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Case Report

Radiation induced leiomyosarcoma of the mandible and a short review of the literature

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ABSTRACT

Background: Leiomyosarcoma is a malignant mesenchymal tumor that originates in smooth muscle cells [1]. Radiation-induced leiomyosarcoma is a rare clinical entity. It arises from previously irradiated zones with a prolonged latency period. Their location in the oral cavity is considered extremely rare due to the lack of smooth muscle tissue in that area [2]. Radiation therapy is an adjuvant in the treatment of many tumors. Second primary malignancy following radiotherapy is one of the late sequelae of radiation therapy, which is of concern in long term cancer survivors [3].

1. Introduction

Radiation therapy is an adjuvant in the treatment of many tumors. Second primary malignancy following radiotherapy is one of the late sequelae of radiation therapy, which is of concern in long-term cancer survivors [3]. Radiation induced sarcoma (RIS) is a rare but recognized complication of radiotherapy and is associated with poor prognosis. Risk factors for developing RIS are young age and treatment-related factors, including high radiation dose and simultaneous chemotherapy with alkylating agents. The histologic criteria for diagnosis include the presence of nuclear pleomorphism, bizarre cell forms, a pattern of interlacing bundles of smooth muscle cells, and a high rate of mitoses. The literature review shows that the best choice of treatment is complete surgical resection of the lesion with tumor-free margins [4].

2. Case report

We present a case of a 56-year-old white man with a history of alcoholism and smoking who was referred to the Oral and Maxillofacial Surgery Department at Rio Hortega University Hospital of Valladolid in 2008, complaining of dysphagia for 3 months. He also had lost 18 kg. On clinical examination the patient had a moderately firm, flesh colored bad-circumscribed mass measuring, approximately 2.0 cm in diameter, in the left-side of the tongue and the floor of the mouth. The patient exhibited no clinical signs of lymphadenopathy. Incisional biopsy was performed. It returned diagnose of squamous cell tumor of the tongue.

He denied any surgical treatment. Thus, he underwent chemotherapy of Docetaxel 150 mg, d1 Cisplatin 150 mg, d1 and 5-fluorouracil (5-FU) 1500 mg. D1-5 in four sessions from 26/2/2008 to 20/05/2008 combined with radiotherapy of 50 Gy in 25 fractions, 5 times a week from 27/06/08 to 31/07/08 and 16 Gy in 8 fractions, 5 times a week from 1/08/08 to 12/08/08.

After radiation he had a total disappearance of the primary tumor and the patient was able to return to his occupation.

In 2010 he was followed for severe odontogenic infections, bone exposure and pain sensitivity alterations. A panoramic scanning dental X-ray revealed osteolitic lesions and moth-eaten bone (Fig. 1). Another incisional biopsy was taken. He was diagnosed

☆ Asian AOMS: Asian Association of Oral and Maxillofacial Surgeons; ASOMP: Asian Society of Oral and Maxillofacial Pathology; JSOP: Japanese Society of Oral Pathology; JSOMS: Japanese Society of Oral and Maxillofacial Surgeons; JSOM: Japanese Society of Oral Medicine; JAMI: Japanese Academy of Maxillofacial Implants.

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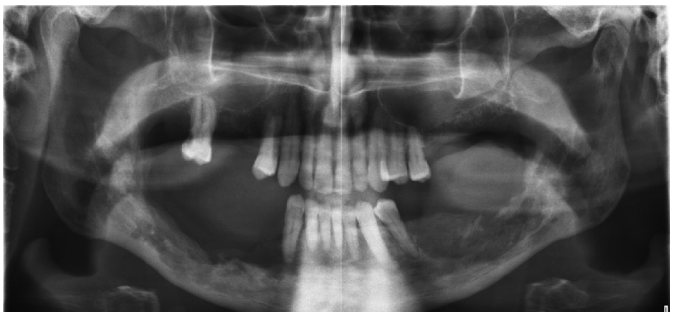

Fig. 1. A panoramic scanning dental X-ray revealed osteolitic lesions and moth-eaten bone.

with osteoradionecrosis and actinomycosis. The patient required antibiotics and extraction of the teeth affected.

He was on regular follow-up and detected this swelling presently. He was disease-free for a period of 5 years. In 2015 he had developed a well-defined mass in the oral cavity. The patient reported that the lesion had been there for about three months. He had difficulty in opening his mouth and dysphagia.

On clinical examination an ulcerative lesion on the left and ventral side of the tongue adjacent to the floor of the oral cavity and to the mandibulary left third molar was observed.

On palpation, the mass had a hard consistency. There was an increase in volume in the left-side tongue because of the lesion, and the area was painful. There was no other significant lesion in the oral cavity. No regional lymphadenopathy was noted. An extraoral physical examination revealed mild facial asymmetry in the left submandibular region.

