The comparison of serial SPECT-CT imaging to estimate absorbed dose to the organ at risk from peptide receptor radionuclide therapy dosimetry

ABSTRACT

Introduction: In Peptide Receptor Radionuclide Therapy (PRRT), the administration of radionuclide such as Lu-177 label with a pharmaceutical agent useful to destroy the lesion. The amount of Lu-177 radioactivity administered to the patients is still not standardize and generally not more than 7.4 GBq per session due to the patient's safety issues. The first cycle of Lu-177 is an excellent technique to estimate radionuclide uptake for organs at risk. This study aims to simplify five SPECT-CT scanning points into less scanning points to estimate absorbed dose to the organ at risk. Methods: Ten patients who have neuroendocrine tumors enrolled in 177Lu-Dotatate therapy dosimetry. The serial SPECT-CT done after 2, 4, 24, 48 and 72 hours to acquired time disintegration for organ at risk. Partik's categorical grading criteria is relevantly used in this study to convert the numeric value of Lin's concordance coefficient into an ordinal scale. Results: Our current result demonstrated an excellent agreement between three and five scanning with LSA exponential fit method. These excellent results presented for kidney, liver and spleen. However, the bladder shows poor results due to the urinary system. Conclusion: Three data point of SPECT-CT images is the best option to estimate absorbed dose to the lesion and organ at risk for 177Lu-Dotatate dosimetry technique.

Keyword: 177Lu-dotatate; Dosimetry; SPECT-CT