Impact of total activity variation in 18F-FDG injected with the overall PET image quality in oncology patients

ABSTRACT

The preliminary study aims to investigate whether variation on dose activity 18F -FDG will influence the overall PET image quality in oncology patients. This is a retrospective analysis of 10 oncology patients who were injected with an average of 337.40 ± 38.43 MBq of 18F -FDG for PET/CT whole body examination. Patients were divided into 2 groups based on total activity of 18F -FDG injected: less than 333 MBq (302.96±12.65 MBq) (group 1) and more than 333 MBq (371.85±14.00 MBq) (group 2). Multiple Image Projection (MIP) PET images were scored visually by two qualified nuclear radiologists using a two-point scoring scale (poor and excellent). The agreement between radiologists was analysed using kappa measure of agreement (K). The prediction on poor-to-excellent PET image by the total activity of 18F-FDG injected was analysed using a Chi-squared test (x 2). A p value of < 0.05 was considered significant. Agreement on PET image scoring was substantial, with a kappa value of 0.737. However, the prediction of the PET image quality by the total activity injected has been found to be insignificant ($p > 0.05$). Therefore, there is no strong evidence suggest that the dose injected will influence the PET image quality. Hence, it is recommended to use low-dosed of 18F -FDG technique as it also potentially yields a comparable PET image and reduces radiation burden to the patients.

Keyword: Medical imaging; Medical image quality; Cancer; Dosimetry; Nuclear medicine imaging