High-grade osteosarcoma of the mandible: a rare tumor successfully treated with surgery and image-guided volumetric modulated arc therapy

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DESCRIPTION

A 69-year-old woman presented with complaints of tingling sensation over the right side of her lower lip for the last 5 months and a progressively increasing swelling over the right cheek for the last 2 months. On clinical examination, an ill-defined, non-tender mass with bony hard consistency was noted in the right body of mandible, which was fixed to underlying bone. She underwent a contrast-enhanced CT (face and neck), which revealed a mixed lytic–sclerotic lesion with poorly circumscribed margins situated in the body of the mandible on the right side along with a sunburst periosteal reaction (figure 1). A contrast-enhanced MRI (face and neck) further revealed bone marrow oedema adjacent to the lesion (figure 1). A biopsy from the lesion suggested a diagnosis of chondrosarcoma and a systemic staging evaluation was normal.

The case was discussed in a multidisciplinary tumour board (MDT) meeting and the patient underwent an en bloc right hemimandibulectomy with modified radical neck dissection along with a pectoralis major myocutaneous flap reconstruction. Histopathological evaluation of the surgical specimen revealed a chondroblastic osteosarcoma (grade 3) with a microscopically involved anterior bony margin and no involved lymph nodes (0/11 nodes positive). Immunohistochemical evaluation revealed positive labelling for vimentin, with a Ki-67 index of 30%–40% (figure 2). The final diagnosis of the patient was a chondroblastic osteosarcoma of the mandible American Joint Committee on Cancer stage IIA (pT1 pN0 cM0 G3). After an uneventful postoperative recovery, the case was reviewed in a MDT and due to the presence of positive surgical margin, she was advised adjuvant radiotherapy with image-guided volumetric modulated arc technique. She received 66 Gy in 33 fractions over 6½ weeks (figure 3). The patient tolerated treatment well and developed Radiation Therapy Oncology Group grade 2 skin toxicity. On follow-up evaluation at 2 weeks, her skin toxicity had resolved and a whole-body 18fluorodeoxyglucose PET CT done 3 months later revealed no recurrence. At the time of last follow-up, she has been disease free for 6 months.

Osteosarcomas of the head and neck region (OHN) comprise less than 2%–10% of all cases of osteosarcomas. They affect an older population and are associated with high lethality.
Owing to local disease that is difficult to control. In contrast, extremity osteosarcoma affects a younger population and demonstrates a higher incidence of distant metastases. The distinct clinical behaviour of OHN mandates an emphasis on achieving negative surgical margins, which is a challenge, therefore necessitating the incorporation of localised radiotherapy. In patients with close or positive surgical margins, radiotherapy improves local control, overall survival and disease-free survival. Since osteosarcomas are considered radioresistant, at least 60 Gy should be delivered, which leads to a complication rate of 40% at 5 years. However, the reported complication rate is with the use of older radiotherapy techniques, and as demonstrated in this case, modern techniques provide the opportunity to reduce their incidence. In conclusion, OHN is a distinct subtype of osteosarcoma that should be managed with radical surgical excision with consideration for adjuvant radiotherapy for close/positive surgical margins.

Learning points

► A bony hard swelling centred over the mandible should be investigated keeping in mind the possibility of diagnosing a malignant bone tumour.

► Surgical excision is the standard of care for treating mandibular osteosarcomas and adjuvant radiotherapy should be considered when surgical margins are involved.

► Modern radiotherapy delivery techniques are necessary for ensuring an optimal outcome with low treatment-related complications.

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