COMPARISON OF EFFECTIVE DOSE RECEIVED BY PATIENTS UNDERGOING WHOLE-BODY PET-CT PROCEDURE USING 18F-FDG AND 68GA-DOTATATE

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INTRODUCTION

• The PET-CT whole body 18F-FDG and 68Ga-DOTATATE imaging is the standard of care in oncologic diagnosis and staging.

• Patient radiation dose must be extremely emphasized in order to balance the benefits the risk of radiation exposure and patients image quality.

• Even though the reference PET-CT doses are available, however the estimation of effective dose stagnantly lacking for the Malaysian.

• The aim of this study was to estimate the patient Effective Dose (ED) for whole body dual tracer PET-CT among oncology patients.
MATERIALS AND METHODS

• In total 85 males and 85 females oncology patient’s radiation dosage were collected retrospective data from the PET-CT record at the Institut Kanser Neagara (IKN).

• The data was collected based on the two types of PET radiopharmaceuticals 18F-FDG and 68Ga-DOTATATE that had been used in different PET-CT imaging procedures.

• The ED for PET-CT imaging was calculated for both activities 18F-FDG and 68Ga-DOTATATE based on the coefficient stated in the International Commission on Radiological Protection (ICRP) Publication 106.

• The effective dose from the CT was determined using k coefficient as stated in the ICRP Publication 102 and Dose Length Product (DLP) value.
RESULTS

• The average effective dose from PET and CT scans for 18F-FDG was found to be 6.90 mSv and 10.34 mSv.

• Meanwhile for 68Ga-DOTATATE, the average effective dose from PET and CT scans was found to be 4.52 mSv and 10.88 mSv.

• The CT scan average effective dose for both radiopharmaceuticals was 11.9±5.9 mSv for male and 10.5±4.6 mSv for female patients respectively.

• The mean whole-body effective dose received by 18F-FDG and 68Ga-DOTATATE patients undergoing the combined PET/CT procedure was 18.15 mSv and 14.76 mSv.
DISCUSSIONS

• The weight of the patient contributes to the whole body effective dose of PET/CT for F18-FDG.
• This study proved the ED F18-FDG for this centre was lowered compared to the previous study (1-2,5-6).
• The ED of the radiopharmaceutical Ga68 DOTATATE less 2 fold compared to F18-FDG PET-CT as same trend with other centre practice (3-4).
• Although Dose Coefficient F18 higher than Ga68, but the fix activity administered (185 MBq) less compared to F18 dose (more than 370 MBq).
• Ga68 administered less radioactivity to the patients due to specific organ only related with NET organ and unlike F18, used to give information the glucose uptake throughout the body.

• The male patient received higher CT dose compared with female patients due to the different heights.
CONCLUSIONS

• The estimation of the total whole body PET-CT effective dose for male oncology patients is moderately high compared to the female oncology patients who undergo PET-CT.

• From this study, it also indicates that the effective dose of the radiopharmaceutical Ga68-DOTATATE was lesser compared to the effective dose of F18-FDG.

• Additionally, it is also important to optimize the PET-CT protocol dose in order to uphold the dose as low as reasonably achievable (ALARA).
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REFERENCES


