Case Report

Delayed Cerebrospinal Fluid Rhinorrhea Twenty Years After Septoplasty
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Summary
A 56-year-old man underwent a septoplasty 20 years ago; however, one month prior to hospitalization he got a bad cold and cough, followed by a watery rhinorrhea. Computed tomography (CT) scan showed a defect in the right planum sphenoidale. After admission, with the typical clinical symptoms, the history of septoplasty and imagology evidence, the patient was diagnosed as delayed CSF rhinorrhea, and accepted a CSF rhinorrhea neoplasty with neuronavigation assistance under general anesthesia using an endoscopic approach. Intraperatively, we found an old bony defect 3×8mm in size at the planum sphenoidale. After 9 months of follow-up, there was no evidence of rhinorrhea.

Key words: Cerebrospinal fluid rhinorrhea, Septoplasty, Neoplasty

INTRODUCTION
Cerebrospinal fluid (CSF) rhinorrhea describes the egress of CSF from the intracranial cavity through an osseous defect within the skull base, and was first described as a pathologic entity in 1899 by St Clair Thompson. CSF rhinorrhea have been classified into two categories: traumatic and nontraumatic(6). Included in the category of traumatic CSF rhinorrhea are postoperative or iatrogenic defects, which are caused most frequently by otolaryngologic or neurosurgical procedures, including endoscopic sinus surgery, transnasal resection of pituitary tumors, septoplasty, or other skull base surgeries(1). However, CSF rhinorrhea after a septoplasty procedure is very rare. To the best of our knowledge, only 5 other cases of CSF rhinorrhea complicating septoplasty have previously been reported, and the time intervals of CSF rhinorrhea after Septoplasty were only ten days to 5 months(2,3,5). However, that a CSF rhinorrhea appeared 20 years after Septoplasty was never reported in before.

CASE PRESENTATION
A 56-year-old man underwent a septoplasty 20 years ago. The postoperative follow-up of the first two
decades was eventless without any complications for a CSF rhinorrhea. However, one month prior to hospitalization, he got a bad cold and a cough, following with watery rhinorrhea, which became more obvious when the patient having an anteversion of his body. Incipiently, the symptom of watery rhinorrhea was not fixed with intervals of paracme, so the patient gave no enough attention. However, one week before his hospitalization, his symptoms were aggravated accompanying with bucking. On examination, we found that his pars nasalis pharyngis was watery. A thin section paranasal computed tomography (CT) scan and a three-dimensional reconstruction showed a defect in the right planum sphenoidale (Fig 1A, B).

With the typical clinic symptoms, the history of septoplasty and imageology evidence, the patient was diagnosed as delayed CSF rhinorrhea, and accepted a CSF rhinorrhea neoplasty with neuronavigation assisted under general anesthesia using an endoscopic approach. Intraoperatively, we found the wall of posterior sphenoida sinus was very weak; after the tuncia mucosa was cut open, a slit-type old bony defect 3×8mm in size was seen at the planum sphenoidale of right side (Fig 1C). We repair the defect with the patient's body fat, assisted with gelatin sponge and medical glue. After 9 months of follow-up, there was no evidence of rhinorrhea.

**DISCUSSION**

Septoplasty is one of the most common operations in otorhinolaryngology to treat the nasal obstruction caused by septal deviation for the more than years. Many methods were applied for the diagnosis of CSF leak. However, the precise localization of the leakage is often a difficult and challenging problem. Possible leaking sites may be in anterior, middle and posterior fossa. Some neurosurgeons use a dilute solution of fluorescein to localize CSF fistulas both preoperatively and during surgery. Fluorescein-stained CSF is seen coming out of the defect as bright yellowish green fluid. However, there are risks of transverse myelitis and allergic reactions. High resolution, thin section CT including all of the paranasal sinuses and petrous temporal bones in the scans is helpful in defect localization. For our case, the bone defect location was easily found by a thin section paranasal CT scan and a three-dimensional reconstruction, so we did not use fluorescent method for the investigation of rhinorrhea.
Until now, only 5 cases of atrogenic CSF rhinorrhea after Septoplasty operation were reported in the English literature, their characteristics are summarized into Table 1. From this table, we may find that most CSF rhinorrhea following septoplasty happened at the right side, and the reasons are still unclear. However, it is not found that there are anatomical differences between the either side of cribiform plate or planum sphenoidale, so it probably has relationship with the right handedness of most operators.

