

# ONJ UPDATE 2024

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### Abstract Submission FORM

NUCLEAR IMAGING APPLICATIONS IN PLANNING SURGICAL INTERVENTION FOR MRONJ

SECTION: 5B

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**Background.** MRONJ (Medication related osteonecrosis of the jaws) is an uncommon but serious pharmacological adverse effect. Radiological imaging is essential for proper diagnosis and treatment planning<sup>1</sup>. CT (computed tomography) is the main second level examination in the diagnostic process for MRONJ, however its limits in the visualization of early stages of this pathology is often reported in literature<sup>1,2</sup>. Nuclear imaging permits visualization of early bony alterations. SPECT/CT (single photon emission computed tomography/CT) has been previously employed in the evaluation of osteomyelitis, osteoradionecrosis and MRONJ<sup>3</sup>. Assessment usefulness and accuracy of SPECT/CT vs CT alone in preoperative diagnostic evaluation of patients with MRONJ in a single-center cohort is presented here.

**Patients and methods.** SPECT /CT was employed in patients diagnosed with MRONJ as second level preoperative examination. Diagnosis of MRONJ was made according to AAOMS and SICMF-SIPMO criteria. Intraindividual correlation of SPECT-CT images vs CT alone (perfusion CT images of SPECT-CT) was assessed by 2 radiologist/nuclear medicine specialist 3 oral surgeons (4-points likert scale of correspondence: 0: no correspondence, 1: underestimation, 2: overestimation, 3: full correspondence) in order to evaluate site and extension of SPECT-CT uptakes vs early & late CT signs of MRONJ.

**Results.** Forty-two patients (9♂,33♀, mean age 71): 29 (69%) were oncologic patients treated with high dose antiresorptive agents; 10 (24%) patients were treated with oral bisphosphonates for >5 years; 3 (7%) patients were taking low dose denosumab. Antiangiogenic agents were associated in 3 patients (sunitinib 2, everolimus 1). Triggering factors associated were: tooth extractions (71%), sore spot (24%), periodontitis (5%). Stage according to AAOMS was 0/1/2/3 in 8/8/24/5 cases and SICMF-SIPMO was 1/2/3 in 14/26/5 cases with a clear majority of symptomatic onset of MRONJ (88.9%). SPECT-CT uptakes were always in accordance with clinical signs and symptoms and anticipated onset of MRONJ in 3 cases. Uptakes in clinically silent sites were observed in 5 cases. SPECT-CT vs CT alone intraindividual correlation revealed the underestimation of CT with regards to the alterations that could be seen in SPECT-CT in 41% cases whereas full correspondence was observed in 34 % cases.

**Conclusions.** SPECT-CT was found effective in evaluation of extension of MRONJ lesions vs CT alone especially in case of prevalent early unspecific signs with diffuse osteosclerotic pattern. The low specificity of nuclear imaging is debated. However, in our experience the integration of morphologic and metabolic information provided by technologic advancements seems to have improved this diagnostic tool. SPECT-CT is already employed in the stage of oncologic patients so could be a suitable option for evaluation of MRONJ lesions without an increase of biologic/economic costs for patients and health service. Its efficacy suggests possible employment also in non-oncologic patients but should be reevaluated in a greater number of cases.

#### REFERENCES:

1. Bedogni A., Campisi G., Fusco V. *Raccomandazioni clinico-terapeutiche sull'osteonecrosi delle ossa mascellari (ONJ) farmaco-relata e sua prevenzione versione SICMF-SIMPO 2.0 03/2020*
2. Minami Y, Ogura I. *Comparison of single photon emission computed tomography-computed tomography, computed tomography and magnetic resonance imaging of osteonecrosis of jaw by new calculated parameters. Q J Nucl Med Mol Imaging. 2022 Oct 26.*
3. Toshima H, Ogura I. *Assessment of inflammatory jaw pathologies using bone SPECT/CT maximum standardized uptake value. Dentomaxillofac Radiol. 2020 Dec 1;49(8):20200043.*

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