

AbstractID: 10462 Title: Effective Doses in Whole Body and Brain PET/CT Procedures of Adult Patients

Abstract

Purpose: To determine the variation in patient effective doses for whole body and brain PET-CT procedures and determine methods for dose optimization.

Method and Materials: Demographic data (age, gender, and weight), CT exposure parameters and activity of ^{18}F (FDG) were taken from patient records of 543 whole body and initial 54 brain PET/CT cases. PET Effective doses were estimated using the dose conversion coefficients for ^{18}F (FDG) in ICRP Report No. 80. CT effective doses for the manufacturer's stated CTDI_{air} were estimated using the IMPACT dose calculator. The Pearson correlation ($p < 0.0001$) of PET effective doses with weight, age and ^{18}F (FDG) activity was analyzed.

Results: There are more male patients (55% and 61%) than females (45% and 39%) for whole body and brain procedures respectively. The mean age of patients for whole body is 47 ± 18 years old and 34 ± 16 years old for brain studies. The mean ^{18}F (FDG) for whole body is 460 ± 130 MBq and 410 ± 45 MBq for brain procedures. Pooling all ages, the mean effective doses are 8 ± 2 mSv and 10 ± 1 mSv for whole body and brain respectively and dose correlate poorly with weight, age and activity. CT effective doses are in the range of 11 to 15 mSv.

Conclusion: There is a wide variation in the ^{18}F (FDG) activity which is about 30% of the mean activity. Standardization of activity can be formulated per weight or per age and a study of the setting image quality criteria and using low dose CT should be made. A dose conversion coefficient of 1.8 mSv per Gy can be used for whole body CT using 6 and 9 mGy CTDI to estimate effective dose.