<table>
<thead>
<tr>
<th>Case</th>
<th>Age (y)</th>
<th>Sex</th>
<th>Interval to CSF leak</th>
<th>Site of Defect</th>
<th>Size of Leak</th>
<th>First symptom</th>
<th>Side of the leak</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>M</td>
<td>3 months</td>
<td>Cribriform plate</td>
<td>15×5mm</td>
<td>Watery rhinorrhea</td>
<td>Right</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>M</td>
<td>12 weeks</td>
<td>Cribriform plate</td>
<td>10×5mm</td>
<td>Watery rhinorrhea</td>
<td>No description</td>
</tr>
<tr>
<td>3*</td>
<td>55</td>
<td>M</td>
<td>3 days</td>
<td>Cribriform plate</td>
<td>No description</td>
<td>Watery rhinorrhea</td>
<td>Right</td>
</tr>
<tr>
<td>4**</td>
<td>28</td>
<td>M</td>
<td>1 day</td>
<td>Cribiform plate</td>
<td>15×5mm</td>
<td>Confusion and delirium</td>
<td>Right</td>
</tr>
<tr>
<td>5</td>
<td>48</td>
<td>F</td>
<td>5 months</td>
<td>Cribiform plate</td>
<td>15×5mm</td>
<td>Watery rhinorrhea</td>
<td>Right</td>
</tr>
<tr>
<td>6</td>
<td>56</td>
<td>M</td>
<td>20 years</td>
<td>Planum sphenoidale</td>
<td>3×8mm</td>
<td>Discontinuous Watery rhinorrhea</td>
<td>Right</td>
</tr>
</tbody>
</table>

* The patient was treated conservatively with intravenous antibiotics and strict bed rest with 45° elevation of the head of the bed. The following day, the patient’s intranasal splints were removed on the ward, and the CSF rhinorrhea ceased completely.

** The patient was first treated with bed rest, head elevation, and diuretics. However, it was unresponsive. And, 17 days later, the CSF fistula was repaired using an endoscopic approach.

From the table, we could also find that all other cases of CSF rhinorrhea appeared less than 5 months after septoplasty; however, in our case, this CSF rhinorrhea appeared 20 years after Septoplasty, which was never reported before. Why did the symptoms of CSF rhinorrhea happen 20 years after Septoplasty in this case? The reason, for no prior similar report, probably is those similar situations never happened or not long enough follow-up or others.

However, the sites of bone defect of all other cases were cribiform plates; but in our case, the bone defect located at his planum sphenoidale, this is a probable anatomical factor for a longer time interval to CSF leak. Moreover, the size of leak in our case was only 3×8mm, while others were much bigger, which could easily lead to an earlier occurrence of CSF leak with obvious symptom of watery rhinorrhea. And in our case, the first symptom was only discontinuous watery rhinorrhea, which also indicated a smaller bone defect.

Meanwhile, our patient got a bad cold and cough before his occurrence of symptom, which could promote the intracranial pressure, and consequently lead to CSF rhinorrhea. From this case, we may presume: after septoplasty, maybe not a few patients could get bone fracture of planum sphenoidale or cribiform plate, and with the crack of fracture being widen, these patients could have bone defects of skull base. But most of them had no clinic symptoms perpetually because their bone defects were not big enough; however, some patient had discontinuous or mild CSF rhinorrhea with a long time interval to septoplasty, because of their medium-sized bone defect (just as our case). There also some patients, whose bone defects were a little bigger, would unfortunately suffer from obvious clinical symptom and had a relatively short time interval.

In this case, intraoperatively, we found the crack of planum sphenoidale was not fresh, but with a blunt edge. This indicates that there was a crack even just after his septoplasty 20 years ago. However, with
age, patients prone to respiratory symptoms, constipation, which lead to increased intracranial pressure, and induce CSF rhinorrhea. Meanwhile, with the declined mucosal proliferative capacity and decreased ability to repair itself elderly patients are more susceptible to CSF rhinorrhea.

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