Frequency of Nasal Septal Perforation at the Suture Fixation Site of a Silastic Sheet Inserted during Nasal Surgery

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Objective: This study was performed to evaluate the frequency of nasal septal perforation at the suture fixation site of a silastic sheet inserted during nasal surgery.

Methods: Seven hundred and twenty-one patients with silastic sheet insertion during common nasal surgeries were examined. The frequency of perforations and subjective symptoms of the patients were evaluated.

Results: Nasal septal perforation at the suture fixation site occurred in seven patients (0.97%). In three patients, perforations occurred immediately after removal of the sheet, while four patients developed perforations 2 to 4 weeks later. In most cases, perforations were small and did not exceed 2 to 3 mm in diameter. No patient complained of nasal symptoms related to the septal perforation postoperatively.

Conclusion: The frequency of the septal perforation at the suture fixation site of a silastic sheet was very low and subjective symptoms were absent.

Keywords: Nasal septum; Perforation; Frequency; Silastic

INTRODUCTION

Silastic is a silicone strengthened with a Dacron mesh that has been used in a variety of surgical fields for various purposes [1-10]. Silastic sheet may also be applied during common nasal surgeries, such as turbinate surgery, septal surgery, endoscopic sinus surgery (ESS), and polypectomy. Silastic sheet can be used to prevent synchiae between turbinates and septum or lateral nasal wall, and to promote the healing in cases of septal mucosal injury. However, several complications related to silastic sheet insertion have been reported. These include obstructive symptoms as a result of displacement or migration, an increased rate of infection, and granulation tissue formation [1,11].

The most common causes of nasal septal perforation include external nasal trauma and septal surgery [12]. However, septal perforations may also occur at the suture fixation site of a silastic sheet due to necrosis of the septal cartilage and mucosa. We cannot conclude the definite cause of septal perforations because, to our best knowledge, no study has been conducted on the perforations associated with silastic sheet insertion. In addition, no study has reported the frequency of nasal septal perforation after silastic sheet insertion during nasal surgery. Thus, we evaluated the frequency of perforations at the suture fixation sites of silastic sheets and associated subjective symptoms of the patients.

MATERIALS AND METHODS

This retrospective study examined the records of 721 patients who had silastic sheet insertion among 2,150 patients who had undergone nasal surgeries, such as turbinate surgery, septal surgery, ESS, and polypectomy from March 2004 to February 2010. Medical records for the type of surgery, surgical procedures, intraoperative findings, occurrence of septal perforations, and associated subjective symptoms of the patients were reviewed. The following cases were excluded from the study: 1) patients with bilateral injuries of septal mucosa at the corresponding area during septal sur-
Frequency of Nasal Septal Perforation

Among 721 patients who had a silastic sheet insertion, septal perforations at the suture fixation site occurred in seven patients (0.97%). The type of surgery, respective number of patients, and frequency of perforations are summarized in Table 1. For the convenience of description, we defined the anterior needle passage site through the nasal septum during through-and-through mattress suture as “anterior suture site” and posterior needle passage site as “posterior suture site.” Four patients had perforations at the anterior suture site (Fig. 1) and two patients at the posterior site (Fig. 2). One patient had perforations at both the anterior and posterior sites. In three patients, perforations occurred immediately after removal of the sheet, while four patients developed perforations 2 to 4 weeks later. In most cases, perforations were small and did not exceed 2 to 3 mm in diameter. During follow-up, perforation size did not change in five patients. However, in two patients with an anterior perforation, the size increased to about 8 to 9 mm in diameter. In all of the patients with septal perforations, nasal mucosa around the perforation site healed well and no patient complained of nasal symptoms related to the perforation.

