

Evaluasi Kualitas Citra SPECT dengan Variasi Geometri: Studi Fantom = Evaluation of SPECT Image Quality with Geometry Variation: Phantom Study

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Abstrak

ABSTRAK

Salah satu faktor yang mempengaruhi kualitas citra SPECT adalah geometri, seperti posisi dan ukuran obyek deteksi, dan juga geometri obyek-detektor dalam akuisisi SPECT. Kualitas citra SPECT dievaluasi dengan FWHM sebagai parameter resolusi citra, dan kontras. Tujuan penelitian adalah menganalisa kemampuan SPECT dalam mengatasi pengaruh geometri obyek deteksi. Penelitian dilakukan pada fantom in-house dengan material penyusun berupa gondorukem, lilin cecek malam dan tepung beras. Variasi geometri yang dilakukan selama penelitian berupa variasi posisi dan ukuran obyek deteksi (vial berdiameter 11, 8, 6, 4 mm) yang berupa vial silinder dari pipa akrilik. Dari variasi tersebut akan terlihat seberapa besar pengaruh letak obyek di dalam fantom pada kualitas citra yang didapatkan, serta seberapa baik SPECT dapat meminimalisir efek geometri posisi obyek deteksi. Hasil penelitian yang dilakukan, didapatkan bahwa ukuran obyek minimum untuk semua variasi posisi ialah 11 mm dengan nilai rerata CF sebesar $1,03 \pm 0,08$. Hasil ini terbukti independen terhadap aktivitas obyek deteksi dengan nilai CF yang cenderung konstan pada ketiga variasi rasio konsentrasi aktivitas obyek yang dilakukan terhadap semua posisi obyek.

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ABSTRACT

One of the factors that influence SPECT image quality is geometry, such as the position and size of the object of detection, as well as the geometry of the objects in the acquisition of SPECT. SPECT image quality is evaluated by FWHM as an image resolution parameter, and contrast. The aim of this research is to analyze the SPECT ability in overcoming the influence of the geometry of the object of detection. The study was conducted on in-house phantoms with constituent materials in the form of gondorukem, evening cecek candles and rice flour. The geometry variations carried out during the study were variations in the position and size of the object of detection (vials 11, 8, 6, 4 mm) in the form of cylindrical vials of acrylic pipes. From these variations will be seen how much influence the location of the object in the phantom on the quality of the image obtained, and how well SPECT can minimize the geometric effects of the position of the object of detection. The results of the research conducted, it was found that the minimum object size for all position variations was 11 mm with an average value of CF of 1.03 ± 0.08 . This result is proven independent of the object detection activity with CF values that tend to be constant in all three variations in the concentration of object activity performed on all object positions.