bone with a sharp instrument such as bone punch or bone scissors.

Cartilage manipulation during septoplasty and subsequent insertion of the splints might have led to destabilization of the superior attachment of the middle turbinate to the cribriform plate. The spontaneous resolution of complications upon

splint removal suggests that Silastic splint had pushed the right middle turbinate into an overlateralized position, further weakening the superior attachment of the middle turbinate to the cribriform plate and causing a fine fracture defect, hence the importance of their cautious insertion under direct vision.

Also when elevating septal mucoperichondrial flaps, advancing the elevator forceps superiorly too far beyond the limits of ethmoid roof may lead to perforation of cribriform plate.

Although cribriform plate fractures may not always be visible radiologically, the presence of a pneumocephalus indicates that cranial cavity has been breached. Cough and sneezing might increase the intranasal pressure enough to push it into the intracranial cavity even without an apparent fracture line.

SUMMARY

Prevention of intracranial complications in septoplasty and other nasal surgeries is achieved through good technique. Taking note of anatomic variation, potential causative mechanisms of trauma to cribriform plate by manipulation and splints, and the effects of cough and sneezing postoperatively is critical. The adoption of endoscopic techniques to septal surgery may also limit unnecessary manipulation. Alternatively, as nasal physiology studies indicate that impact of posterior nasal deformities on overall nasal resistance is minimal,[9] it may, therefore, be best to adopt a conservative approach to surgical correction of posterior septal deviations.

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