

Denosumab-Induced Osteonecrosis of the Jaw with FDG PET/CT imaging features

Saloni Rajkotia¹, Ritesh Suthar^{1,2}, Abhishek Palsapure¹

¹[Department of Nuclear Medicine, The Gujarat Cancer and Research Institute, Ahmedabad, India](#)

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Abstract

Denosumab is a monoclonal antibody that inhibits receptor activator of nuclear factor-kappa B ligand (RANKL), which plays a crucial role in osteoclast formation, function, and survival. By blocking RANKL, denosumab helps prevent bone resorption, making it an effective therapeutic option for managing conditions associated with bone metastases and osteopenia, such as in patients with lung cancer. Lung cancer, particularly non-small cell lung cancer (NSCLC), often metastasizes to bones, and denosumab is commonly used to reduce the incidence of skeletal-related events (SREs) in these patients. However, denosumab therapy is not without its risks, and one of the most significant side effects is osteonecrosis of the jaw (ONJ), a potentially debilitating condition characterized by bone exposure and necrosis, typically following dental extractions or trauma [1][2].

This case report explores the role of FDG PET/CT in diagnosing and managing Denosumab-induced ONJ in a patient with lung cancer, underscoring the value of this imaging modality in clinical practice.

Keywords: FDG PET/CT, Denosumab, Osteonecrosis, Mandible

²Corresponding author: [Ritesh Suthar](#) - received: 22.11.2024 - peer reviewed, accepted and published: 30.11.2024

Case description

A 77-year-old female with a history of stage IV non-small cell lung cancer (NSCLC) presented to the oncology clinic with complaints of persistent jaw pain and swelling, which had been gradually worsening over the past two months. The patient had been receiving denosumab for the prevention of skeletal-related events due to bone metastasis. Patient had intense pain and swelling in the jaw, accompanied by low-grade fever.

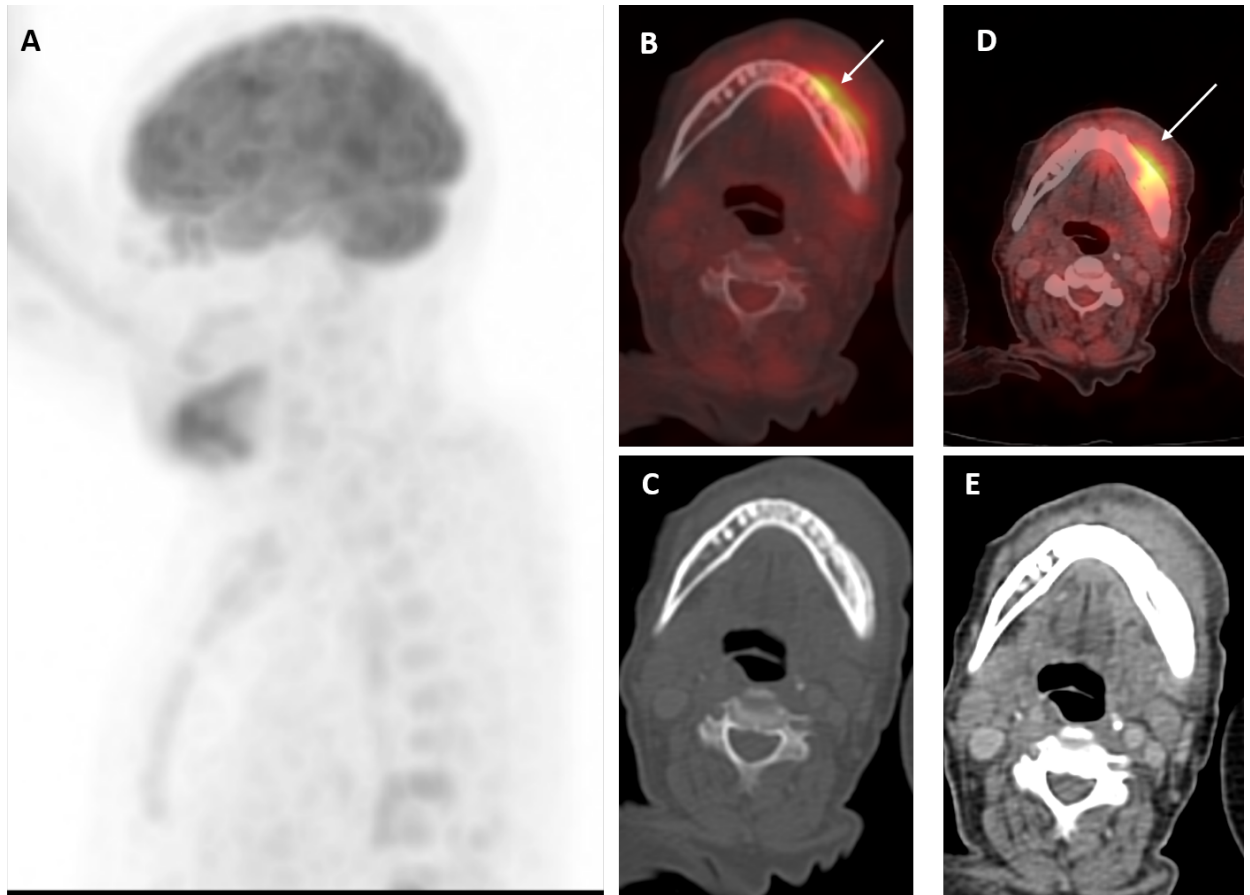
Upon physical examination soft tissue inflammation was noted in the left mandibular region. To assess cause such as metastatic involvement or infection, the patient underwent FDG PET/CT imaging. The results revealed localized increased metabolic activity in the left mandible (Figure A). Correlative fused PET/CT image revealed increased FDG uptake in left hemi-mandible with cortical thickening and marrow sclerosis (Figure B & C arrow). It is also associated with surrounding

