

Osteosarcomatous De-differentiation of Low Grade Chondrosarcoma of Mandible –A Clinical Rarity

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ABSTRACT

Introduction: Chondrosarcoma is a malignant cartilaginous tumour arising de novo in a bone or superimposed upon a pre-existing benign cartilaginous neoplasm. It makes up 10 % of malignant tumours of jaws.

Case report: A case of de-differentiated chondrosarcoma of the anterior region of the mandible is presented, which was initially low grade variant and on recurrence it was turned to be a high grade variant of osteosarcomatous type with metastasis to lungs, along with a review of its prognostic factors.

Conclusion: When occurring in the head and neck, it arise most frequently in the maxilla, less common sites of involvement are the mandibular body, symphysis, coronoid process and condylar processes. Recurrent tumour always forecast bad prognosis.

Keywords: De-differentiated Chondrosarcoma, mandible, metastasis, prognostic factors

INTRODUCTION

Chondrosarcoma (CS) is a malignant tumour whose cells produce a pure hyaline cartilage that results in an abnormal bone and/or cartilage growth. It comprises about 10% of all primary tumour of skeleton but the involvement of jaw is very rare. Approximately 1-3% of all CS arise in the head and neck area and such lesions comprise only 0.1% of all head and neck malignancies.¹ Among the different histologic variants, Dedifferentiated chondrosarcoma (DDCS) is a rare and rapidly expansile bone tumour reported in oral and maxillofacial region. It constitutes 1%-2% of all primary bone tumours.² This article describes a rare case of De-differentiated chondrosarcoma of osteosarcomatous type arising from incompletely resected low grade chondrosarcoma of the anterior mandibular region with metastasis to lung. This is the second most case reported in the oral and maxillofacial region. The clinical, radiographic, surgical and pathological aspects of this lesion are presented and the prognostic factors are reviewed.

CASE REPORT

An 18 year old female reported with a complaint of swelling in relation to left lower anterior region of the jaw since 3 months. She also gave a history of swelling in the anterior region of the mandible, which was noticed 3 months back. It was of almond size initially and attained to the present size. It was associated with numbness in the same region. Patient underwent incomplete mandible resection for a similar swelling in the jaw 1.5 years back and post operative course

was uneventful and her histopathological report was documented as low grade chondrosarcoma. The history of similar complaint was reported for her grandmother in the family. Local examination revealed a diffuse swelling on the left lower third of the face across the midline of size 12.5cm x 11 cm. Anterio-posteriorly it extended from the right symphysis region upto the left angle of mandible and superior-inferiorly at the level of corner of mouth to upper one third of left cervical region. Skin overlying was tensed, erythematous and also with ulcerations (Figure 1). Two jugulodigastric lymph nodes on the left side measuring approximately 1.5cmx1.8cm was palpable, tender, hard and fixed to underlying tender, hard in consistency, with local rise in temperature and fixity to underlying tissues on palpation.

Intraoral examination revealed a diffuse swelling with ill defined margin measuring approximately 3.2 cm x 2.8 cm extending from 43 to 37 obliterating the mucobuccal fold and also extended to floor of mouth. On palpation, inspecory findings were confirmed; swelling was stony hard in consistency and was tender. Routine examination revealed mobility in relation to 43 and 37 and missing teeth in relation to 41, 42, 31, 32, 33, 34, 35, 36. Orthopantomograph showed missing tooth along with loss of cortical bone with respect to 42,41,31,32,33,34,35 and 36 and widening of periodontal ligament space with respect to 43 and 37. It also showed metallic prosthesis at the inferior border of mandible extending from 46 to 38 (Figure 2). Axial computerized tomography revealed Sun burst pattern within the ill defined heterogeneous mass (Figure 3). Incisional biopsy of the tumour was advised and specimen was sent for histopathological examination. Microscopic examination of Haematoxylin and Eosin stained sections revealed Chondroid areas along with few osseous areas in which chondroblasts are present of varying size. Most of the cells are pleomorphic and binucleated with nuclear atypia. Cellularity is so dense at the periphery of lesion with spindle cell differentiation. Osteoid is distributed homogenously irregular manner in few areas suggestive of De-differentiated Chondrosarcoma of additional osteosar-

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comatous component (Figure 4). Following the report of dedifferentiated chondrosarcoma, the Patient was scheduled for chemotherapy first and excision of lesion under general anesthesia later. However, when the patient returned for initiation of chemotherapy, the swelling had increased in size to about 17 cm by 15.5 cm. The mucosa overlying the swelling was granular and pus discharge was present. The Patient succumbed to death during her first visit for chemotherapy due to metastasis to lungs.

