Inferior Turbinate Swing Technique: A Novel Surgical Route to Approach Maxillary Sinus Area Pathology

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No sponsorships or competing interests have been disclosed for this article.

Abstract

The inferior turbinate is an important structure for maintenance of adequate physiologic function within the nasal cavity. However, it hampers access to lesions involving maxillary sinus areas, including postoperative mucocele or benign tumor, and acts as an inferior limit to widening the natural ostium of a maxillary sinus. Here, we introduce a novel technique, inferior turbinate swing, to facilitate entry to the inferior meatus or maxillary sinus while maintaining integrity of the inferior turbinate. In this technique, the anterior part of inferior turbinate is cut with sharp scissors, rotated posteriorly, and held in the nasopharynx. The inferior turbinate swing technique was employed in 38 subjects, and no patients exhibited recurrence of the causative disease without complication. Therefore, we may conclude that the inferior turbinate swing technique is a simple, effective, and safe treatment option for the management of postoperative mucocele, maxillary sinusitis with narrow inlet, or benign tumors.

Keywords

 turbinates, nasal cavity, maxillary sinus, mucocele, maxillary sinusitis

Received February 8, 2018; revised April 19, 2018; accepted June 5, 2018.

The inferior turbinate is a structure that projects from the lateral wall of the nasal cavity, covering almost the entire lower portion of the cavity. IT is a necessary structure for nasal physiology¹; however, its shape and anatomic location sometimes interfere with access to the maxillary sinus in pathologic cases, such as chronic sinusitis with a narrow natural drainage pathway, postoperative mucocele (POMC) located at the inferior meatus, and a benign tumor rising from the maxillary sinus. IT forms the upper boundary of the inferior meatus; additionally, it serves as the lower boundary during middle meatal antrostomy.

In most cases of POMC, the medial wall of the mucocele shares the inferolateral wall of the inferior meatus; thus, it is difficult to create a large drainage hole in the narrow space under the IT. Moreover, it is difficult to simultaneously handle endoscopes and surgical instruments within this narrow corridor. Another manner in which IT impedes endoscopic surgery is in cases of recalcitrant maxillary sinusitis with a narrow ostial window. Neo-osteogenesis, due to recurrent inflammation or scar formation following previous sinus procedures, may aggravate these narrow sinus ostia; importantly, the IT interferes with the creation of a large antrostomy.²,³ The difficulties encountered during endoscopic sinus surgery that are related to the position of the IT are the same as those encountered during excision of tumors that originate from the maxillary sinus. To resolve these problems, we devised a new surgical technique, known as IT swing, that preserves the entire IT structure while ensuring a very wide surgical field of view.

Methods

Approval was obtained from the Samsung Changwon Hospital institutional review board prior to review of the medical records of enrolled patients. Cases that underwent the new IT swing technique were identified; subjects who were followed for >6 months postoperatively were included in this study. Preoperative diagnosis, demographic data, and complications related to IT swing technique were investigated.

Surgical Technique

A cut was made on the head of the IT with sharp conchotomy scissors at a distance of 5 to 6 mm inward from the anterolateral attachment of the IT. The remaining lateral stump facilitated suture repair of the swung IT to the original position, following completion of all procedures. The

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This article was presented at the 2017 AAO-HNSF Annual Meeting & OTO Experience; September 10-13, 2017; Chicago, Illinois.

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The cut was extended in the posterior direction (along the lateral attachment of the IT to the lateral nasal wall) until the cut reached the posterior attachment, under the guidance of a 30° endoscope. The cutting line passed medially to Hasner’s valve to avoid damaging the nasolacrimal drainage pathway, and the posterior attachment of the IT was preserved to maintain blood supply. Then, the IT head was gripped with Blakesley forceps and pushed back such that the entire IT was maintained within the nasopharynx during surgical excision of the primary lesion. During push-back, some portions of the IT bone were fractured; however, healing of the IT was not affected by this fracture. Moreover, the time required for the IT swing technique was minimal (5-10 minutes) and included cutting of the IT from the lateral nasal wall and subsequent suture repair. The incision was repaired (4-0 Vicryl; Ethicon, Somerville, New Jersey) endoscopically or under direct vision with headlight. Illustrations of the surgery are described in detail in Figure 1.

In cases of POMC, IT swing was used simply to obtain a wide surgical field in the inferior meatus (Figure 2); therefore, no additional procedure was employed. In cases of chronic maxillary sinusitis with narrow inlet and benign tumors arising from the maxillary sinus, the upper part of the medial wall was removed until a sufficient drainage pathway or surgical field was secured (Figure 3).

Results
Thirty-eight patients underwent IT swing procedures during treatment of lesions in the maxillary sinus area. Patients consisted of 21 men and 17 women; the mean patient age was 51.9 years (range, 26-71 years). Among the enrolled patients, 17 patients received treatment for POMC; 11 received treatment for benign tumor involving maxillary sinus; and 10 received treatment for chronic maxillary sinusitis. All 11 benign tumor cases were diagnosed as inverted papilloma without dysplasia (Table 1).

There was no recurrence of causative disease for any of the enrolled patients. After the completion of surgery, the maxillary sinus ostium and the drainage pathway of the POMC remained wide open; furthermore, there was no recurrence of tumor in any of the 11 cases or those with chronic sinusitis. There was no complication related to the nasolacrimal drainage system, such as epiphora.

Discussion
The objective of this study was to introduce our new IT swing surgical technique and report surgical results of its usage. For 38 enrolled patients, there was no recurrence of causative disease; a single negligible complication was recorded.

The IT swing technique is not a completely new surgical method, as similar methods were described; however, all
were indicated for the removal of inverted papilloma and introduced as part of a modified endoscopic medial maxillectomy, rather than an independent surgical approach. We applied IT swing not only for removal of inverted papilloma but also for treatment of POMC and chronic maxillary sinusitis. This study suggests that IT swing can serve as an independent approach that can be applied to various disease groups.

Table 1. Detailed Information of Each Disease Group.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Patients, n</th>
<th>Sex (M:F), n</th>
<th>Follow-up, mo</th>
<th>Revision Surgery, n</th>
<th>IT Swing, n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative mucocele</td>
<td>17</td>
<td>9:8</td>
<td>18.4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Inverted papilloma</td>
<td>11</td>
<td>7:4</td>
<td>15.3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Chronic sinusitis</td>
<td>10</td>
<td>5:5</td>
<td>24.9</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>21:17</td>
<td>19.5</td>
<td>9</td>
<td>15</td>
</tr>
</tbody>
</table>

Abbreviations: F, female; IT, inferior turbinate; M, male.

Conclusion

The IT swing technique to the maxillary sinus provides a very useful route to access the maxillary sinus or POMC located at the inferior meatus while preserving the entire IT without complication. The surgeon can apply this technique to various lesions around the maxillary sinus, such as sinusitis, benign tumors, or POMC. The IT swing technique is an easy, effective, and safe treatment option for the management of POMC, maxillary sinusitis with narrow inlet, or benign tumors.

Acknowledgments

Medical illustrations were provided by Jung-yon Ko with special thanks.

Author Contributions

Yong Gi Jung, substantial contributions to the conception and design of the work, the acquisition, analysis, and interpretation of data for the work, drafting the work and revising it, final approval, accountability for all aspects of the work; Gi Cheol Park, substantial contributions to the conception and design of the work, the acquisition, analysis, and interpretation of data for the work, drafting the work, final approval, accountability for all aspects of the work.

Disclosures

Competing interests: None.

Sponsorships: None.

Funding source: None.

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