Osteoma in Ethmoid Sinus: a case report

Kazuhiko Hasegawa,¹ Ritsu Iida,¹ Shigeo Tanaka,¹ Jun Shibutani,¹ Masamichi Komiya,¹ Tatsuo Ishii,¹ Yoshiaki Akimoto,¹ Takeshi Maeda,² Yasuhide Makiyama,² Teruyasu Hirayama,² Hiroyuki Okada,³ Hirotugu Yamamoto,³ and Takashi Kaneda⁴

Departments of ¹Oral Surgery, ²Neurological Surgery, ³Oral Pathology, and ⁴Radiology, Nihon University School of Dentistry at Matsudo, Matsudo, Chiba 271-8587, Japan

Correspondence to:
Kazuhiko Hasegawa
E-mail: kazh@mascat.nihon-u.ac.jp

Abstract
We present a case of ethmoid sinus osteoma. A 66-year-old woman was referred with an asymptomatic mass of the nose. Radiographs showed a rounded homogeneous radiodense lesion in the right ethmoid sinus, suggesting an osseous lesion. Computed tomography demonstrated a multi-lobulated high density lesion (2.0 × 1.5 cm in size) occupying the ethmoid sinus. The lesion was attached to the nasal septum and extended to the posterior orbit. Total excision of the mass lesion was performed under general anesthesia via the oral vestibular approach with an operating microscope. Histopathological examination revealed eburneous-type osteoma. The postoperative course was uneventful.

Introduction
Paranasal sinus osteoma is a slow-growing, benign, encapsulated bony tumor that is commonly asymptomatic in its early stages. However, enlargement can result in the following complications: epiphora, nasal obstruction, and symptoms related to compression of the adjacent orbit and intracranial structures (1). In this report, a case of a large asymptomatic osteoma in ethmoid sinus is described with radiological diagnosis, treatment, and pathological findings in addition to a review of the literature.

Case Report
A 66-year-old woman was referred with an asymptomatic radiopaque mass of the paranasal sinus. Medical history included radical surgery on both maxillary and ethmoid sinuses in 1988 (Fig. 1). No complexion abnormality was recognized on in initial examination. Waters’ (occipitomental) and P-A radiographs revealed a round homogeneous radiopaque lesion in the right ethmoid sinus (Fig. 2). Axial and coronal CT images demonstrated a multi-lobulated, homogeneous, high density mass measuring 2.0 × 1.5 cm in the ethmoid sinus, which was attached to the nasal septum and extended to the posterior wall of the orbit. Mucosal thickening of the right maxillary sinus was also evident (Fig. 3). A tentative diagnosis of osteoma in the right ethmoid sinus was made. Surgery was performed via the oral

Fig. 1. View of patient on admission.
vestibular approach, and the entire mass was resected using an operating microscope.

Macroscopically, the operative specimen consisted of an oval-shaped yellowish-white bony hard mass measuring 2.6×2.5×1.2 cm in size (Fig. 4).

Histopathologically, the tumorous lesion was composed of a proliferation of compact bone and exhibited lamellar structures and remodeling lines (Fig. 5). Trabecular bone was recognized in some areas at the periphery. These tissues had high bone density and many osseous lacunae containing osteocytes. Many osteoblasts lined the periphery of the bone and some osteoclasts were also seen. Bone marrow cavities were scanty or consisted of areolar tissue with inflammatory changes. Histopathological examination hence confirmed the diagnosis of osteoma, with features suggesting eburneous type osteoma.

Subsequent follow-up over a half year was uneventful (Fig. 6).

Discussion

Osteoma is the most common benign tumor of the paranasal sinus. This encapsulated bony tumor is a slow-growing benign neoplasm, which is commonly
asymptomatic, being detected incidentally in 0.0018 \sim 1.0\% of plain sinus radiographs and in 3.0\% of sinus computed tomographic images (2-8) (Table 1). The most common site is the frontal sinus, followed by the ethmoidal, maxillary and sphenoid sinus (9) (Table 2). Male to female ratio is reported at approximately 2 : 1, and the tumor is more common in young adults, with peak incidence from 10 to 20 years (10-13). This may reflect the fact that the bone grows most rapidly during these years.

