Endoscopic Sinus Surgery for the Treatment of Organized Hematoma of the Maxillary Sinus

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Summary: Organized hematoma is a benign and non-neoplastic lesion, however, differential diagnosis from neoplastic diseases is always problematic, and patients are often forced to sustain excessive surgical invasion. We retrospectively studied the characteristics of imaging findings of organized hematoma of the maxillary sinus, and estimated the validity and effectiveness of endoscopic sinus surgery for the treatment of this disease. Three patients (2 men and a woman, ranging in age from 50 to 62 years) with organized hematoma of the maxillary sinus who underwent endoscopic sinus surgery were retrospectively analyzed. The diagnosis was provisionally made based on the findings of preoperative computed tomography (CT) and magnetic resonance imaging (MRI), and was confirmed by histopathological examinations of surgical specimens. CT revealed a well-defined expansile mass in the unilateral sinus associated with thinning and expansion of the medial sinus wall in all the cases. On contrast-enhanced images, patchy heterogeneous enhancement was observed. Intermingled low/intermediate/high signal intensity was seen on both T1- and T2-weighted MRI. The lesions were curetted via an endoscopic middle meatal antrostomy with the assistance of a microdebrider. None of the patients received arterial embolization or blood transfusion. Histopathological findings were consistent with those of organized hematoma. Their postoperative courses were uneventful, and all the patients are currently free from disease. We conclude that organized hematoma of the maxillary sinus can be successfully treated by endoscopic sinus surgery under accurate preoperative diagnosis and careful surgical planning.

Key words organized hematoma, maxillary sinus, endoscopic sinus surgery, microdebrider, computed tomography, magnetic resonance imaging

INTRODUCTION

Organized hematoma is a benign hematoma-like pseudotumor, which preferably arises in the maxillary sinus. Less frequently, such a lesion may arise from the pericardium, cerebrum, adrenal gland, cerebello-pontine angle, etc. Organized hematoma of the maxillary sinus was first described by Tadokoro [1] in 1917 in the Japanese literature. The occurrence of this disease has also been sporadically documented in the English literature in the 1990s and 2000s [2-10]. Although the disease is essentially benign and non-neoplastic, differential diagnosis from neoplastic diseases including malignancy has been always problematic, and patients have been often forced to sustain excessive surgical invasion. In recent years, however, indication of endoscopic surgery is increasing for the treatment of this disease under precise preoperative...
imaging examinations. We herein studied the characteristics of imaging findings of organized hematoma of the maxillary sinus, and estimated the validity and effectiveness of endoscopic sinus surgery for the treatment of this disease.

PATIENTS AND METHODS

Three patients with organized hematoma of the maxillary sinus who were treated in our department from 2004 to 2006 were retrospectively analyzed on the basis of their medical records. They were 2 men and a woman, ranging in age from 50 to 62 years. The diagnosis was provisionally made from the findings of preoperative computed tomography (CT) and magnetic resonance imaging (MRI), and was confirmed by histopathological examinations of surgical specimens.

RESULTS

The patients’ clinical features are summarized in Table 1. The chief complaints were nasal obstruction, nasal bleeding, and bloody rhinorrhea. None had a past history of nasal or paranasal sinus surgery. Two patients were receiving anticoagulant drugs for the treatment of underlying diseases. These drugs were halted during the perioperative period. On anterior rhinoscopy, the lateral nasal wall was medially displaced in cases 1 and 3, and a blood clot was seen in the middle nasal meatus in case 2. CT revealed a well-defined expansile mass in the unilateral sinus associated with thinning and expansion of the medial sinus wall in all the cases (Fig. 1). On contrast-enhanced images, patchy heterogeneous enhancement was observed (Fig. 2). The lesions showed intermingled low/intermediate/high signal intensity on both T1- and T2-weighted MRI (Fig. 3). From these findings, we suspected that the lesions were probably organized hematomas. Because contrast enhancement was only patchy, preoperative arterial embolization was not performed in any of the cases. Macroscopically, a dark-reddish crumbly lump consisting of blood clots and fibrous tissue filled the sinus of each patient. The lesions were curetted by

<table>
<thead>
<tr>
<th>Case</th>
<th>Age/Sex</th>
<th>Side</th>
<th>Chief complaint</th>
<th>Underlying disease</th>
<th>Anticoagulant drug</th>
<th>Total blood loss during surgery</th>
<th>Operation time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>62/M</td>
<td>R</td>
<td>Nasal bleeding</td>
<td>Old myocardial infarction</td>
<td>Warfarin</td>
<td>250 ml</td>
<td>80 min</td>
</tr>
<tr>
<td>2</td>
<td>50/F</td>
<td>L</td>
<td>Bloody rhinorrhea</td>
<td>Anorexia nervosa</td>
<td>(–)</td>
<td>250 ml</td>
<td>70 min</td>
</tr>
<tr>
<td>3</td>
<td>57/M</td>
<td>L</td>
<td>Nasal obstruction</td>
<td>Ischemic heart disease</td>
<td>Aspirin</td>
<td>350 ml</td>
<td>110 min</td>
</tr>
</tbody>
</table>

Fig. 1. Plain CT of case 2 showing a well-defined expansile mass in the left maxillary sinus.