soft tissue thickening and edematous changes (Figure D & E arrow). On basis of clinical history of denosumab intake and imaging findings diagnosis of osteonecrosis of jaw (ONJ) was made. No distant metastases or other abnormal areas of FDG uptake were observed, further supporting the diagnosis of ONJ. The findings were confirmed by an oral surgeon, and the patient was initiated on a conservative treatment regimen, including antibiotics, optimized oral hygiene, and pain management.

Discussion

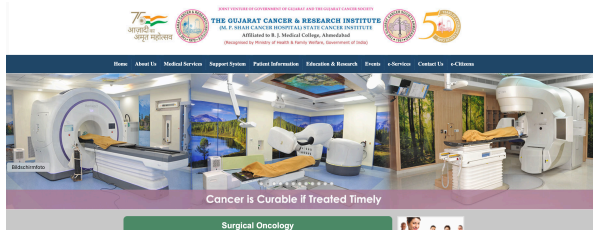
This case highlights the significant role of FDG PET/CT in diagnosing Denosumab-induced osteonecrosis of the jaw. While conventional radiographs and CT scans are useful for assessing structural changes, FDG PET/CT offers superior sensitivity for detecting early metabolic changes, which can help in diagnosing ONJ before obvious





bone damage occurs [3]. In addition, FDG PET/CT aids in differentiating ONJ from other conditions, such as metastatic lesions which may present with similar symptoms but require different management approaches [4].

Correspondence to
[Dr. Ritesh R Suthar](mailto:Dr.RiteshR.Suthar@GCRIC.org)
<https://orcid.org/0000-0002-9383-069X>
 The Gujarat Cancer & Research Institute
 Civil Hospital Campus, Asarwa,
 Ahmedabad-380 016.
 Gujarat, INDIA
 Phone :+91-79- 2268 8000
 Fax : +91-79-2268 5490



Conflict of interest:

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