Table 1. Type of surgery, number of patients, and frequency of perforations

<table>
<thead>
<tr>
<th>Surgery</th>
<th>Patient</th>
<th>Patient with silastic insertion</th>
<th>Perforations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbinate surgery</td>
<td>221</td>
<td>44 (19.91)</td>
<td>1 (2.27)</td>
</tr>
<tr>
<td>Septal + turbinate surgery</td>
<td>716</td>
<td>295 (41.20)</td>
<td>2 (0.88)</td>
</tr>
<tr>
<td>ESS</td>
<td>195</td>
<td>21 (10.77)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>ESS + turbinate surgery</td>
<td>191</td>
<td>53 (27.75)</td>
<td>1 (1.89)</td>
</tr>
<tr>
<td>ESS + septal + turbinate surgery</td>
<td>186</td>
<td>82 (44.09)</td>
<td>1 (1.22)</td>
</tr>
<tr>
<td>ESS + polyectomy</td>
<td>184</td>
<td>35 (19.02)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>ESS + polyectomy + turbinate surgery</td>
<td>211</td>
<td>83 (39.34)</td>
<td>1 (1.20)</td>
</tr>
<tr>
<td>ESS + polyectomy + septal + turbinate surgery</td>
<td>223</td>
<td>105 (47.09)</td>
<td>1 (0.95)</td>
</tr>
<tr>
<td>Other combinations</td>
<td>23</td>
<td>3 (13.04)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Total</td>
<td>2,150</td>
<td>721 (33.53)</td>
<td>7 (0.97)</td>
</tr>
</tbody>
</table>

Values are presented as number or number (%). ESS, endoscopic sinus surgery.

Percentage means number of patients with silastic insertion per number of patients.

Percentage means number of perforations per number of patients with silastic insertion.
DISCUSSION

Silastic sheets have been used in various nasal surgeries, mainly for the prevention of synechiae and the promotion of mucosal healing. Synechiae occurring after nasal surgeries often disturb postoperative management and are associated with recurrence of the nasal obstruction, eventually resulting in patient dissatisfaction. In patients who underwent ESS, synechia formation between the...
middle turbinate and lateral nasal wall can obstruct the outflow of the ethmoid, maxillary, and frontal sinus, leading to recurrent symptoms and necessitating synchiae division or further surgery [1-10]. Additionally, in cases of septal and turbinate surgeries, synchiae between the nasal septum and inferior turbinate may occur and lead to recurrence of nasal symptoms. Silastic sheet insertion can prevent this complication by acting as a mechanical barrier. If septal mucosal injury occurs during septal surgery, a silastic sheet can accelerate the healing process by moistening and humidifying the injured site and by avoiding further trauma during postoperative care.

Several complications related with silastic sheet insertion have been reported, such as obstructive symptoms as a result of displacement or migration, the possibility of infection, and granulation tissue formation [1,11]. The application of silastic sheets does not always have beneficial effects. Some patients may complain of nasal pain due to irritation of nasal mucosa. Furthermore, some patients may complain of nasal obstruction due to crust formation and nasal discharge. However, this can be relieved by proper location of the sheet, frequent saline irrigation, and meticulous postoperative care. Crusting at the suture site can also be prevented by applying an ointment or emollient. Because this study was conducted in a retrospective manner, we could not evaluate patient discomfort numerically or statistically. However, placement of a silastic sheet for 10 to 14 days may not be a great burden or discomfort to the patient, and a large number of patients did not notice the sheet in the nasal cavity.

As mentioned in the introduction, we cannot conclude the exact cause of septal perforations associated with silastic sheet insertion. However, in our opinion, the most possible and explainable cause of septal perforation is thought to be excessive tension when fixing the sheet to the nasal septum with suture material. This may compromise the blood supply, resulting in necrosis of the septal cartilage and mucosa. In all of our cases, through-and-through mattress suture was used for the fixation of a silastic sheet to the nasal septum. The suture material passed the nasal septum twice, anteriorly and posteriorly, and both sites received the similar tension during the fixation. Thus, our theory can be applied to both anterior and posterior perforations, and proper tension should be used when affixing the sheet. Too loose a knot will not cause the sheet to adhere to the septum and can cause swinging of the sheet and nasal obstruction during breathing. In contrast, excessively tight suturing causes pressure necrosis, as mentioned above. Four patients demonstrated delayed perforations. These patients developed crust on both sides of the suture site. In our opinion, this may slowly compromise the blood circulation and result in delayed perforations. We were always careful when affixing the sheet to the nasal septum with suture material. However, even when appropriate tension is applied, perforations may occur for reasons that are not apparent from the results of this study.

Our study showed that the frequency of nasal septal perforation at the suture site was very low (0.97%) and none of the patients with septal perforation complained of discomfort or symptoms postoperatively. This may be due to the small size of the perforation and complete mucosal healing of the perforation site.

In conclusion, the frequency of septal perforations occurring at suture fixation sites after applying silastic sheets was very low and there were no subjective symptoms. However, we suggest that reasonable criteria are necessary prior to silastic sheet insertion and appropriate tension should be applied before affixing a silastic sheet to the nasal septum. We believe that this report has value as the first study to evaluate the frequency of septal perforation occurring after application of silastic sheets in nasal surgery.

REFERENCES
