

# Pengembangan In-House Software Untuk Perhitungan Dosimetri Berdasarkan Metode MIRD Pada Pencitraan Kamera Gamma Planar = In-House Software Development for Dosimetry Calculation Based on the MIRD Method on Gamma Camera Imaging Planar

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## Abstrak

Pada umumnya, dosis pasien kanker terapi radionuklida diberikan secara fixed dose, namun diperoleh eror yang besar. Untuk menjamin keakurasian, maka diperlukan perhitungan dosimetri internal. Penelitian bertujuan mengembangkan software in-house perhitungan dosimetri internal terapi radionuklida dengan menggabungkan software peneliti sebelumnya terkait kuantifikasi aktivitas organ citra planar kamera gamma dan perhitungan AUC. Software tersebut bernama Absorbed Dose Calculator of Lu-177 dalam bentuk tampilan GUI (graphical user interface) yang dikembangkan melalui software MATLAB versi 2020a. Terdapat 3 tahap perhitungan yaitu tahap kuantifikasi aktivitas berdasarkan perhitungan aktivitas conjugate view, tahap perhitungan AUC dan dosis serap. Perhitungan dilakukan terhadap 7 pasien RrDTC pada organ ginjal kanan, ginjal kiri, hati dan limfa. Nilai tertinggi untuk aktivitas diperoleh pada organ hati sebesar 20,02 MBq, sedangkan untuk dosis serap pada organ limfa sebesar 554,46 mGy atau 0,55 Gy. Nilai dosis yang diperoleh tidak melebihi nilai batas dosis yang ditoleransikan. Hasil validasi menunjukkan eror (relative deviation, %RD) kurang dari 10%. Software peneliti dapat melakukan perhitungan dosimetri internal dengan hasil yang baik.

.....In general, the dose of radionuclide therapy cancer patients is given in a fixed dose, but a large error is obtained. To ensure accuracy, it is necessary to calculate the internal dosimetry. This study aims to develop an in-house software for calculating the internal dosimetry of radionuclide therapy by combining the software of previous researchers related to the quantification of organ activity in gamma camera planar images and AUC calculations. The software is called Absorbed Dose Calculator of Lu-177 in the form of a GUI (graphical user interface) display which was developed through the MATLAB software version 2020a. There are 3 calculation stages, namely the activity quantification stage based on the conjugate view activity calculation, the AUC calculation stage and the absorbed dose. Calculations were performed on 7 RrDTC patients in the right kidney, left kidney, liver and spleen. The highest value for activity was obtained in the liver at 20,02 MBq, while the absorbed dose in the spleen was 554,46 mGy or 0,55 MBq. The dose value obtained does not exceed the tolerable dose limit value. The validation results show the error (relative deviation, %RD) is less than 10%. Research software can perform internal dosimetry calculations with good results.