



## Scintigraphy of $^{99m}\text{Tc}$ -D-glucaric acid in Multiple Myeloma Patients

PRELIMINARY RESULTS OF BONE MARROW SCINTIGRAPHY WITH  $^{99m}\text{Tc}$ -D-GLUCARIC ACID VERSUS  $^{99m}\text{Tc}$ -SESTAMIBI FOR EVALUATING PATIENTS WITH MULTIPLE MYELOMA was presented at the SNM Annual meeting in June, 2005 by Paola A Erba\*<sup>1</sup>, Ferdinando Buffoni<sup>2</sup>, Mauro Della Porta<sup>1</sup>, Stefania Brizzi<sup>3</sup>, Vincenzo Mattone<sup>1</sup>, Enrico Capochiani<sup>4</sup>, Raffaele Pratali<sup>2</sup>, Mario Petrini<sup>3</sup>, Koon Y Pak<sup>5</sup>, Giuliano Mariani<sup>1</sup>.<sup>1</sup>Regional Center of Nuclear Medicine, University of Pisa Medical School, Pisa, Italy; <sup>2</sup>Nuclear Medicine Service, Town Hospital, Leghorn, Italy; <sup>3</sup>Division of Hematology, Department of Oncology, University of Pisa Medical School, Pisa, Italy; <sup>4</sup>Division of Hematology, Town Hospital, Leghorn, Italy; <sup>5</sup>Molecular Targeting Technology, Inc, West Chester, Pennsylvania, United States.

**Background.** The novel radiopharmaceutical  $^{99m}\text{Tc}$ -D-Glucaric acid ( $^{99m}\text{Tc}$ -GLA) has proven to be useful for tumor imaging by in-vivo and in-vitro studies. Both experimental and clinical studies show similar imaging features of  $^{99m}\text{Tc}$ -GLA as those of  $^{99m}\text{Tc}$ -Sestamibi, especially in breast cancer. On the other hand,  $^{99m}\text{Tc}$ -Sestamibi is of considerable value for evaluating the extent and severity of bone marrow involvement in patients with multiple myeloma, although its physiologic distribution makes interpretation of spine involvement difficult due to accumulation in the abdominal area. Because of the lower physiologic accumulation of  $^{99m}\text{Tc}$ -GLA in the abdomen, we evaluated the performance of  $^{99m}\text{Tc}$ -GLA in the detection of bone marrow involvement in patients with multiple myeloma.

**Methods.** We prospectively studied 10 patients (7 men and 3 women, age  $64.1 \pm 4.8$  yr), all of whom underwent Magnetic Resonance Imaging (MRI) and bone marrow biopsy for confirmation and staging prior to beginning treatment. Whole body scintigraphy with the two agents was performed within 10 days, imaging starting 20 min after  $^{99m}\text{Tc}$ -Sestamibi and 1 hr after  $^{99m}\text{Tc}$ -GLA injection (740 MBq). Visual interpretation was performed by two nuclear medicine specialists independently, in a blind fashion.

**Results.** MRI revealed marrow involvement in 7/10 patients.  $^{99m}\text{Tc}$ -Sestamibi depicted patterns of focal and, respectively, diffuse involvement in 5 patients each.  $^{99m}\text{Tc}$ -GLA depicted with better accuracy 5 patients with focal pattern, one of whom also had diffuse marrow uptake. In particular, 3 focal vertebral lesions only faintly visualized with  $^{99m}\text{Tc}$ -Sestamibi was clearly positive with  $^{99m}\text{Tc}$ -GLA, with tracer uptake more evident in the peripheral zone of the lesions, supposedly due to peripheral cell reaction.

**Conclusion.** This preliminary study shows that  $^{99m}\text{Tc}$ -Sestamibi visualizes bone marrow involvements in multiple myeloma in a similar manner, or even more accurately than

MRI does. Glucarate presents a reproducible pattern of focal accumulation, even in presence of diffuse <sup>99m</sup>Tc-Sestamibi uptake and seems to perform better than <sup>99m</sup>Tc-Sestamibi in presence of focal lesions only, especially if localised at the spine. The clinical importance of this finding still has to be explored by larger scale studies.

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