Optimasi akuisisi citra sistem computed radiography menggunakan in-house phantom = Optimization of computed radiography image acquisition using in- house phantom

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Abstrak

Penelitian ini bertujuan untuk mendapatkan kombinasi parameter eksposi optimum pada pemeriksaan sinar-x diagnostik menggunakan Computed Radiography (CR). Kombinasi faktor eksposi yang diuji berada dalam rentang 55 kVp-66 kVp dan 15 mAs-24 mAs untuk toraks, 81 kVp-102 kVp dan 8 mAs-20 mAs untuk abdomen, serta filter tambahan 0 mmAl, 1 mm Al + 0.1 mm Cu, 1 mm Al + 0.2 mm Cu, dan 2 mm Al. Figure of Merit (FOM) sebagai rasio antara kuadrat Signal Difference to Noise Ratio (SDNR) dan dosis dipilih sebagai parameter uji, dengan parameter kualitas citra tambahan berupa Modulation Transfer Function (MTF) dan Contrast Consistency (CV). Meskipun didapatkan kombinasi dengan FOM tertinggi, hasil penelitian menunjukkan bahwa FOM tidak dapat digunakan sebagai parameter optimisasi tunggal dan penggunaannya harus disertai parameter lain. Karenanya, diperlukan penelitian lanjutan sebelum metode ini dapat diterapkan secara klinis.

.....This study aims to obtain an optimum combination of exposure parameters on diagnostic x-ray examinations using Computed Radiography (CR). The combination of exposure parameters tested were in the range of 55 kVp-66 kVp and 15 mAs-24 mAs for thorax, 81 kVp-102 kVp and 8 mAs-20 mAs for the abdomen, and additional filters 0 mmAl, 1 mm Al + 0.1 mm Cu, 1 mm Al + 0.2 mm Cu, and 2 mm Al. Figure of Merit (FOM) as a ratio between the squared Difference to Noise Ratio (SDNR) signal and the Entrance Surface Dose (ESD) was chosen as optimization parameter alongside with additional image quality parameters such as Modulation Transfer Function (MTF) and Contrast Consistency (CV). Although the combination with the highest FOM was obtained, the results showed that FOM cannot be used as a single optimization parameter and its use must be accompanied by other parameters. Therefore, further research is needed before this method can be applied clinically.