Case Report

Giant Osteochondroma of the mandibular condyle and temporomandibular joint - A case report

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Abstract

Osteochondroma is one of the common bone tumours but is rarely seen in the head and neck region. Osteochondroma of the mandibular condyle, extending to the temporomandibular joint (TMJ) is an infrequent occurrence. Patients commonly present with restricted mouth opening and malocclusion. Due to the significant overlap in features between chondromas and condylar hyperplasia, it is very likely to be misdiagnosed, resulting in treatment errors. In this report, an interesting case of a large osteochondroma of the mandibular condyle extending into the zygomatic and petrous part of the temporal bone involving the left TMJ in a 35-year-old female patient is described who presented with facial asymmetry and restricted mouth opening. This paper outlines the clinico-radiographic and histopathological features for diagnosis and appropriate treatment of osteochondroma.

Keywords: Computed tomography, condyle, condylectomy, mandible, osteochondroma, temporomandibular joint

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INTRODUCTION

Osteochondroma is one of the most frequent benign bone tumours, accounting for 35 to 50% of all benign bone tumours and 8% to 15% of all primary bone tumours. Osteochondroma is an osseous protuberance with cartilaginous growth potential that typically occurs around the growth plate at the ends of long bones like the knee, hip, shoulder and joints. Only about 1% of these are found in the head and neck area.[1] The condyle and the coronoid process are the most prevalent sites in the craniofacial region.[2]

The mandibular condyle osteochondroma is an exophytic, cartilage-covered lesion that arises from the bone cortex. The term 'osteocartilagenous exostosis' is a synonym for 'osteocartilagenous exostosis', which describes the condition as a completely benign hamartous lesion. Therefore, osteochondroma is considered as a developmental lesion rather than a real neoplasm in contemporary bone tumour thinking.[3] The pathogenesis and aetiology of this tumour are still unknown. It mainly causes mandibular asymmetry, crossbite, posterior open bite, temporomandibular joint (TMJ) pain and limiting of mandibular lateral motions when it is seen in the mandibular condyle.[4]

In this report, an interesting case of a large osteochondroma of the mandibular condyle extending into the zygomatic and

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temporal bone in a 35-year-old female patient is described who presented with facial asymmetry and restricted mouth opening and was treated with condylectomy and excision of the tumour mass.

CASE REPORT

A 38-year-old female patient reported to the dental outpatient department with the complaint of swelling in the left preauricular region since a year and reduced mouth opening for 6 months. The swelling was initially small in size and gradually increased to the present size. The patient also reported of clicking sounds from her left TMJ after which she developed a sudden reduction in her mouth opening. She experienced pain while chewing and deficient hearing since a few days.

On extraoral examination, a diffuse, non-tender, protuberant, bony hard swelling was seen on the left preauricular region extending from the zygoma to the tragus and measuring approximately 4 × 3 cm with a smooth surface [Figure 1]. The mouth opening was 4–5 mm and the intraoral crossbite was seen in relation to the right posterior premolar and molars [Figure 2].

Panoramic radiograph revealed a diffuse radio-opaque mass engulfing the left condyle, interarticular space and temporal bone, involving the left TMJ [Figure 3]. A provisional diagnosis of osteochondroma was given. Ankylosis, condylar hyperplasia, osteoma were considered in the differential diagnosis. Contrast-enhanced computed tomography (CT) of the head and neck demonstrated a large giant-sized bony expansile proliferation of the condylar process of the mandible with solid periosteal reaction measuring approximately 3 × 1.5 cm [Figure 4]. The lesion extends to the arch of the left zygomatic bone and the petrous part of the temporal bone. Mild atrophy of the associated medial and lateral pterygoid and masseter was observed. Partial bony ankylosis between the condyle and mastoid parts of the temporal bone was observed.

The tumour was operated under general anaesthesia with endotracheal intubation. An Alkayat Bramley incision was marked, beginning from the left pinna region away from the ear, anterosuperiorly just within the hairline and backward-downward posterior to the main branch of temporal vessel till it meets the upper attachment of the ear. The incision was placed through the skin and superficial fascia to the level of temporal fascia. Dissection was carried out and a vertical incision was made through the incision line in front of the external auditory meatus to the ear lobule. The hard bony ankylotic mass was exposed [Figure 5].

