

Nuclear Medicine
Interesting Case Study
Osteoradionecrosis of the Mandible

A 57 year-old male presented to the emergency department with a three day history of right jaw pain and difficulty opening his mouth. His past medical history includes two separate primary head and neck malignancies. The more remote lesion involved the right palatine tonsil and right oropharynx. Treatment included partial right pharyngectomy, selective right neck dissection, and radiation. The more recent neoplasm was of the right lateral tongue and was treated with partial glossectomy and radiation.



Figure 1

Figure 1. Axial image from a maxillofacial CT obtained at the time of presentation to the emergency department shows a displaced fracture through the posterior aspect of the horizontal ramus of the right mandible (arrow). There is a lytic lesion at the site of fracture.

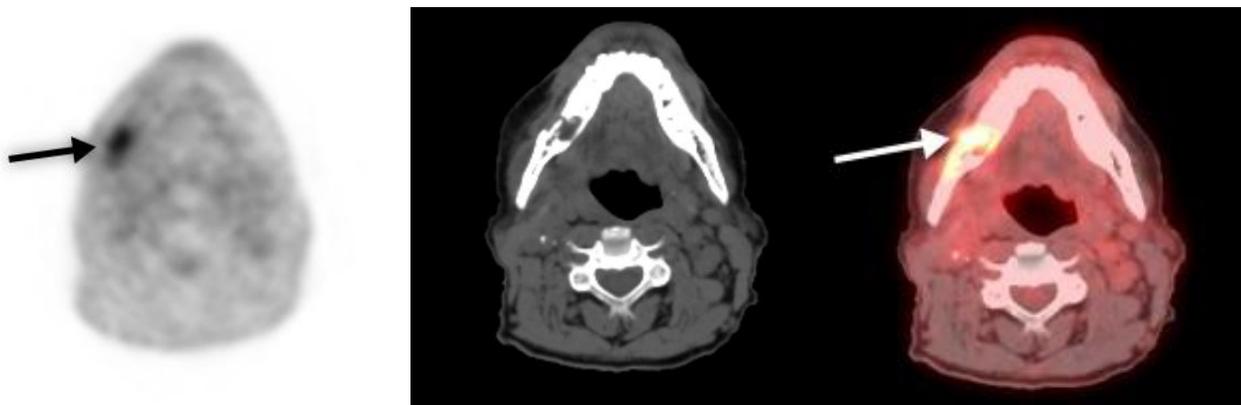


Figure 2

Figure 2. Images from a PET/CT obtained 2 months prior to presentation at the emergency department reveals focal increased FDG uptake within the right mandible. The maximum standard uptake value was 5.7. This finding was attributed to either osseous metastatic disease or osteoradionecrosis of the jaw.

Clinical Outcome:

The patient underwent surgical debridement of the fracture site on two separate occasions. There were acute and chronic inflammatory changes with necrosis on pathologic evaluation of both resected specimens. This constellation of findings is most consistent with osteoradionecrosis of the jaw.

Discussion:

Osteoradionecrosis of the mandible is a relatively uncommon complication that occurs in patients receiving radiation for head and neck malignancies. Inciting radiation doses are generally greater than 60 Gy, and there is increased risk associated with implantable radiation seeds. While the precise pathogenesis of osteoradionecrosis remains somewhat uncertain, proposed mechanisms include tissue injury secondary to radiation. Resultant endothelial damage devascularizes the mandible and overlying soft tissues. A non-healing wound develops within the skin or mucosa exposing the mandible. Further, radiation injury to osteoclasts and fibroblasts limit bone formation and normal bone turnover within the mandible. Dental and periodontal disease as well as trauma including tooth extractions predispose patients to osteoradionecrosis or exacerbate preexisting disease. Superimposed osteomyelitis was once thought to play a role in the development of osteoradionecrosis but infectious organisms are only variably present in resected specimens.

Diagnosis by imaging is often challenging because these patients have a history of nearby malignancy. The presence of a hypermetabolic, lytic process such as that presented here is difficult to distinguish from osseous metastatic disease. In this case, the absence of a soft tissue lesion surrounding the hypermetabolic focus in the mandible suggests the diagnosis of osteoradionecrosis rather than metastatic squamous cell carcinoma.

Treatment depends on the extent of disease with options including wound care, hyperbaric oxygen therapy, and surgical debridement. Small areas of mucosal or skin breakdown with superficial osteoradionecrosis are treated conservatively. Wound management promotes growth of tissue to cover exposed bone. Hyperbaric therapy augments oxygen diffusion into damaged tissue further stimulating healing. In addition, for more significant osseous involvement or lesions that have failed conservative measures, surgery is used to resect devitalized bone.

References:

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3. Bras J, De Jonge H, van Merkesteyn J. Osteoradionecrosis of the mandible: Pathogenesis. *Am J Otolaryngol*. 1990; 11:244-250.

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