Chapter 4

IMAGING OF OSTEORADIONECROSIS OF THE JAWS

Hazal KARSLIOĞLU[1]
Dilek YILMAZ[2]

Radiotherapy (RT) is an important option in cancer treatment. RT is used in the primary treatment of oral soft tissue cancer or as a supportive treatment in advanced-stage cancers. (1,2) The most important risk of RT for the head, neck, and oral soft tissue cancers is osteoradionecrosis (ORN) of the jaws. (3)

ORN is described as hypoxic, hypovascular, and hypocellular changes in bone exposed to radiation that cause tissue deterioration and the formation of chronic non-healing wounds.[4] It is a late complication of RT and occurs when an area of irradiated bone becomes devitalized. After RT, if the exposed bone does not heal over a period of three months without any evidence of tumor or pathology in the jaw, the condition is interpreted as ORN. (4,5,6) ORN develops most frequently >70% in the first three years after completion of RT, with an incidence between 5% and 15%. (7,8)

Researchers suggest that the mandible is the most affected bone in the maxillofacial region, with a ratio of 2:1 compared to the maxilla. (4,9,10) Areas with anatomical prominences, such as torus and exostoses, are more likely to develop ORN because they are more prone to direct trauma. Other anatomical sites at high risk include the internal oblique line and the mylohyoid groove. (11,12,13,14) ORN is more common in the mandible because of its dense bone structure and weaker vascularization than in the maxilla. (7,15,16) In addition, ORN that develops in the maxilla progresses more slowly than ORN that develops in the mandible, and it is less destructive. (17)

RADIOLOGICAL EXAMINATION OF OSTEORADIONECROSIS

Radiological evaluation is necessary to identify the potential triggers of ORN and to define the size of ORN, its effect on the bone, its proximity to vital anatomical

[1] Assistant Professor, University of Baskent, Faculty of Dentistry, Oral and Maxillofacial Radiology, email: hazal23k64@gmail.com, ORCID iD: 0000-0003-2910-2417

[2] Assistant Professor, University of Baskent, Faculty of Dentistry, Oral and Maxillofacial Radiology, email: dtdilek@hotmail.com, ORCID iD: 0000-0001-8802-8259

Tablo 2: Advantages and disadvantages of imaging techniques in ORN

Imaging techniques	Advantages	Disadvantages
Panoramic	Relatively inexpensive, convenient and low radiation dose	2 dimensional images
CBCT	It is useful for examining all margins of the lesion and reassessing the surgical margins on bone	CBCT is insufficient for a detailed assessment of soft tissue changes
CT (54,58,60)	ORN's effects on bone and soft tissue together and providing a three-dimensional image	No image can be obtained during the ORN initial phase, contains radiation.
MRI (24,44,60,61,64, 65)	ORN initial stage and soft tissue effects are displayed. It distinguishes between tumor metastasis and ORN.	For breaks, osteoid and other bone complications it's insufficient.
PET	Differentiating between ORN and tumor recurrence.	Expensive and contains high radiation
SPCET (44,67)	Allows diagnosis of ORN and differentiation of recurrent tumors from ORN	The size of the ORN lesion and its attachment to bone and soft tissue cannot be observed. Only which bones are involved is observed. Contains radiation.

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