



# Primary Ewing Sarcoma of the Mandibular Condyle: A Rare Case With Diagnostic Challenge

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## Abstract

**Introduction:** Ewing sarcoma (ES) is a rare primary malignant tumor of the maxillofacial area. On the other hand, the primary involvement of the mandibular condyle is really very rare and any misdiagnosis may significantly affect the prognosis of the disease.

**Case Presentation:** This report describes a 29-year-old female patient who has been treated for temporomandibular disorder before being referred to our department. The patient was admitted with a diagnosis of ES and managed by primary induction chemotherapy, followed by tumor resection, radiotherapy and postoperative chemotherapy.

**Conclusions:** ES of the mandibular condyle is really rare. Therefore, early diagnosis and multimodal therapy are essential for having a better prognosis of these lesions.

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## Introduction

Ewing sarcoma (ES) is the second most common bone malignancy in children and young adults after Osteosarcoma (1). ES has an estimated incidence of 2.93 cases/million inhabitants under 20 years of age (2). It is an aggressive malignant tumor, and in 15% to 28% of the cases, metastasis is present at the time of diagnosis (3). It has a slightly predilection for male (male: female 3:2) (2). The prevalence of ES in Caucasian children is 10 times more than in black children (4). This tumor almost shows rapid growth and the most common clinical features are swelling and pain (5).

Approximately 15% to 20% of ESs originate from soft tissue and the remaining arise in the bone (6). The most common site of ES is in the long bones (58%), pelvis (20%) and ribs (7%) (7). In the maxillofacial area, this tumor represents only 3% of ES of all sites and its most frequent location is the mandible (69%), maxilla (28.2%), and soft tissue (2.8%) (5,6). Although ES is more frequent in the posterior part of the mandible, the primary involvement of the mandibular condyle is really rare (8). In this article, we report a case of primary ES of the mandibular condyle. The case was wrongly diagnosed and treated for temporomandibular joint disorder.

## Case Report

A 29-year-old woman was referred to the Department of Oral and Maxillofacial Surgery with the complaints

## Highlights

- ▶ Ewing sarcoma in one of the most common bone malignancies in young adults.
- ▶ Pain and swelling are the most important findings of ES.

of restricted mouth opening and severe pain in her left preauricular area.

She had the pain and restriction of mandibular movement for the last one year, which gradually increased after a few months. The patient was a restaurant receptionist and she answered the phone many hours a day. Considering the patient's occupation in the etiology of her complaints, she was treated with a diagnosis of temporomandibular disorder. But the symptoms of the disease became worse over time and then she was referred to our department. The only systemic health issue was hypothyroidism and she was taking Levothyroxine.

On clinical examination, a fixed, firm to hard in consistency, irregular, significantly tender and expansive mass in the left preauricular area was observed. The overlying skin appeared normal but the local temperature was raised. The amount of mouth opening was significantly reduced. There was no noticeable lymphadenopathy and paresthesia in head and neck. Intraorally, the swelling was detectable in the left condylar region and was firm to hard when compressed. In panoramic radiograph, the left

condyle was destructed with irregular borders (Figure 1). Computed tomography (CT) scan revealed an ill-defined destruction of medullary and cortical bone of left condyle which presented as mixed radiolucent-radiopaque lesion in the site of the condyle. This lesion was extended to the base of skull, ramus and surrounding soft tissue. There was a soft tissue mass adjacent to the destructed condyle. Also, sun-ray appearance was seen around the destructed condyle.

The only remarkable finding of hematological and biochemical evaluations was elevated CRP (8.1 mg/L). Additional CT and bone scans and chest radiography did not find any evidence of metastatic disease. Considering the patient's age, clinical and imaging findings, the differential diagnosis included osteosarcoma, chondrosarcoma and ES.