DISCUSSION

In 1971, Dahlin and Beabout first introduced the term Dedifferentiated chondrosarcoma. It constitutes 6 -10% of all chondrosarcomas (CS). It more often involves the extremities, especially the proximal femur, the pelvic bone and the humerus. Usually de-differentiation occurs in low grade chondrosarcoma. Nowadays it is noted that de-differentiation can occur in high grade chondrosarcoma and in benign chondromata. The prognosis of this tumour is remarkably poor, with a reported survival of less than six months and survival at five years of 10.5% - 13%, 7 with most patients living for less than two years.² Dedifferentiated chondrosarcoma (DDCS) consist of two distinguishable elements: low-grade chondrosarcoma elements and high-grade dedifferentiated elements. The dedifferentiated elements composed of osteosarcomas, angiosarcomas, fibrosarcomas, rhabdomyosarcomas, leiomyosarcomas, and giant cell tumours feature. Frassica et al found that patients with osteosarcomatous dedifferentiation had the worst prognosis.³ Capanna et al noted that 44% recurrence occurred in low grade chondrosarcomatous component cases and 72% in high grade component cases. Mercuri et al recognised 33% relapses in cases with Malignant fibrous histiocytomas component and 30% relapses when the undifferentiated part was an osteosarcoma.⁴ According to Aigner et al report, DDCS is usually found in adults between 5th and 6th decade of life, with a mean of 54.6 years and ranging from 2nd to the 8th decade. The gender distribution is nearly equal. Most common signs are pain, swelling, palpable tumour masses and even pathological fractures, all manifests within a short span of time. Relatively high pathological fractures, ranging from 13 to 44.4% can be seen in this malignant tumour. The mass is usually rapidly growing and can ulcerate mucosa at later stages. The mechanism involved in the formation of this malignant tumour is trans-differentiation which was analysed by Aigner et al in 1998. It is also formed as a result of genetic alterations, loss of heterozygosity in both components of the tumour.⁴ The characteristic feature of this malignancy is that, when it transforms from low grade lesion to a high grade malignant lesion, the dedifferentiated component will increase rapidly in size, causing distant metastatic disease and subsequent death in a relatively short time. This statement is in concurrent with our case. Patient died of lung metastasis within one week after biopsy.⁵ Chondrosarcoma shows two quite different radiographic images: Frank radiolucency usually in an early stage or a radiolucency containing various shapes and sizes of radiopaque shadows. These radiopaque shadows are the result of calcifications or ossifications in areas of cartilage formation and are a feature of relatively long standing tumours; these



Figure-1: A diffuse swelling seen extraorally wrt anterior and left posterior body of mandible.

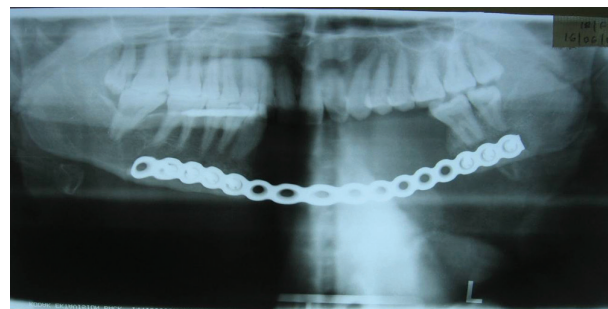


Figure-2: Orthopantomograph showed missing tooth along with loss of cortical bone wrt 42,41,31,32,33,34,35,36, widening of periodontal ligament space with respect to 43 and 37 and metallic prosthesis at the inferior border of mandible extending from 46 to 38.

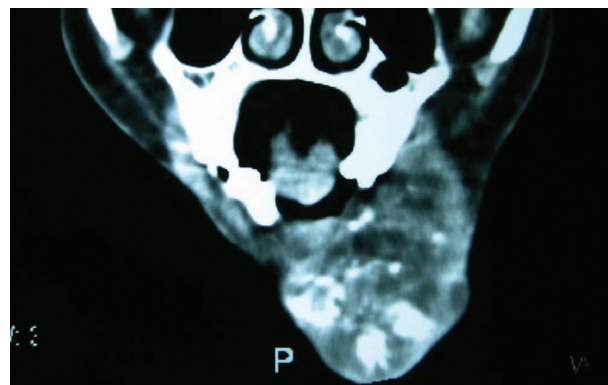


Figure-3: Axial computerized tomography revealed Sun burst pattern within the ill defined heterogenous mass.