Fig. 2. Contrast-enhanced CT of case 2 showing patchy heterogeneous enhancement.
Fig. 3. MRI of case 2. The lesion shows intermingled low/intermediate/high signal intensity on both T1- (A) and T2- (B) weighted MRI.

Fig. 4. Photomicrograph of case 2. The lesion comprises hemorrhage and blood clots coexisting with neo-vascularization and fibrosis without evidence of neoplasm. (H & E stain, original magnification ×200)
piecemeal via endoscopic middle meatal antrostomy with the assistance of a microdebrider. In case 2, the mass was broadly based on the lateral wall of the sinus, whereas the other portion of the mass was readily separated from the sinus mucosa. In the other cases, no obvious base was seen, and the border between the lesion and sinus mucosa was endoscopically unclear. The lesions were eradicated as thoroughly as possible, but small remaining tissue was left, particularly, on the anterior and inferomedial walls in the sinus. Total blood losses during surgery were 250-350 ml, and no blood transfusions were needed. Operation times were 70-110 min. Intraoperative frozen-section analysis was performed in 2 patients, showing consistent findings with those of organized hematoma and no evidence of malignancy. In the other patient (case 2), an almost definite diagnosis was preoperatively obtained from typical radiographic findings, and thus, an intraoperative pathology consultation was not arranged. Microscopically, the lesions comprised hemorrhage and blood clots coexisting with neovascularization and fibrosis without evidence of neoplasms (Fig. 4). Their postoperative clinical courses were uneventful, and all the patients are free from disease 2-4 years after surgery (Fig. 5).

DISCUSSION

Since organized hematoma of the maxillary sinus was first described by Tadokoro [1] in 1917, a number of authors have reported this disease in the Japanese literature. On the other hand, in the English literature, there are only few papers on this disease. A case report by Ozhan et al. [2] in 1996 is the first English document about organized hematoma of the maxillary sinus, which was associated with von Willebrand’s disease. At a later time, in the 2000s, organized hematoma of the maxillary sinus was reported in patients without bleeding diathesis [3], and was recognized to often be an idiopathy. This disease has been otherwise referred to as hemophilic pseudotumor [2] or a hematoma-like mass [6], but the term “organized hematoma” is most commonly accepted [3,5,7-10].

It is important to read the characteristics of imaging in order to make an unerring preoperative diagnosis. On CT, an organized hematoma generally exhibits a well-defined expansile mass in the unilateral sinus often associated with thinning or resorption of the surrounding bone. The medial sinus wall, particularly the uncinate process, is most frequently eroded, and resorption of the posterior, superior and anterior sinus wall is sometimes observed [8]. The lesion may show heterogeneous X-ray density, but calcification is rarely seen. No bilaterally-affected case has been reported to date. On contrast-enhanced images, enhancement is usually patchy and heterogeneous [7-10], but may occasionally be faint and unremarkable [2-4]. More conspicuous characteristics are seen on MRI. The lesion has a clear contour often surrounded by edematous sinus mucosa, and shows intermingled heterogeneous low/intermediate/high signal intensity on both T1- and T2-weighted MRI [2,6,9,10].

Because the clinical and radiographic appearance of organized hematoma is similar to that of neoplasms such as hemangioma, papilloma, schwannoma, carcinomas, sarcomas, and lymphoma, most of the previous cases have undergone surgical resection via a Caldwell-Luc operation, Denker’s operation, or a lateral rhinotomy approach. However, considering the benign and non-neoplastic nature of organized hematoma, a less invasive surgical approach is desirable. Recent reports have described an endoscopic approach to evacuating this lesion [5,7-9]. In the present patients, organized hematoma was cured by piecemeal via endoscopic sinus surgery with the assistance of a microdebrider. The middle meatal approach may be insufficient for the access to the anterior and inferomedial walls of the sinus, and in the present cases, small remaining tissue was left behind in the sinus. However, the disease eventually cured in all the cases, indicating that combination with other approaches such as inferior meatal and transcaneous antrostomy is basically unnecessary.

There are several requirements for the application
of endoscopic sinus surgery in order to achieve good treatment outcome of this disease: First, the preoperative diagnosis needs to be made as accurately as possible. The radiographic findings mentioned above give convincing clues for making a diagnosis. Second, if there is underlying bleeding diathesis, it must be thoroughly controlled. Even in patients without bleeding disorders, organized hematoma may still be hemorrhagic, but the lesion generally shows only weak and patchy enhancement, as in the present study. Preoperative arterial embolization has not been performed in the reported or present cases, and is thought to be unnecessary. Third, intraoperative frozen-section analysis is advisable because the preoperative diagnosis is often in doubt. If neoplasms including malignancy are suspected by pathology consultation, other surgical procedures such as a Caldwell-Luc operation, Denker’s operation, midfacial degloving or a lateral rhinotomy approach should be immediately indicated. Fourth, the use of a microdebrider is strongly recommended in combination with an endoscopic approach for the evacuation of the maxillary sinus, particularly, the anterior and inferomedial portions of the sinus.

CONCLUSION

We retrospectively studied the characteristics of imaging findings of organized hematoma of the maxillary sinus, and estimated the validity and effectiveness of endoscopic sinus surgery for the treatment of this disease. We would like to emphasize that this disease can be successfully treated via an endoscopic approach. Accurate preoperative diagnosis and careful surgical planning play key roles in attaining this goal.

REFERENCES