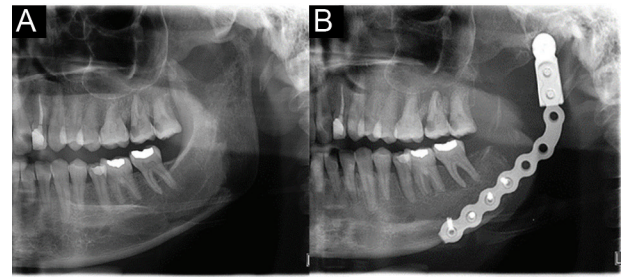
An open incisional biopsy was performed through a small preauricular incision under general anesthesia.

The specimen was sent for histopathologic evaluation. Histologically, variable-sized nests of tumor cells separated by septa creating lobular pattern were seen. The nests consist of small, uniformly bland, round cells with round nuclei, scant cytoplasm and ill-defined cell borders. Few mitotic figures were seen (Figure 2) (8). Immunohistochemical staining was performed which revealed membrane staining for CD99 (Figure 2). Based on these features, the diagnosis of Ewing's sarcoma was considered.

After a definitive diagnosis of the lesion, the patient was referred to the oncologist for a general treatment plan. Clinical and paraclinical evaluations carried out by the oncologist showed that there is no pathological lesion in other areas of the body. The patient's overall treatment plan was inductive chemotherapy, surgical removal of the lesion, radiotherapy and chemotherapy.

The patient initially received six courses of chemotherapy. Then she was admitted for surgical resection.

The preauricular approach was used for exposing the malignant tumor and detaching it from the surrounding soft tissue. Then, through the Risdon's approach, the mandibular angle region was exposed on the left side and the mandible was cut from the superior border of the

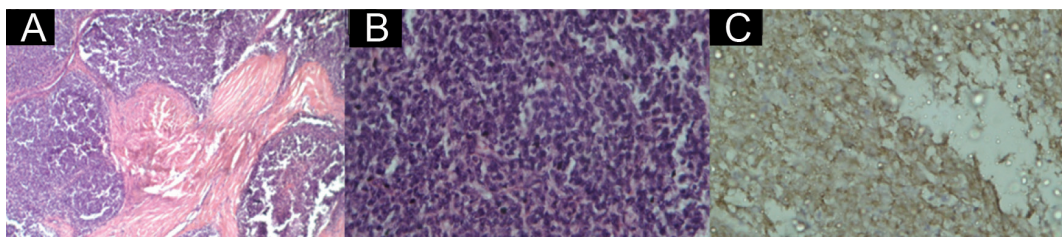


**Figure 1.** (A) Preoperative panoramic image of patient shows destruction of left mandibular condyle. (B) Postoperative radiography.

mandible at the distal part of second molar to the inferior border at the antegonial notch. After mobilizing the proximal segment, the malignant tumor was removed with condylar process, coronoid process and ramus and then a reconstruction plate was fixed to the remained mandibular body (Figure 1). The lesion was resected especially in the ramus, with free margin. The final histopathologic and immunohistochemical studies on submitted excisional sample confirmed ES. The postoperative course ended without any problem. The patient was treated by an oncologist for one year. There has been no evidence of recurrence two years after treatment.

#### Discussion

ES, which was first reported by James Ewing in 1921, is one of the most destructive and aggressive bone tumors. It accounts for 4% to 7% of primary bone malignancy (9). Primary bone malignancy of jaws, including ES, is rare and therefore, their diagnosis and treatment are occasionally challenging. The initial signs and symptoms of ES may be pain, sometimes numbness, increased C-reactive protein (CRP), leukocytosis, and increased body temperature (8). In the mandible, the usual presentation of ES is the insidious onset of pain and swelling (7). All of these findings are nonspecific and may appear in other disorders of jaw such as odontogenic infections (6). Therefore, in the early stages of tumor growth, in which the swelling is not clinically obvious or significant, the risk of misdiagnosis is high (2). Although, the prognosis of ES in the head and neck is better compared to other areas of the body (10),



**Figure 2.** (A) Hematoxylin-eosin-stained section shows lobular pattern. (B) Hematoxylin-eosin-stained section shows small, uniformly bland, round cells with round nuclei, scant cytoplasm and ill-defined cell borders. (C) Immunohistochemical staining reveals strong membrane staining for CD99.

any delay in correct diagnosis has a direct effect on the prognosis of the disease.

