Osteochondroma of the mandibular condyle: a case report and review of the literature

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Abstract: Osteochondroma is rarely found in the oral and maxillofacial regions. A rare case of osteochondroma affecting the mandibular condyle of a 46-year-old Japanese woman is reported. Clinical examination revealed facial asymmetry, malocclusion, and a palpable hard mass in the right temporomandibular joint (TMJ). Radiologically, the lesion was visualized as a radiopaque mass in the same region, but no destructive features were evident. Three-dimensional computed tomography was employed for estimating the stereographic extension of the lesion, which seemed to develop from the anterior portion of the condylar neck, and extend to the condylar head. The patient underwent tumor excision and condyloplasty under a clinical diagnosis of benign TMJ tumor. The histopathological diagnosis was osteochondroma of the mandibular condyle, and the lesion consisted of proliferative bony and hyalinized cartilage-like tissues. Moreover, a cartilage cap, a characteristic feature of osteochondroma, was also observed. Thirty-eight cases of osteochondroma of the mandibular condyle described in the English literature, including the present case, were reviewed. The mean patient age was 39.7 years with a peak in the fourth decade, which was older than patients with tumors in the axial skeleton. There was no sexual predominance for tumors in either the mandibular condyle or axial skeleton. The histopathogenesis of this tumor developing in the mandibular condyle was also discussed. (J. Oral Sci. 43, 293-297, 2001)

Key words: osteochondroma; bone tumor; mandibular condyle; histopathology.

Introduction

Osteochondroma is the most common benign tumor of the axial skeleton. However, it occurs only rarely in the oral and maxillofacial regions, with an incidence of approximately 1% of all cases (1). Unni (2) has suggested that solitary osteochondroma in the orthopedic field has a 2% recurrence rate. Solitary osteochondroma shows a low incidence (approximately 1%) of malignant transformation, and the multiple form has an 11% risk of sarcomatous change (3). However, no case of malignant change has ever been reported, and only one recurrence has been reported in the mandibular condyle region. Therefore, although the treatment for the tumor in this region is condylectomy, we suspect that this may be regarded as excessive surgery. We report a case of osteochondroma in the mandibular condyle, and discuss the nature of this rare entity from a histopathological viewpoint and its treatment.

Case Report

A 46-year-old Japanese woman was admitted to Kobe City General Hospital with chief complaints of facial asymmetry and posterior open bite in April 1996. Clinical examination revealed facial asymmetry and displacement of the chin, and a hard mass was palpable through the periauricular skin. However, neither pain nor joint noise was noted during jaw movement. Intraoral examination showed posterior open bite and a 4-mm leftward shift of the lower incisor (Fig. 1).

Panoramic radiography and Shüllar radiography demonstrated an enlarged right mandibular condyle with
a radiopaque mass (Fig. 2). Plain CT scan showed an additive growth pattern of the tissue, which was bone-like and dense, from the anterior-medial portion of the condyle. Evaluation by three-dimensional CT scan showed that the lesion had developed from the anterior portion of the condylar neck, and extended to the condylar head (Fig. 3). No abnormal feature was observed in the circumjacent bone and other tissue. $^{99}$Tc bone scintigraphy showed a focal hot image, which corresponded to the above findings. Under a clinical diagnosis of benign tumor of the mandibular condyle, excision of the tumor and condyloplasty were performed under general anesthesia.

As of 22 months postoperatively, the outcome, including the condylar displacement, malocclusion, and facial asymmetry, has been uneventful without sign of tumor recurrence.

Histopathological Findings
The surgical specimen showed a grayish white tumor mass with a smooth surface, which was bone-like and hard upon palpation. Microscopically, the lesion consisted of a proliferation of bony and hyalinized cartilage-like tissues. The tissue resembling hyalinized cartilage contained homogeneous cells in lacunae with a myxoid background, corresponding to the so-called cartilage cap (Fig. 4). Different degrees of calcification were also observed in the lesion, which was connected with the existing bone.

Moreover, a cartilage cap - a characteristic feature of osteochondroma - was also seen in the surface of the lesion. These findings corresponded to those of osteochondroma. Toluidine blue (pH 2.5, 4.1 and 7.0) staining showed various degrees of matrix formation in the hyaline cartilage-like tissue with partial metachromatism. Azan-Mallory staining also revealed various amounts of collagen fibers in the matrix.
Discussion

Osteochondroma usually affects the metaphysis of the axial skeleton in individuals in their second decade or younger (1,4,5), but it is rare in the mandibular condyle. A total of 38 cases affecting the mandibular condyle, including the present case, have been reported in the English literature (4-37). A literature review showed that the tumor in this region developed mainly in the fourth decade with mean age of 39.7 yr (Fig. 5) and a male to female ratio of 1.0:1.5. These circumstances differed from those reported for tumors of the axial skeleton. The rare development of osteochondroma in the mandibular region might be associated with the anatomical and histological differences from the axial skeleton, since anatomically the mandible is the only skeletal bone in humans to have bilateral joints. Histologically, the mandibular condyle of the adult human consists of fibro-cartilage, and lacks hyaline cartilage, whereas many other skeletal joints have hyaline cartilage (38). In the mandibular condyle, the tumor may predominantly arise in the fourth decade of life because of the number of missing or prosthetic teeth present at that age, compared with individuals in their second decade.

These circumstances may account for a higher frequency of malocclusion and influence the mandibular condyle. Some authors have reported the pathogenesis of osteochondromas of skeletal bones.

Keith (39) postulated that this tumor resulted from defects in the periosteal cuff and herniation of the epiphyseal plate cartilage during fetal growth and development.

Other authors have described that osteochondroma develops through spontaneous or induced metaplasia of the peristeum (40). Although there are many theories for the pathogenesis of osteochondromas, they are still uncertain whether this lesion is developmental, neoplastic, or reparative (8). In some reported cases in the mandibular condyle, the patients had a history of mandibular trauma. Thus, missing teeth or prosthetic teeth, traumatic factors and joint disease including TMJ disorders may induce the appearance of osteochondroma in the mandibular condyle. In the present case, the tumor seemed to develop from the anterior portion of the condylar neck, and extend to the condylar head. Anatomically, the lateral pterygoid muscle connects to the pterygoid fossa, which houses the anterior portion of the condylar neck. Cells having the potential for cartilaginous differentiation in the peristeum are stimulated by unusual muscle stress. These cells may then proliferate and cause neoplastic change.

Osteochondroma of the mandibular condyle must be distinguished from unilateral condylar hyperplasia. Clinically, the latter is manifested as an enlarged condylar process, whereas osteochondroma usually shows a globular appearance with distortion of the normal morphology. Histopathologically, unilateral condylar hyperplasia reveals a normal pattern of cartilage proliferation (14), whereas osteochondroma has aberrant cartilage proliferation and calcification. Moreover, a cartilage cap, which is a characteristic feature of osteochondroma, is also observed. However, the cartilage cap is not always associated with osteochondroma, because an old osteochondroma tends to show calcification of the cap.

In the orthopedic field, solitary osteochondroma has a low incidence of malignant transformation (approximately 1%) and recurrence (approximately 2%) (2,3).

However, no case of malignant transformation and only one case of recurrence has ever been reported in the mandibular condyle (10). Common surgical treatments include condylectomy and reconstruction. However, tumor excision and condyloplasty were selected for the present case because condylectomy might have caused limitation of mouth opening, jaw movement disorder, and cosmetic problems. As of 22 months postoperatively, the outcome in the present case has been uneventful without any sign of tumor recurrence. Thus, condylectomy is considered to be an adequate treatment for osteochondroma in the mandibular condyle.

References


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