CASE REPORT

Diagnosis of Giant Cell Tumor of Temporomandibular Joint with Ultrasound-guided Core Needle Biopsy

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Temporomandibular joint (TMJ) tumors may initially present with symptoms similar to TMJ internal derangements and myositis of masticatory muscles. However, malignant tumors and specific types of benign tumors, such as giant cell tumors, may need aggressive surgical intervention. The current case is a 41-year-old man who initially presented with right preauricular pain. Computed tomography (CT) revealed a destructive bone lesion over the right TMJ with temporal bone destruction. A biopsy conducted with an ultrasound-guided core needle confirmed that the lesion was a giant cell tumor. Giant cell tumors can eventually destroy the surrounding tissue. Magnetic resonance imaging and CT have been traditionally used to evaluate TMJ disorders, whereas ultrasonography provides real-time imaging for evaluating the joint structure, movement, and biopsy guidance. For a TMJ tumor, a precise diagnosis is necessary for adequate planning of treatment. Ultrasound-guided core needle biopsy is a safe and effective method for confirming a diagnosis. © 2014, Elsevier Taiwan LLC and the Chinese Taipei Society of Ultrasound in Medicine. Open access under CC BY-NC-ND license.

Introduction

The temporomandibular joint (TMJ) comprises a condyloid process and articular eminence. The articulating surface is composed of fibrous connective tissue with a layer of hyaline cartilage. Disorders and tumors occurring at other joints can also occur at the TMJ. However, TMJ tumors are relatively infrequent and usually present as orofacial pain,
which is similar to the presentation of TMJ internal de-
rangements and myositis of masticatory muscles [1]. Most
benign tumors, including synovial chondromatosis and
osteochondroma, can be removed with a simple resection
or arthroscopy; malignant tumors and some benign tumors,
including giant cell tumors, must be removed extensively
with a safe margin. Here, we present a case with a right
TMJ tumor.

Case Report

The patient was a 41-year-old man who reported feeling
pain in the right preauricular area for more than 10
months, particularly while opening his mouth. He had
previously visited local clinics several times, but his
symptoms did not respond to medication. One month
before visiting our hospital, he found a painful mass in his
right TMJ area. When he presented to our hospital, the
mass was approximately 2 cm × 2 cm. An asymmetric facial
appearance without trismus where the right side was
obviously lower than the left side at the mandible level was
also noted during the physical examination. Computed to-
mography (CT) revealed an expansive bony lesion that was
3.4 cm in diameter and involved the right temporal bone,
mandibular fossa, and TMJ. Destruction of the right
mandibular fossa also was noted, which was accompanied
by an enhanced soft tissue mass (Fig. 1). Head and neck
ultrasonography (UST-5412 Linear transducer with Pro-
Sound α7, Aloka Co., Ltd., Tokyo, Japan) indicated a solid,
hypoechoic, homogenous lesion in the horizontal plane that
was approximately 2.4 cm × 1.8 cm. The anterior part of
the TMJ was eroded by the tumor (Fig. 2). The margin was
not clearly identified, and no obvious blood flow was
detected. A core needle biopsy was performed under ul-
trasound guidance (Fig. 3). The pathological examination
confirmed that the mass was a giant cell tumor and iden-
tified the proliferation of oval to spindle stromal cells
intermingled with osteoclast-like giant cells and foamy
histiocytes, without atypical mitosis. Wide excision of the
tumor with reconstruction of the right TMJ was suggested,
but the patient refused the procedure because of personal
issues.

Discussion

Giant cell tumors are idiopathic, benign, proliferative les-
ions affecting tendons, joint capsules, or bursae [2]. The
tumor was classified according to the World Health Orga-
nization classification as a diffuse type giant cell tumor,
also known as pigmented villonodular synovitis or a giant
cell tumor of the tendon sheath, which is considered a
localized type. The diffuse form is characterized by pro-
liferation of synovial-like mononuclear cells that can lead
to aggressive destruction and erosion of the surrounding
tissue [2,3]. Giant cell tumors may initially present with
symptoms that are similar or identical to those for TMJ
disorders or other types of TMJ tumors and pseudotumors,
but can progress to a mass lesion that limits the joint’s

Fig. 1 Contrasted computed tomography (CT) reveals an expansive bony lesion (arrow) involving the right temporal bone with
mandibular fossa and temporomandibular joint (TMJ) involvement. CT also indicates destruction of the right mandibular fossa and
an enhanced soft-tissue mass.

Fig. 2 Ultrasonography reveals a solid, hypoechoic, and ho-
mogeneous lesion (white arrow). The lesion destroyed the right
temporomandibular joint (black arrows).
The range of motion or causes a misalignment of the TMJ, as well as numbness in territories innervated by the trigeminal nerve [1,2].

TMJ disorders are traditionally evaluated with static radiography, such as plain film, CT, and magnetic resonance imaging (MRI) [4]. MRI provides excellent depictions of the anatomy, inflammation, and joint disk displacement of TMJ, and it is considered the standard imaging tool in some reports [4–6]. However, its high cost and complications with pacemakers and metallic prostheses limit MRI use. Unlike CT and MRI, ultrasonography provides real-time images that may help clinicians evaluate the fine structure and motion of the joint, which is difficult to achieve with radiography. Some authors have concluded that ultrasonography is a suitable tool for evaluating TMJ disorders, and devices with higher resolutions may have greater sensitivity and accuracy [4–11]. Nevertheless, ultrasonography for evaluating TMJ tumors has been rarely discussed in previous reports. Although an increase in sound waves reflected from the bone and muscle surface limits the field of view, ultrasonic anatomical investigations of TMJ are well described in the literature; thus, it is possible to identify the anatomical structure of TMJ using ultrasonography [4,9]. Ultrasound also allows investigation of mass lesions involving TMJ, particularly those that destroy the joint, as well as TMJ range of motion in real-time.

Poveda-Roda et al [1] classified TMJ masses into three categories: pseudotumors, benign tumors, and malignant tumors. Most types of TMJ tumors can be treated with surgical excision, including simple excision, excision with a safe margin, condylectomy, and arthroscopic synovectomy. In the case of extensive excision, reconstruction is needed to restore joint function. By contrast, surgical intervention is not a suitable treatment for some types of tumors, such as Hodgkin lymphoma and plasmacytoma. Therefore, treatment strategies for TMJ tumors should be based on a precise diagnosis. Fine-needle aspiration cytology has been used as a diagnostic tool for giant cell tumors affecting the TMJ [3,12]. However, this technique is rarely used alone to obtain differential diagnoses of all possible TMJ tumors. Instead, core needle biopsy provides histological information on the tumor, and under ultrasound guidance, the tumor can be sampled precisely with a minimal chance of injuring the surrounding tissue. In our opinion, ultrasound guidance of core needle biopsy provides a safe and effective method for diagnosing TMJ tumors.

Conclusion

Ultrasound is a noninvasive and inexpensive method that can be used to evaluate TMJ disorders in real time, and can provide precision guidance for core needle biopsy. When a TMJ tumor is present, ultrasound-guided core needle biopsy is useful for diagnosis and deciding on the best treatment.

References