

Optimisasi Dosis dan Kualitas Citra Berdasar Hubungan source Image Distance (SID) dan Diagonal Flat Detektor (FD) pada Pesawat C Arm Angiografi

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Abstrak

Radiologi Intervensional (IR) mengalami perkembangan yang sangat pesat, prosedur ini banyak digunakan baik pada orang dewasa maupun anak-anak bahkan pada pasien dengan kontra indikasi untuk pembedahan. Namun, prosedur ini dikaitkan dengan resiko radiasi yang tinggi. Penelitian ini bertujuan untuk menentukan optimisasi rerata dosis dan kualitas citra berdasar hubungan source image distance (SID) dan diagonal flat detector (FD) pada pesawat C arm angiografi. Penelitian ini menggunakan phantom PMMA setebal 25 cm. Dan penelitian, dilakukan analisis untuk meneotukan optimisasi rerata dosis dan kualitas citra. Rerata dosis diukur menggunakan detektor solid state, sedangkan analisis kualitas citra ditunjukkan dengan resolusi spasial melalui analisis Modulation Transfer Function (MTF). Hasil penelitian menunjukkan bahwa SID terkecil 90 cm rerata dosis 0,1 19 mGy/s, sedangkan SID terbesar adalah 120 cm rerata dosisnya 0,243 mGy/s, sedangkan variasi diagonal FD menunjukkan rerata dosis terbesar pada diagonal FD 15 cm, yaitu 0,263 mGy/s dan rerata dosis terkecil pada diagonal FD 48 cm adalah 0,109 mGy/s. Analisis menunjukkan bahwa rerata dosis optimal dan resolusi spasial terdapat pada SID 110 cm dengan rerata dosis 0,215 mGy/s dan MTF optimum 2,35 lp/mm, dalam variasi FD rerata dosis optimal pada FD 27 cm dengan rerata dosis 0,251 mGy/s dan MTF optimumnya 2,55 lp/mm, sehingga optimisasi dosis dan kualitas citra terdapat pada SID 110 cm dan diagonal FD 27 cm karena pada kondisi ini diperoleh dosis optimum dengan kualitas citra yang optimum.

Optimization of Dose and Image Quality Based on the Relationship of Source Image Distance (SID) and Diagonal Flat Detector (FD) on C Arm Angiography Aircraft

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Abstract

Interventional Radiology (IR) has developed very rapidly, this procedure is widely used in both adults and children, even in patients with contraindications to surgery. However, this procedure is associated with a high radiation risk. This study aims to determine the optimization of the average dose and image quality based on the relationship between the source image distance (SID) and the diagonal flat detector (FD) on the C arm angiography plane. This study used a PMMA phantom with a thickness of 25 cm. In this research, an analysis was carried out to determine the optimization of the average dose and image quality. The average dose was measured using a solid state detector, while the analysis of image quality was indicated by spatial resolution through Modulation Transfer Function (MTF) analysis. The results showed that the smallest SID was 90 cm with an average dose of 0.1 19 mGy/s, while the largest SID was 120 cm with an average dose of 0.243 mGy/s, while the diagonal variation of FD showed the largest mean dose on a 15 cm diagonal FD, which was 0.263 mGy/s. and the smallest mean dose on the 48 cm FD diagonal is 0.109 mGy/s. The analysis showed that the optimal dose mean and spatial resolution were found in SID of 110 cm with an average dose of 0.215 mGy/s and an optimum MTF of 2.35 lp/mm, in the variation of FD the optimal dose average was at FD 27 cm with a mean dose of 0.251 mGy/s and MTF. the optimum is 2.55 lp/mm, so that the optimization of dose and image quality is

found at SID 110 cm and diagonal FD 27 cm because in this condition the optimum doors are obtained with optimum image quality.

Pembimbing Akademik

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