

ABSTRACT

Renal scan examination using Tc-99m DTPA radiopharmaceutical is one of the diagnostic procedures in nuclear medicine used to evaluate renal perfusion, glomerular filtration function, and renal excretion physiologically. In practice, the administered radiopharmaceutical activity must adhere to radiation protection principles, particularly patient dose optimization. One approach to dose optimization is the implementation of Diagnostic Reference Levels (DRLs), which serve as benchmark values for evaluating radiopharmaceutical activity administration while maintaining diagnostic image quality and minimizing radiation exposure. This study aimed to determine the Diagnostic Reference Level based on the radiopharmaceutical activity administered to patients. This research employed a quantitative descriptive method using secondary data from adult patients who underwent renal scan examinations with Tc-99m DTPA at the Nuclear Medicine Department of Dr. Sardjito General Hospital. The collected data consisted of the radiopharmaceutical activity administered to each patient. The Diagnostic Reference Level was determined using the 75th percentile (P75) method in accordance with the recommendations of the International Commission on Radiological Protection (ICRP). In addition, the effective dose received by patients was estimated based on the administered radiopharmaceutical activity and the effective dose coefficient of Tc-99m DTPA. The results showed that the radiopharmaceutical activities used in renal scan examinations were within the recommended range for dynamic renography procedures using Tc-99m DTPA. The obtained Diagnostic Reference Level can be used as a local reference for the evaluation and optimization of radiopharmaceutical administration in renal scan examinations. The establishment of a local DRL is expected to support the implementation of the ALARA (As Low As Reasonably Achievable) principle, enhance patient safety, and serve as a foundation for the development of diagnostic reference levels in nuclear medicine services in Indonesia.

Keywords : *Diagnostic Reference Level, renal scan, Tc-99m DTPA, nuclear medicine, radiation protection.*