

Summary

Effect of the Respiratory Movements on the Intensity of FDG Accumulation in PET Inspection Image

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[Purpose] With chest PET examination, expansion of an image showing a small accumulation and reduction in the radiation count due to breathing movements are anticipated. The purpose of this paper is to analyze movement in the chest region when breathing and to clarify effects of the movement on expansion of the image of a small accumulation and intensity of the radiation count.

[Methods] Movements around the hilum of the lung under resting respiration are analyzed in X-rays, CT images and MR images. Based on results of the analysis, breathing movements are reproduced by means of a phantom of our own design. The phantom is adjusted to the PET apparatus so as to change in accordance with the magnitude and movement of a small accumulation to obtain expansion of the image of this

part and the intensity of the radiation count.

[Results] It was found that movements around the hilum of the lung under resting respiration are of a reciprocal kind in the cranio-caudal direction which can be approximated by the fundamental wave. The extent of the image with average amplitude (8.2 ± 2.8 mm, $n = 30$) was 6 mm in the cranio-caudal direction. The average amplitude of the radiation count was lowered 38% at 3 mm ϕ and 22% at 6 mm ϕ .

[Conclusions] It is considered that breathing movement results in a reduction in the radiation count in small accumulations and this may cause underestimation of SUV.

Key words: Standardized uptake value (SUV), PET value, Positron emission tomography (PET), ^{18}F -FDG.