The pathogenesis of osteoma is unknown (14). Some investigators consider it to be a true neoplasm, while others classify it as a developmental anomaly (15-17). The possibility of a reactive mechanism, triggered by trauma or infection, has also been suggested (18). In the present case, although there was a history of bilateral radical surgery on the maxillary sinuses in 1987, the tumor remained asymptomatic or alternatively other possible precipitating factors are unknown.

Osteoma is usually classified into three histologic types according to bone formation: eburneous-type (hard laminated), cancellous-type (spongy), and mixed type (combining features of the eburneous and cancellous type) (19-21) (Table 3). The present case was classified as eburneous-type osteoma, which appear to have a lower proliferative rate than the cancellous type (22). Since growth of osteoma is very slow, it is necessary to perform radiographic examination periodically to evaluate the growth rate of the tumor (1).

While most osteomas exhibit very slow or no growth (reported at 1.61 mm/year on average (23)) and tend to remain asymptomatic, around 10\% exhibit more rapid growth, resulting in symptoms (24). Age at onset of first symptoms is usually in the third or fourth decade of life (25). Initially, the osteoma takes the form of the paranasal sinus in which it originates, and with increasing size it

### Table 1. Incidence of sinus osteomas based on radiographical studies

<table>
<thead>
<tr>
<th>X-P</th>
<th>CT</th>
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<tbody>
<tr>
<td>8/5600 cases (0.0018%) (1)</td>
<td>46/1500 cases (3.0%) (7)</td>
</tr>
<tr>
<td>3/2500 cases (0.12%) (2)</td>
<td></td>
</tr>
<tr>
<td>4/2500 cases (0.16%) (3)</td>
<td></td>
</tr>
<tr>
<td>15/3510 cases (0.427%) (4)</td>
<td></td>
</tr>
<tr>
<td>64/16000 cases (0.4%) (5)</td>
<td></td>
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<tr>
<td>50/5086 cases (1.0%) (6)</td>
<td></td>
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</tbody>
</table>

(1-7) Reference number

### Table 2. Clinical characteristics of osteoma according to paranasal sinus distribution

<table>
<thead>
<tr>
<th></th>
<th>Frontal</th>
<th>Ethmoid</th>
<th>Sphenoid</th>
<th>Maxillary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence</td>
<td>50%~60% (Most common)</td>
<td>20%~30% (Common)</td>
<td>&lt;10% (Rare)</td>
<td>&lt;10% (Rare)</td>
</tr>
<tr>
<td>Shape</td>
<td>Lobulated</td>
<td>Pedunculated</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Growth</td>
<td>Slow</td>
<td>Relatively rapid</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Proptosis</td>
<td>Downward &amp; outward</td>
<td>Outward only</td>
<td>Outward</td>
<td>Upward &amp; outward</td>
</tr>
<tr>
<td>Involves first</td>
<td>Cranial cavity</td>
<td>Orbit</td>
<td>Optic nerve</td>
<td>Lacrimal passages &amp; infraorbital nerves</td>
</tr>
</tbody>
</table>
invades adjacent orbital and intracranial cavities; this appearance tends to be seen in patients presenting with symptoms and serious complications (1, 26–30) (Table 4). It is therefore necessary to understand activity in the lesion; radionuclide bone scans (99mTc–methylene diphosphonate) can help to differentiate an actively growing “hot” lesion from a normal “cold” region, (31).

In the treatment of paranasal osteoma, asymptomatic tumors have commonly been followed up using plain films and CT. If symptoms are already evident or thought likely to occur, enucleation of tumor is essential (Table 5).

Recurrence of ethmoid osteoma is rare, as illustrated in the present case, in which no recurrence has been detected during six months of follow up.

**Conclusion**

Radiography allow us to establish the presence of sinus osteoma, determine its extent, and detect any complications.

Radiological examinations were useful to determine surgical treatment in the present case.

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**References**

9. Ahmad MM, Haytham S, Sami U, Rola D, Ziad B: Ethmoid sinus osteoma Presenting as Epiphora and Orbital Cellulitis: Case Report and Literature review
Survey of Ophthalmology, 43: 5; March–April, 1999.