Radiation-induced chondrosarcoma of the maxilla seven years after combined chemoradiation for tonsillar lymphoma

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ABSTRACT

Radiation-induced sarcoma is a rare complication of radiation therapy. We report a case of radiation-induced chondrosarcoma of the maxilla. An 80-year-old Persian woman developed radiation-induced chondrosarcoma of the left maxilla 7 years after combined chemotherapy and external beam radiation therapy for the Ann Arbor stage IE malignant lymphoma of the right tonsil. She underwent suboptimal tumour resection and died due to extensive locoregional disease 8 months later. An English language literature search of Medline using the terms chondrosarcoma, radiation-induced sarcoma and maxilla revealed only one earlier reported case. We describe the clinical and pathological features of this case and review the literature on radiation-induced sarcomas.

Case History

A 73-year-old Persian woman with an unremarkable past history presented with a 3-month history of sore throat. Physical examination showed a large right tonsillar mass. Biopsy from the mass confirmed the diagnosis of Ann Arbor stage IE, diffuse lymphocytic lymphoma (mature peripheral B-cell lymphoma). She received 6 cycles of CHOP chemotherapy, cyclophosphamide/doxorubicin/vincristine/prednisolone followed by 50 GY in 25 fractions over 5 weeks of external beam radiation therapy with Cobalt-60, delivered using parallel-opposed lateral fields encompassing the nasopharynx, base of the tongue, tonsillar fossa, and the draining lymphatics in the neck.

Complete response was achieved without any serious acute adverse effects, and no recurrence during the 7-year follow-up. In the seventh year follow-up, she presented with a 2-month history of sinus pain, nasal bleeding and ill-fitting dentures. On examination, a tender swelling of the left cheek was found. Intraoral examination showed an ulcerative, hard mass in the left upper alveolar ridge. This mass was extended posteriorly to the left retromolar trigone and the oropharynx. Plain X-ray (PNS view) showed opacification of the left maxillary sinus with areas of bone destruction. Computed tomography (CT) scan showed a space-occupying lesion arising from the left maxilla causing expansion of the left maxillary sinus. This mass extended medially to the nasal cavity, superiorly to the anteromedial wall of the left orbit, inferiorly to the left upper alveolar ridge, and posteriorly to the retromolar trigone and the oropharynx.

An incisional biopsy was carried out which revealed it to be a chondrosarcoma. The patient underwent left maxillectomy with curative intent, however, the disease was more extensive and gross residual tumour was left behind and complete tumour clearance could not be obtained surgically. Histological examination of the left maxillectomy specimen confirmed a well-differentiated conventional chondrosarcoma. (Figures 1 and 2) Subsequently, the tumour regrew extensively within a short time. Chemotherapy using actinomycin D, cyclophosphamide and vincristine and for 3 cycles was introduced in an effort to control the disease but it failed to achieve any response. She died 8 months later due to extensive progressive local disease.

Discussion

Radiation-induced sarcoma is one of the late ominous complications of ionizing radiation, which occurs within the field of irradiation. The diagnosis of radiation-induced sarcomas is
made when the following criteria are met: 1) Different histological features of the original tumour and the radiation-induced sarcoma, 2) The radiation-induced sarcoma being located within the field of irradiation, 3) The exclusion of patients with cancer syndromes such as Li-Fraumeni or Rothmund-Thomson syndrome, and 4) The latent period (years between the initiation of radiotherapy and the histological diagnosis of the second neoplasm) being greater than 4 years.2

Malignant fibrous histiocytomas, osteosarcomas, and fibrosarcomas are the common RIS of the head and neck.3 Primary sinonasal chondrosarcoma is very rare. The reported incidence is less than 0.05% of all head and neck primary cancers.4 Radiation-induced sarcoma occurring in the maxilla are very rare, only 18 cases has been reported till date.5,7,8,9,10 In a series of 150 patients diagnosed with RIS at the Mayo Clinic between 1933 and 1992, only 3.7% had chondrosarcoma and 4% of all tumours had a maxillary location.2 The largest series of RIS in the head and neck region was published by Patel et al.1 This review article detailing a single case of radiation-induced chondrosarcoma of maxilla in a 70-year-old man 9 years after external beam radiotherapy for Waldeyer’s ring lymphoma.3 A literature review revealed no other reported case of radiation-induced chondrosarcoma.

Mertens et al studied the mechanism behind the RIS and reported loss of material from chromosome arm 3p, in particular 3p21-3pter, in 8 cases analysed by comparative genomic hybridization (CGH). The most frequent imbalance detected by CGH in their series was gain of 15cen-q15 (3 cases), followed by loss of chromosome 13 and gain of 5p, and 7cen-q22, each detected in 2 cases.7 Extensive expression of the KIT protein, but no mutations in exon 11 of the c-kit gene has also been described.6

In general, primary chondrosarcoma, and particularly, radiation-induced chondrosarcoma of the head and neck region tends to present late. It has a tendency for progressive spread and multiple recurrences and is, therefore, considered to have a poor prognosis.5,6 The reported survival ranges from 3- to 60% in various series.

Surgery remains the cornerstone of treatment in RIS. When primary surgery fails, survival is usually short due to lack of available effective adjuvant or palliative treatment modalities. The role of chemotherapy and re-radiation is not well established. Recently, treatment with the KIT inhibitor imatinib mesylate has been described for patients with post-radiation sarcomas.6

Improvement in treatments leading to improved survival has led to identification of long-term complications of radiation therapy; RIS is one such complication. A high index of suspicion leading to early diagnosis and complete surgical removal, perhaps, offers the only chance for cure.

References