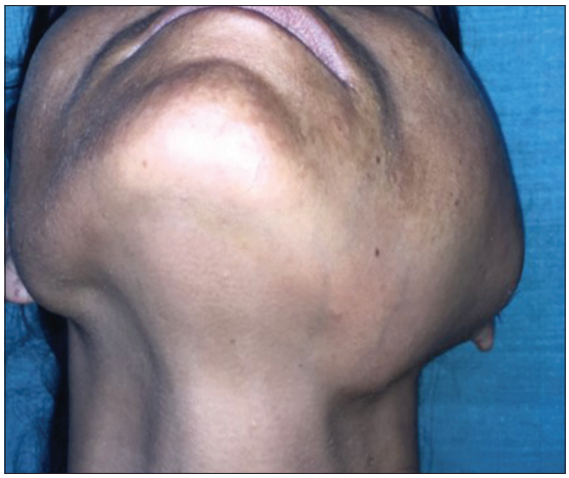

Figure 1: Extraoral protuberant, bony hard swelling in the left preauricular region

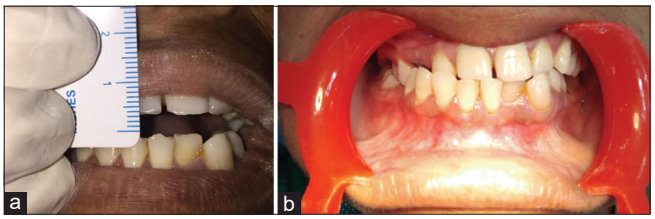

Figure 2: (a) Decreased mouth opening. (b) Crossbite on right side

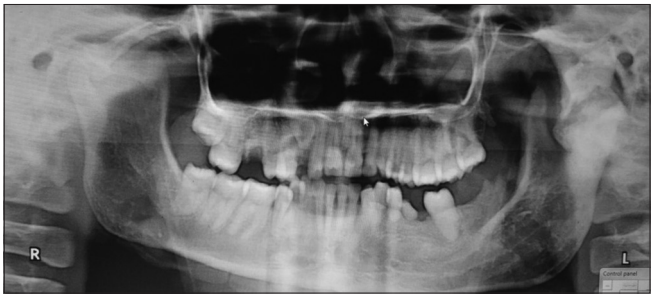

Figure 3: Panoramic radiograph revealed a diffuse radio-opaque mass engulfing the left condyle, interarticular space and temporal bone, involving the left temporomandibular joint

Osteotomy was done above the zygomatic arch and an inferior condylectomy was done using bur and osteotome. The ankylotic mass over the lateral region along with the disc was resected. The medial mass was left to avoid the opening of the base of the skull. The resected tumour was sent for histopathological examination [Figure 6].

The histopathology-stained section shows the presence of non-capsulated well-circumscribed bone. In 40× magnification, the bone shows normal trabecular patterns, resting lines and reversal lines and osteocytes. Enlarged marrow spaces are seen filled with fibrous connective tissue. There is a presence of a cap of fibrous and hyaline cartilage within the bone showing ossification at the interface. A focal area shows the presence of dense

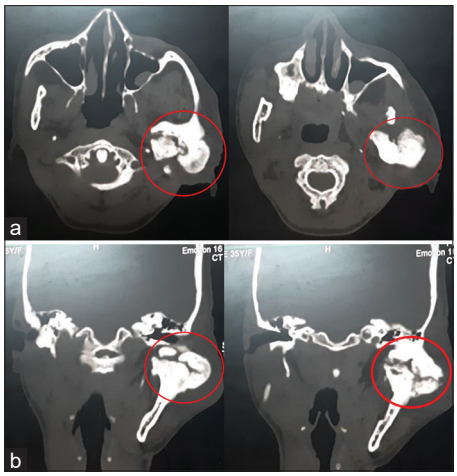

Figure 4: (a) Coronal section demonstrating a large giant sized bony expansile proliferation of the condylar process of the mandible, petrous part of temporal bone and left TMJ. (b) Axial section demonstrating bony expansile proliferation of the condylar process of the mandible extending to the arch of left zygomatic bone and petrous part of temporal bone

