

Estimation of patient Effective Doses and Cancer Risk in Positron Emission Tomography and Computed Tomography in Kuwait

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Abstract

The combination of positron emission tomography (PET) with Computed tomography (CT) has been used to diagnose and evaluate many clinical conditions. However, both imaging modalities expose the patients to significant radiation dose from ionizing radiation. The radiation dose from both the positron emitters (e.g. ¹⁸F) and from X-rays used PET/CT imaging results in high patient dose. Therefore, there is a massive need to assess and optimize the radiation dose to the patients during PET/CT procedures. The objective of this study is to evaluate the patients radiation dose and radiation risks and to establish diagnostic reference levels (DRL) for PET/CT procedures in Kuwait. A total of 220 patients doses were investigated. The patients were scanned using a general electric (GE) discovery 710 PET/CT scanner at the department of nuclear medicine in Kuwait cancer control center (KCCC), Kuwait. The patients effective dose were estimated using the administered activity. The mean patient's effective dose was estimated using patient exposure parameters in ImPACT software. The mean and range of the administered activity is 222 MBq (6.0 mCi) per procedure, based on patient body mass index (BMI). The range of patients' effective doses per procedure was 5 - 18 mSv. The radiation risk per procedure is 1×10^{-5} per procedure. Patient doses depend on the size of patient, the type of scanner, the imaging protocol and reconstruction method used. Effective doses considered low compared with previous studies. Proper justification and radiation dose optimisation are required for further dose reduction.

[1] Quinn B (2016) BMC medical imaging 16:41

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