In the presented case, the patient's initial complaints were severe pain in left preauricular area and reduced jaw movement. Supposing that the tumor was temporomandibular disorder, the attending physician prescribed medicine and physical therapy. After the size of the swelling was noticeable, the patient was referred to our department.

Another cause that may increase the risk of misdiagnosis of ES in the mandible is the lack of specific findings in plain radiography. In the jaws, the most characteristic radiographic feature of ES is moth-eaten destructive radiolucency. However, it usually presents as a non-specific diffuse osteolytic irregular radiolucency with ill-defined margins (11). Thus, every bony lesion in jaws must be evaluated more extensively with CT scan or magnetic resonance imaging (MRI). We used CT scan in this case to evaluate the tumor extension and aggression.

Histologically, Small, uniformly bland, round cells with round nuclei, scant cytoplasm and ill-defined cell borders were seen. Therefore, this tumor has been classified as small round cell tumor that has very differential diagnoses which include metastatic carcinoma, lymphoma, rhabdomyosarcoma, neuroblastoma, osteosarcoma (small cell variant) and mesenchymal chondrosarcoma (8,12).

Immunohistochemistry can be useful for distinguishing between these lesions. For example, follicular center cell lymphomas are CD10 positive, B-cell lymphomas are CD20 and CD22 positive and T-cell lymphomas are CD43 and CD45RO positive but ES cells express CD9 (13).

Unlike ES, Rhabdomyosarcoma tumor cells are positively reacted with anti-Desmin, anti-Myogenin, and anti-MyoD1 antibodies (14).

Neuroblastomas contain more uniform round cells within a neurofibrillary background; Synaptophysin is expressed in fibrillar background of neuroblastoma (15).

Osteosarcoma contains osteoid, the cells of this tumor were positive for osteopontin (16). Mesenchymal chondrosarcoma contains chondroid (12). The cartilaginous areas express S-100 (17).

Our case was CD99 positive that confirmed the diagnosis of ES.

However ES is an aggressive malignant tumor of bone, its prognosis is better in jaws than in other parts of the body (10). This is mainly due to the early detection of ES in the jaw and face. Some findings are correlated with a poor prognosis of ES as the presence of metastatic disease, the larger size of the lesion, female gender, elevated serum lactate dehydrogenase levels and the age above 17 years (18). The successful treatment of ES requires a multimodal approach because this tumor must be controlled both locally and systemically. Although surgical resection is the preferred modality for local control, radiation therapy is an efficient substitute for it in cases where the functional morbidity of surgery is considered too high.

Postoperative radiation therapy is used when complete surgical resection with pathologically negative margins cannot be achieved (19). However, radiation therapy is not without any risk. There is a possibility of growth disorder in children and incidence of secondary malignancies (20). The cornerstone of multimodal therapy in ES is chemotherapy. The use of new chemotherapy regimens has increased the 5-year survival rate of ES without metastasis, from less than 15% to 75% (9). The presented patient initially received systemic chemotherapy drugs as induction chemotherapy. Then the primary tumor was resected with a wide surgical margin. Since the tumor extended to the infratemporal fossa, we were not sure that the resection margins were histopathologically negative. Therefore, postoperative radiotherapy was planned. Finally, the oncologic treatment was completed by several chemotherapy courses.

### Conclusions

Primary ES of the mandibular condyle is very rare and it poses a diagnostic difficulty. Therefore, the clinician should consider all clinical, imaging, histopathologic and immunohistochemical findings before reaching final diagnosis. Generally, the stage of the disease at the time of diagnosis and tumor size are important prognostic factors.

### Authors' Contribution

MRJ performed the operation. SJ collected the pathology findings. AA and BH helped MRJ in operation. MAN wrote and revised the paper.

### Ethical Statement

Written informed consent was obtained from the patient and her family for the use of the patient's clinical information and images for publication.

### Conflict of Interest Disclosures

The authors declare that they have no conflict of interests.

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