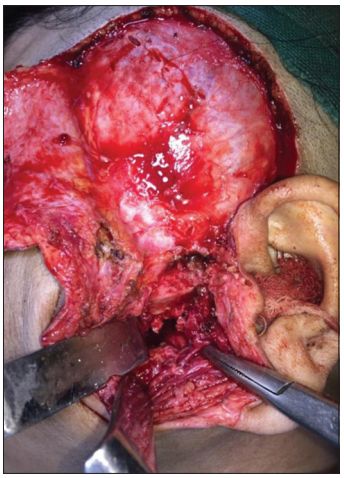

Figure 5: Intra-operative view of the hard bony ankylosed tumour mass

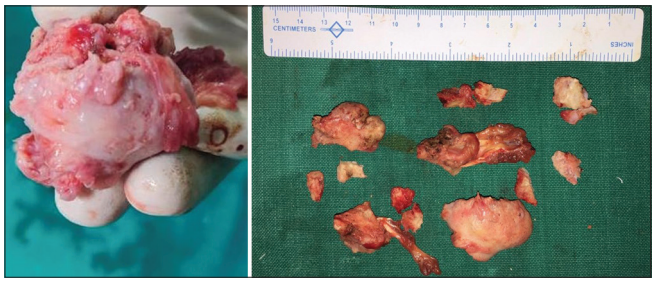

Figure 6: Excised tumour mass and condyle

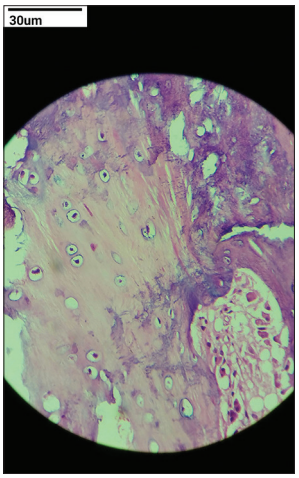

Figure 7: Histopathology section in 40× magnification demonstrating non-capsulated well-circumscribed bone with a cap of fibrous and hyaline cartilage within the bone showing ossification at the interface

fibrous connective tissue showing muscle fibre bundles and adipose tissue showing slight degeneration and presence of cartilage within the connective tissue [Figure 7].

The above clinical, radiographical and histopathological features are suggestive of osteochondroma. Post-surgery, the mouth opening increased to 35 mm and occlusion was restored [Figure 8]. The patient is under follow-up for 10 months with no recurrence. Reconstruction with grafting was planned but the patient was not willing for further treatment.

DISCUSSION

Osteochondroma of the mandibular condyle is a rare condition that usually starts from the condyle's medial anterior section and extends superiorly.[5] The pathophysiology of osteochondroma remains unknown. Inflammation and trauma have both been suggested as predisposing variables. Osteochondroma is a type of bone tissue that is most commonly found in long bones. A gradual and pathological enchondral ossification is the pathomechanism of this lesion. The majority of the facial skeleton is made up of desmal ossified bones. This may explain why osteochondromas in the facial skeleton are uncommon. Osteochondroma of the skull base, maxilla, mandibular ramus, corpus and symphyseal area occur very seldom in the maxillofacial region.[5-7]

The coronoid process of the mandible is cartilaginous, and osteochondromas that arise in this area of the bone are considered real neoplasms. The presence of these tumours in the condyle lends credence to the hypothesis of abnormal epiphyseal cartilage foci on the bone's surface.[8] According to one idea, the growth of these tumours is caused by stress in the tendinous insertion zone of the lateral pterygoid muscle, where focal accumulations of cells with cartilaginous potential exist. The occurrence of osteochondromas most commonly on the medial aspect of the condyle (52%) further supports the reason for their growth potential due to consistent stimulation by lateral pterygoid muscle tendons during lateral excursions. In

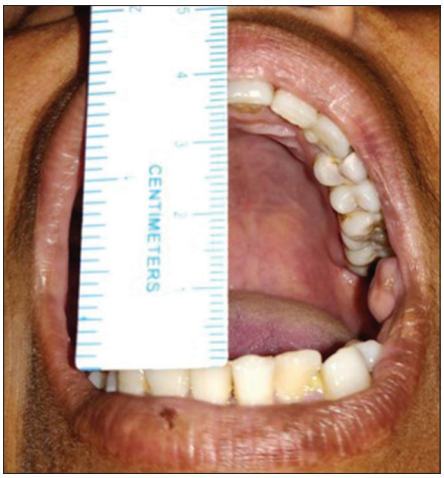

Figure 8: Improved mouth opening post-surgery

the present case, the mass appeared spontaneously and gradually increased in size for 1 year from the medial aspect of the left condyle where the lateral pterygoid is attached. This could also explain the formation of osteochondromas in the coronoid process in other cases, which is strained by temporalis muscle tension.[9] Neoplastic, developmental, reparative and traumatic aetiologies are among the other hypotheses.[10]

Peroz *et al*.[11] described a series of 34 cases in which they discovered that osteochondromas of the mandibular condyle are most commonly diagnosed in adult patients (mean age: 40 years) and are most often located on the medial aspect of the mandibular condyle (57 percent), occasionally anteriorly (20 percent), and rarely lateral or superiorly (1%). 3:2 is the female-to-male ratio. In terms of age and location of occurrence, our case matched the findings in the literature.

Progressive facial asymmetry, prognathic displacement of the chin, crossbite to the contralateral side, alterations in condylar morphology and malocclusion with an open bite on the affected side are all common clinical signs of condylar osteochondroma (OC). Pain is caused by impingement on nearby structures such as nerves or a fracture through the stalk; otherwise, they are asymptomatic.[8,9] Most of the findings could be corroborated in the present case.

