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Image Quality Analysis of an aSi:H/CsI(Tl) Flat-Panel Based Digital Radiography System Using a Chest Phantom

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In digital radiography system, the diagnostic utility of image quality mainly depends on processing technique of image data. The aim of this work is to quantitatively evaluate image quality of our aSi:H/CsI(Tl) flat-panel based digital radiography system using a chest phantom. The study on the human visual property and the detector response to four standard radiation qualities (from RQA 3 to RQA 9) was performed. The high and low contrast resolution was assessed with two commercially available digital systems based on the same detector. The resulting signal-to-noise ratios (SNRs) of the nine low contrast objects in the lung, heart and subdiaphragm regions, and relative spatial resolution in the lung field were comparable with those of other systems. Low contrast objects were automatically detected and SNRs were computed by our image analysis algorithm. The quantitative analysis procedure of image quality designed in this work removes observer's subjectivity. In addition, it can be easily applied for the detectability measurement of low contrast object in other digital modalities by our image analysis algorithm.

Keywords : aSi:H/CsI(Tl) Flat-Panel, Digital Radiography System, Signal-to-Noise Ratio