An axial computed tomography scan confirmed the presence of an aggressive osteolytic lesion and destruction of the mandibular cortex, as well as a rupture of the basic buccal and lingual bony corticals. The area was completely hypodense without any evidence whatsoever of intraosseous calcification, measuring 5.6 cm × 4.2 cm × 6 cm (Fig. 2).

An incisional biopsy specimen of a representative portion of the lesion showed a malignant spindle cell neoplasm with marked pleomorphic cells and frequent typical and atypical mitosis, suggesting a malignant neoplasm of mesenchymal origin.

Considering the microscopic findings, and with the possibility of the existence of a mesenchymal neoplasm, new examinations were included in the diagnostic process: abdominal ultrasonography, helicoidal CT scanning of the chest, and use of the immunohistochemical technique to define the nature of the lesion. No alterations were found in the abdominal or thoracic regions, and the result of the examination by immunohistochemistry confirmed the diagnosis of a highly aggressive mesenchymal lesion, of a leiomyosarcoma-type, because of cellular structure and positive immunoreactivity for proteins present in smooth muscle cells.

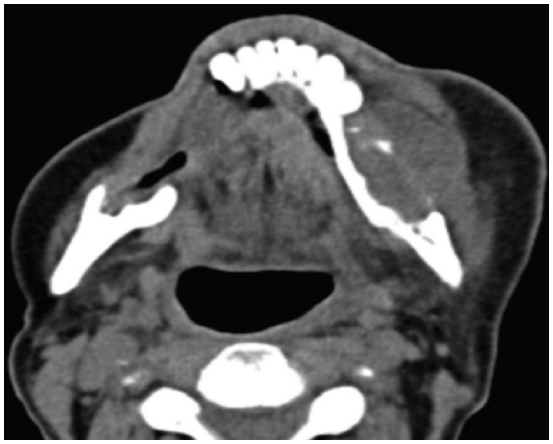

Fig. 2. Axial CT scan showing soft tissue mass occupying the right body of the mandibule with destruction of the mandibular cortex, as well as a rupture of the basic buccal cortical.

The histological analysis showed interlacing fascicles of spindled cells with eosinophilic cytoplasm, typical of leiomyosarcoma. Mitosis ranged from 5/10 high power field (HPF) to 9/10 HPF. It was diagnosed of leiomyosarcoma, based on this evidence. The immunohistochemical studies showed strong positive staining with smooth muscle actin and focal positivity for actin HHF35. Cytokeratin (AE1/AE3), S-100 protein and desmin were negative (Fig. 3).

Finally, the diagnosis of a high-degree post-irradiated leiomyosarcoma of the mandible was established with these clinical, radiographic, and microscopic findings and was supported by the immunohistochemical findings.

The treatment of choice was a partial mandibulectomy with a safety margin of 1 cm, a supraomohyoid lymph node dissection, including the submandibular gland adjacent to the tumor (Fig. 6). The tumor specimen, the submandibular gland, and regional lymph nodes were subjected to a histopathologic evaluation, which confirmed the diagnosis of a leiomyosarcoma-type mesenchymal lesion without glandular or lymph node involvement. Immediate reconstruction was rejected due to bad prognosis and radionecrosis of the bone. At the time of submission of this article, the patient has no sign of recurrence and is being followed up regularly.

3. Discussion

Radiation induced sarcoma is a rare but recognized complication of radiotherapy and is associated with poor prognosis. Several cases have been reported in the literature [5,6]. In a review article on radiation induced sarcomas, Malcolm Feign had summarized 10 reports totalling 14,000 patients, the reported incidence being 0.16%.

In 1948, Cahan et al. proposed, the following criteria for the diagnosis of RIS [24]:

1. Sarcoma must develop within the boundaries of a previously irradiated area;
2. Relatively long asymptomatic latent period (at least 4 years) must have elapsed;
3. Sarcoma must have a different histology from the original lesion;
4. Sarcoma must be histologically confirmed.

These criteria were revised and updated by Murray et al. in 1999 [4]:

1. History of irradiation with the sarcoma arising in the area included in the radiation field and the 5% isodose line;
2. No evidence that the sarcoma was present before the radiation therapy;
3. Sarcomas must be proven histologically and be of different pathology compared with the primary tumor.

The latency period for development of RIS is typically 5–20 years. Consensus does not prevail to agree the duration of latency after radiation exposure. The sarcoma team at MSKCC (Memorial Sloan Kettering Cancer Center) suggests that a latency of six months is sufficient to affirm the diagnosis of RIS [4]. Our patient had a latency period of 5 years and 8 moths after the radiation exposure fitting in time frame of the latency duration. Our case fulfilled the criteria for diagnosing a post-radiation sarcoma.

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