Schwannoma of the Mandible

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A case of intraosseous schwannoma of the mandible is presented. This tumor was so large that expansion of the lingual cortex of the alveolar bone led to perforation. It was linked with the inferior alveolar nerve in the distal side and the mental nerve in the mesial side, and therefore the nerve was severed and electrocoagulated. Histopathologically, the tumor showed characteristics of a schwannoma, with a mixture of Antoni- A and -B areas. Atypical cells and degeneration were also seen. The defect of the mandibular bone after enucleation of the tumor was filled with a mixture of iliac cancellous bone marrow and hydroxyapatite granules. There has been no sign of recurrence of this tumor for nine years since the operation.

Key words: schwannoma, mandible, inferior alveolar nerve

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Introduction
Schwannomas, also as referred to as neurilemmomas, are benign slow-growing tumors that originate from the Schwann cells that ensheath axons of the peripheral nerves (1). Schwannomas usually occur in the head and neck region, and are not common in the intraosseous region of the jaws (2, 3). Most intraosseous schwannomas of the mandible show asymptomatic progression, and therefore they are often neglected until they become large (4, 5).

Case Report
A 63-year-old Japanese man was referred to the First Department of Oral and Maxillofacial Surgery in the Dental Hospital of Kyushu University by a neighboring dental clinic for a lump in his lower jaw. At his first visit, the general condition of the patient was quite good, although his medical history included chronic hepatitis and congestive heart failure.

Though details were not available, the patient had suffered a bruise on his right mandible during a fall more than 30 years prior. His build was moderate, and the color of his face was not pale, but his right mandibular region was slightly swollen. His buccal and lingual alveolar bone from the midline to the right second molar region also had indolent swelling. Although the cortical bone of his right mandible was not palpable, there were no symptoms of pain or paresthesia. All teeth of the right mandible responded positively in an electric stimulation test. On panagraphy film and computed tomography (CT) images there was a unilocular, radiolucent lesion which had a defined boundary, and which was enclosed by an osteosclerotic area in the right mandibular region. (Fig. 1) Root apices of the right lower first and second molars were contained in the lesion and showed resorption. In examination using CT, there were high-density spots (CT value: 180) in some places. The relation between the mandibular canal and the lesion was not clear. At that point, an odontogenic tumor or a cyst was strongly suspected.

Under local anesthesia, a biopsy was performed. The preliminary histopathological diagnosis was intraosseous schwannoma. Surgical intervention under general anesthesia was then done. The tumor was very fragile, and it was attached to the inferior alveolar nerve in both the medial and the distal sides. The nerve was ligated and coagulated for complete enucleation of the tumor. The size of tumor was $42 \times 22 \times 20$ mm. A small fenestration was observed in the thin layer of the lingual cortical bone after enucleation of the tumor. The bone cavity was curetted and shaved using a round burr because there was partial adhesion between the tumor and the bone with a trace of tumor expansion. After sufficient
irrigation, the cavity was filled with a mixture of iliac particulate cancellous bone marrow (PCBM) and hydroxyapatite (HA) granules, and then the soft tissue was trimmed and sutured. Teeth near the tumor were extracted. The tumor was a whitish yellow, solid and elastic soft mass with a thin incomplete capsule that was torn.

In hematoxylin and eosin stained sections, the tumor showed proliferation of spindle cells organized in a palisaded pattern (so called Antoni A area) with myxoid degeneration (so called Antoni B area). At the periphery of the tumor, hyalinization and calcification were seen. (Fig. 2) There were many tumor cells around the stump of the alveolar inferior nerve. Atypical or bizarre cells with large nuclei were often observed, but mitotic figures were rarely seen. (Figs. 3, 4) Immunohistochemical examination for expression of S-100 protein and/or neuron specific enolase (NSE) was performed with specific antibodies. Both antibodies reacted positively in the tumor cells that concentrated closely. (S-100 protein: Fig. 5, NSE: data not shown) Meanwhile, an anti-desmin antibody showed no positive signal. The final diagnosis was determined by these findings.

Three months after the operation a denture was set to the mandible. It fitted very well on the firm residual ridge, and therefore enabled the patient to take foods easily. Nine years have passed since the operation, and there has been no sign of recurrence or infection because of the HA granules.

Discussion

Schwannomas often occur in the head and neck region, but intraosseous schwannomas are relatively rare. Because of the length of the inferior alveolar nerve, the mandible is the most commonly affected region, especially the posterior part including the angle of the mandible (3, 6). According to most of the past reports, the relation between the tumor and the inferior alveolar nerve is unclear (2, 3, 7). In this case, the tumor was directly connected to the nerve at the mesial and the distal sides.

Because of the tumor growth, fenestrations were caused on both the buccal and the lingual cortical bones. So a long time seems to have passed from the first occurrence until the enucleation of the tumor, and as a result, nerve fibers were involved in the growing tumor. For complete removal of the tumor, the involved nerves were ligated, and eventually paresthesia remained. But there
has been no sign of recurrence of the tumor for nine years since the operation.

Originally, schwannomas were described as having a true capsule consisting of the epineurium (4). However, some reports have subsequently described the lack of a capsule (2, 8). Concerning this matter, depending on the size or the position of the involved nerve, the epineurium is involved in the progression of the tumor, and therefore, the appearance of a capsule differs among tumors. Whether the tumor has a capsule or not, only residual tumor cells cause recurrence (8). Among reported cases, there is one case of recurrence 15 years after surgery (9). So a careful follow-up and complete enucleation of the tumor are required.

To prevent recurrence, extraction of the teeth and curettage of the bone surrounding the tumor was performed, resulting in a large bone defect. In previously reported cases, a titanic plate or PCBM was used to reconstruct the bone defect after the enucleation of the tumor (8, 9). In the case of our patient, a bone graft was required. However, there was a lack of volume of the bone marrow because of the large bone defect or scarcity of bone marrow due to aging. So granules of HA were added. Despite a fair degree of biophylaxis against HA as a foreign body, there was no sign of infection and the residual ridge is so firm that it allowed a denture to fit very well for nine years since the operation.

The tumor showed characteristic pathological findings of schwannoma, a mixture of Antoni A and B areas. However, degenerative changes of the tumor with the appearance of atypical cells were also seen. These findings appear in “ancient schwannoma” arising in the deep region (5). Although the present case does not show classical findings of ancient schwannoma, in the peripheral part of the tumor, cells were sparse and showed degenerative changes. Therefore, it seemed to be very inveterate.

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References


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