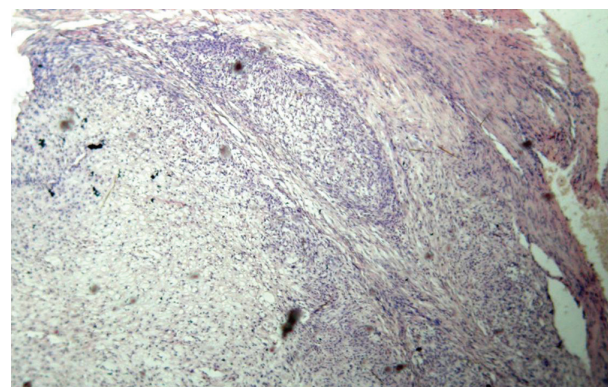


Figure-4: Chondromyxoid background with few osseous areas in which chondroblasts showed variation in size, binucleated cells with nuclear atypia and osteoid was seen in few areas in an irregular pattern (10x)

are found in the older parts of the tumour. The usual radiograph of a chondrosarcoma is that of an irregularly shaped, poorly defined radiolucency with randomly scattered, patchy opaque mottling. This indicates a probably malignant lesion. In case of dedifferentiation large areas of osseous destruction without reactive changes in association with large unmineralised soft tissue mass is seen in radiographs. In the 57 cases of DDCS reported, calcification was found in around 50% of the lesions and an extra osseous mass was observed in roughly 55% of tumours.⁶ In low grade chondrosarcoma, the lesion is round, ovoid or lobulated. Generally the borders are well defined and at times are corticated. In DDCS, the peripheries are ill defined, infiltrative, invasive, with non corticated borders. The internal structure usually exhibit some form of calcification within the centre giving them a mixed radiolucent - radiopaque appearance. The central radiopaque structure has been described with flocculent, imploring snow like features. The reported patient's CT scan showed same features.⁷ Tendency for metastasis disclosed in higher grades of CS and in sinonasal lesions. The rates of metastasis were 0% for grade 1, 10% for grade 2 and 71% for grade 3. Grade 3 chondrosarcoma often kills by metastasis, even if the complete treatment has been done. In our case too patient died due to lung metastasis.⁸ The 5 year survival rates for grade 1, grade 2 and grade 3 were 90%, 81% and 43%. The 10 year survival rate were 83%, 64% and 29% respectively. The most important prognosis factor is resectability, which makes complete excision of the tumour the most single significant factor in the prognosis. The prognostic factors for grade 1, grade 2 and grade 3 were 80-90%, 50-80% and 0-43% respectively. The rate of recurrence were 40% for grade 1, 60% for grade 2 and 47% for grade 3. The rate of uncontrolled recurrence 27% for grade 1, 35% for grade 2 and 35% for grade 3.⁸ Mercuri et al stated that 70 -82% of metastases occurred in lungs followed by 20% in viscera and 10% in skeleton. The other less common sites of metastases to occur are skin, adrenal glands, heart, intestines and brain. The average time from diagnosis to the onset of metastatic disease was 9 weeks. CS, particularly DDCS, is known to be resistant to the chemotherapy and radiotherapy. Thus, surgery remains the only potentially curative treatment for DDCS. The optimal treatment is always surgical treatment, with resection of the tumour within wide or radical margins. The rate of recurrence after wide or radical resection found a rate of 18.5% in contrast to 67% after inadequate resection according to Capanna et al. The longest interval between primary resection of a chondrosarcoma and occurrence of dedifferentiation was reported by Kumta et al. to be 20 years.⁹ Mitchell et al stated that younger patients survive longer than older patients. The younger group had a 2-year survival rate of 56% and 28% after 5 years. Frassica et al noted that the five year survival rates of the patients treated with surgery alone and those treated with adjuvant chemotherapy were 11.8% and 4%, and the median survival time was 6.4 months and 8.4 months, respectively. The most common cause of death in chondrosarcoma is recurrence, not metastasis. Local recurrence, however, is more common than distant metastasis. Recurrent tumour forecasts bad prognosis. The reported patient

was suffering from recurrence and died within few weeks. Some recurrent chondrosarcomas in our series showed rapid and aggressive growth. Treatment was extremely difficult in cases of recurrent tumour.¹⁰ The swelling of reported patient underwent rapid growth about an increase of 4.5cm in height and width after incisional biopsy. Therefore our patient was sent for chemotherapy before doing surgery. In these cases, death resulted from the direct extension of the tumour into vital structure.

CONCLUSION

To conclude, even benign lesions following recurrence, are often found to be more cellular or to have already turned frankly malignant. Hence, all cartilaginous tumours of the jaws, benign or malignant, should be radically excised with a portion of the normal tissue to avoid recurrence.

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