SAMARIUM-153 EDTMP BONE PAIN THERAPY: METHODOLOGY, BIODISTRIBUTION AND ABSORBED DOSE ESTIMATION

Spaić R, Planić S
Medica Nucleare, Beograd

Samarium-153 ethylenediaminetetramethylenephosphonate (EDTMP) is used in therapy of painful skeletal lesions. Patients which are treated with others medicament and with resistant pain in bone are come for radiation therapy. Patients are screened with whole body bone scintigraphy and blood parameters prior and after therapy. Sm-153 was labeled in our center with EDTMP with Izotop, Hungary labeling protocol. Quality control is done with paper chromatography. Sm-153 has 46,3 hours half-life and maximal beta energy 810 keV (20%), 710 keV (30%), 640 keV (50%) and gamma energy 103 keV (28%). This gamma energy is used for chromatographic measured paper on gamma camera. Measured radiochemical purity was 96±2%. Before treatment all patients assign agreement for this therapy. Four patients were treated with iv. labeled Sm-153 EDTMP with activity of 37 MBq/kg (about 2000-2500 MBq). Patients lies about 2-3 hours in our center. During that period is collected about 90% of total activity which was eliminated with urine. Whole body scintigraphy with gamma energy 103 keV±20% was done for biodistribution and dosimetry estimations at 10 minutes and after 3 hours. After that patient was discharge with written instructions. Blood test are done seven days after therapy and patients were follow-up evaluated.

Biodistribution data show rapid uptake Sm-153m EDTMP into bone with complete clearance of nonskeletal activity. Metastatic uptake was about 3-6 times more that bone. Bone uptake rate was calculated and absorbed dose of metastasis (25000 Gy/MBq), bones (7000 Gy/MBq) and urinary bladder (average 950 Gy/MBq).

All patients was without or with small decrease of blood parameters and there are no need for RBC transfusion. Expected increased bone pain for 12-48 hours after Sm-153 EDTMP was in 50% patients and this flair reaction is in big correlation with excellent pain release. Nonhematologic side effects are minimal. One patient have fair, two good and one was totally without bone pain.

Sm-153 EDTMP of 37 MBq/kg activity is enough for pain palliation therapy. Biodistribution and absorbed dose estimation can be done with gamma camera whole body measurements. Our clinical answers is in accordance with others reported data. It is necessary further estimation of absorbed dose on macroscopic and microscopic level and its correlation with bone pain effect.