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Osteosarcoma of the Mandible: A Rare Case Report with Clinical Insights

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Abstract

Osteosarcoma, also known as osteogenic sarcoma, is a highly malignant primary bone tumor arising from mesenchymal cells that produce osteoid or immature bone matrix. It is the most common primary bone cancer, especially among children, adolescents and young adults. The disease exhibits a bimodal age distribution. It most frequently occurs during the second decade of life, coinciding with the adolescent growth spurt and shows a second, less prominent peak in older adults – often in the context of predisposing conditions such as Paget's disease of bone or prior radiation exposure.

Anatomically, osteosarcoma typically arises in the metaphyses of long bones; the distal femur, proximal tibia, and proximal humerus are among the most commonly involved sites. Tumours in axial locations such as pelvis, sacrum, or jaw are less frequent.

Keywords: CBCT, Consistency Distal Femur, Osteosarcoma

Case Presentation

A 60-year-old male patient, Mr. Davidu Raju, reported with pain and swelling in the left lower jaw posterior tooth region for the past two months (Fig-1). The patient gave a history of impingement of bone in the same region two months back, followed by swelling that gradually increased in size. He also reported associated tooth sensitivity. On extraoral examination, a gross facial swelling measuring approximately 3.5 × 3.5 cm was noted on the left side, which was tender on palpation and hard in consistency. Intraoral examination revealed a cauliflower-like exophytic growth in relation to teeth numbered 31 to 35, measuring about 1.5 × 3.0 cm(Fig-2). On palpation, the lesion was firm in consistency and exhibited a smooth surface texture. Cone Beam

Computed Tomography (CBCT) revealed irregular bone loss in relation to the 31–35 region (fig-3). An incisional biopsy was performed from the left mandibular posterior region, and tissue specimens were obtained consisting of a soft tissue fragment measuring 2 × 1 cm and a hard tissue fragment measuring 4 × 1 cm (Fig-4). Both samples were preserved in 10% neutral buffered formalin and submitted for histopathological analysis.

Figure 1: A male patient of 60 years old reported with swelling and pain in left lower jaw posterior tooth region

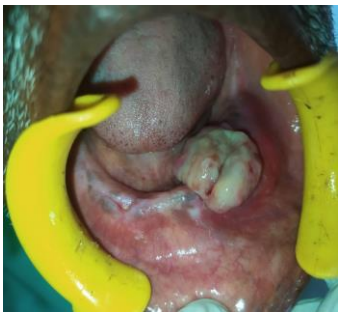

Figure 2: Intraoral examination revealed a cauliflower-like exophytic growth in relation to teeth numbered 31 to 35

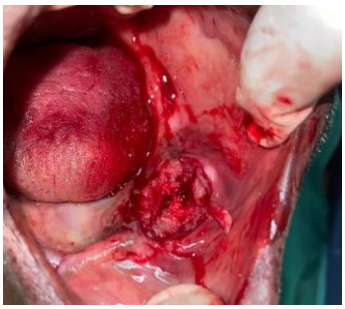

Figure 3: Cone Beam Computed Tomography (CBCT) revealed irregular bone loss in relation to the 31–35 region

Figure 4: An incisional biopsy was performed from the left mandibular posterior region

Discussion

Osteosarcoma is a highly malignant primary bone tumour characterized by the direct formation of osteoid by malignant mesenchymal cells [1]. It is most common in long bones, while involvement of the craniofacial skeleton is rare, constituting about 6–8% of cases [2]. Among the gnathic osteosarcomas, the mandible is more frequently affected than the maxilla, with a predilection for the posterior regions [3].

In the present case, a 60-year-old male presented with pain and swelling in the left mandibular posterior region. Gross examination of the biopsy specimen revealed multiple soft and hard tissue fragments, irregular in shape, brownish-black and creamish white in color, with soft and hard consistency and irregular borders.

Microscopically, sections stained with hematoxylin and eosin demonstrated discontinuous stratified squamous parakeratinized epithelium with underlying connective tissue exhibiting dense mixed inflammatory infiltrate and numerous capillaries. Deeper connective tissue showed lobular proliferation of stellate-shaped cells with prominent pleomorphic vesicular nuclei, abnormal and increased mitotic figures, and areas of tumor osteoid formed by pleomorphic osteoblasts. Entrapped osteocytes and necrotic areas were also observed. In addition, sections revealed malignant cartilage arranged in islands with atypical chondroblasts within lacunae, along with

areas of bone and osteoid formation (Fig: 5-6). Myxoid areas with proliferating osteoblasts, bizarre mitotic activity, and atypical stellate-shaped cells were noted. These findings are consistent with the chondroblastic variant of osteosarcoma**.**

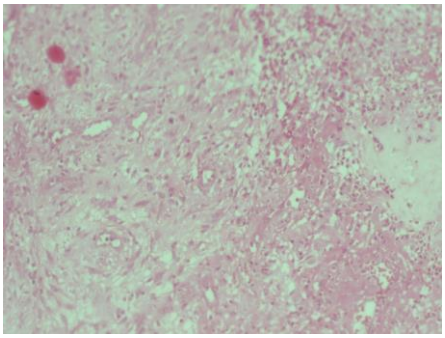

Figure 5: Sections revealed malignant cartilage arranged in islands with atypical chondroblasts within lacunae, along with areas of bone and osteoid formation

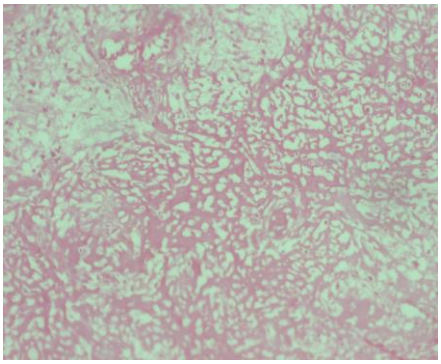

Figure 6: Myxoid areas with proliferating osteoblasts, bizarre mitotic activity, and atypical stellate-shaped cells were evident

The chondroblastic variant is the most frequent histological subtype of osteosarcoma in the jaw, accounting for approximately 50% of cases[4]. Histologically, it is characterized by a predominance of malignant cartilage interspersed with areas of osteoid and bone formation[5]. Differentiating chondroblastic osteosarcoma from chondrosarcoma can be challenging; however, the presence of malignant osteoid deposition by tumour cells is a key diagnostic feature [6].

From a clinical perspective, jaw osteosarcomas tend to present with swelling, pain, loosening of teeth, or exophytic growths, as observed in this patient. Radiographically, irregular bone destruction with ill-defined borders is typical. Compared to long bone osteosarcomas, gnathic osteosarcomas generally exhibit slower progression, lower metastatic potential, and relatively better prognosis when detected early and managed with surgical resection combined with adjuvant therapy [3,6].

Thus, in the current case, the combination of macroscopic irregular tissue fragments, microscopic evidence of malignant osteoid along with atypical chondroblastic proliferation, and clinicoradiographic correlation confirmed the diagnosis of chondroblastic variant of osteosarcoma.

Conclusion

Osteosarcoma of the jaws, though rare, should be considered in the differential diagnosis of rapidly enlarging jaw swellings, particularly when accompanied by pain, tooth mobility, or irregular bone loss. Early diagnosis through imaging and histopathological confirmation is critical for timely intervention. Radical surgical resection remains the mainstay of treatment, with adjunctive chemotherapy reserved for aggressive or unresectable cases. Compared to long bone osteosarcomas, jaw osteosarcomas generally have a more favorable prognosis; however, long-term follow-up is essential to monitor for recurrence and optimize survival outcomes.

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