Imaging plays a crucial role in the diagnosis and follow-up of osteochondroma. Panoramic radiographs reveal a radiodense mass in the condyle region, which increases in density as the cartilage cap calcifies with age. CT is useful for determining the nature of the lesion, its continuity with the condyle's cortex and medulla and its relationship to the surrounding structures, and is a diagnostic feature of osteochondroma.[12,13] The thickness of the cartilage cap can be measured using an MRI, and the presence of the cartilage cap validates the diagnosis of osteochondroma. The bone scan can help confirm the diagnosis by verifying greater radiotracer uptake as a result of enhanced osteoblastic activity, by Tc99 MDP. Furthermore, a whole-body single-photon emission CT scan eliminates the possibility of further osteochondromas in the bones.[14]

It is crucial to distinguish osteochondroma from unilateral condylar hyperplasia and osteoma. On radiographs, a regular formed but expanded condyle can be seen in condylar hyperplasia. In unilateral hyperplasia, differences in the length of the condylar neck relative to the unaffected side are also common. Furthermore, the structure and growth of bone and cartilage are normal. Osteochondroma, on the other hand, is characterized by spherical projections that originate from the condylar head's borders [Figure 3a]. The osteochondroma appears on CT as a growth from a morphologically normal condylar neck, but the entire process is enlarged in unilateral hyperplasia.[15,16] On panoramic radiographs, the tumour appears as an increase in the condylar head in the majority of instances. The mix of cartilage and bone, which results in alternate radiopacities and radiolucencies of the lesion, may make it difficult to distinguish between tumour and condyle. Histopathologically, condylar hyperplasia exhibits normal cartilage proliferation, whereas osteochondroma exhibits abnormal cartilage proliferation. Furthermore, the existence of a cartilage cap verifies osteochondroma; however, in elderly people, the cap may be missing and become cemented. Osteoma shows an expansion of the condyle and histopathologically thick cortical lamellar bone is seen. In our case, a cap of fibrous and hyaline cartilage within the bone showed ossification at the interface and abnormal calcification within the connective tissue.[13,17]

Depending on the symptoms and duration of the osteochondroma, treatment options include tumour excision alone or condylectomy in combination with tumour excision. Total condylectomy and subtotal condylectomy are common treatments for condylar osteochondroma. Some surgeons recommend that the mass be treated conservatively with local excision in case of a solitary osteochondroma with a stalk. Depending on the size of the mass, total condylectomy can be performed to achieve curative resection of the tumour, followed by secondary reconstructive surgery. The choice of reconstructive surgery depends on the resulting defect.[18] In reconstructive surgery, the options depend on the resulting defect and include free costochondral grafting, free flaps, orthognathic surgery, prosthesis and sliding osteotomy.[8]

The choice of one of the three techniques is mostly determined by the tumour's placement in relation to the condyle. Chen *et al*.[19] conducted a study to propose a classification of mandibular condyle osteochondroma based on computed tomographic imaging and present their treatment experiences. According to their results, protruding expansion and globular expansion were the two kinds of condylar osteochondroma. In Type 1-protruding expansion, less than two-thirds of the surface of the condyle is involved, and in Type 2-globular expansion, more than two-thirds of the surface of the condyle is involved. Local excision of the tumour was sufficient for Type 1 condylar osteochondroma and subtotal condylectomy or total condylectomy followed by orthognathic correction is recommended for Type 2 osteochondroma. The distinction between the two forms of condylar osteochondroma may help the surgeon choose the best surgical strategy. The present case was a globular expansion involving more than two-thirds of the condyle, expanding into the glenoid fossa and extending to involve the temporal and zygomatic bone. Total condylectomy with excision of tumour mass was performed in our patient and orthognathic surgery was planned depending on the patient's consent. Our findings support those of Wolford *et al*.[8] and Holmlund *et al*.[20] who advocate for condylectomy and conservative treatment for the condition.

According to Villanueva *et al*.,[21] regardless of the cause of the osteochondroma, the major goal of treatment should be to attain appropriate mouth opening. In our case, post-treatment the mouth opening improved significantly by 35 mm and was functionally rehabilitated.

Any bone that grows through endochondral ossification has the potential to become malignant. Solitary osteochondromas in the axial skeleton account for 1% of all malignant transformations. They usually stop growing after adolescence, therefore continued growth later in life could indicate sarcomatous changes in the long bones. They may, however, grow slowly in the maxillofacial area. The overall recurrence rate of osteochondroma has been estimated to be around 2%, although it is considerably lower in the condylar region. To rule out recurrence, follow-up and the thickness of the cartilage cap are critical.[22] The patient is under follow-up for more than 10 months with no recurrence.

This case highlights the importance of imaging and histopathology for proper diagnosis and treatment of the tumour. Very few cases of a giant osteochondroma of condyle extending into the TMJ and zygoma have been reported in the literature. In situations of suspected osteochondroma, a CT scan is highly suggested since it provides for a precise description of the lesion's boundary and interior structure. Total condylectomy followed by reconstruction is the treatment of choice depending on surface involvement.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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