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Paediatric CT optimisation utilising Catphanw 600 and age-specific anthropomorphic phantoms (Article)

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Abstract

The purpose of the study is to perform phantom-based optimisation of paediatric computed tomography (CT) protocols and quantify the impact upon radiation dose and image noise levels. The study involved three Portuguese paediatric centres. Currently employed scanning protocols for head and chest examinations and combinations of exposure parameters were applied to a Catphan®600 phantom to review the CT dose impact. Contrast-noise ratio (CNR) was quantified using Radia Diagnostic® tool. Imaging parameters, returning similar CNRs (<1) and dose savings were applied to three paediatric anthropomorphic phantoms. OsiriX software based on standard deviation pixel values facilitated image noise analysis. Currently employed protocols and age categorisation varied between centres. Manipulation of exposure parameters facilitated mean dose reductions of 33 and 28 % for paediatric head and chest CT examinations, respectively. The majority of the optimised CT examinations resulted in image noise similar to currently employed protocols. Dose reductions of up to 33 % were achieved with image quality maintained. © The Author 2014.

Indexed keywords

EMTREE medical terms: age; anatomy and histology; anthropometry; child; computer assisted diagnosis; computer assisted tomography; computer program; head; human; image quality; multidetector computed tomography; newborn; preschool child; procedures; radiation dose; radiation monitoring; radiation protection; radiography; statistics and numerical data; thorax; thorax radiography

MeSH: Age Factors; Anthropometry; Child; Child, Preschool; Head; Humans; Infant, Newborn; Multidetector Computed Tomography; Phantoms, Imaging; Radiation Dosage; Radiation Monitoring; Radiation Protection; Radiographic Image Interpretation, Computer-Assisted; Radiography, Thoracic; Software; Thorax; Tomography, X-Ray Computed

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