

AbstractID: 10614 Title: An Automated Analysis of Contrast Detail Phantom Images for Quality Control

Purpose: A contrast detail (CD) phantom is used for quality control of X-ray imaging systems. However, the observation of CD phantom images is time-consuming, and there are intra- and inter-observer variations in quality assessment. Therefore, we attempted to develop an automated approach for analysis of contrast detail phantom images for quality control of X-ray imaging systems. **Method and Materials:** A CD phantom (Kyoto-Kagaku Co.) with similar signals to the CDRAD phantom (Artinis Medical Systems) was used in this study. The CD phantom images were obtained by a computed radiography (CR) system under the condition of chest radiography (120kV, 6.4mAs). Five CR images with various image qualities were prepared by changing the thickness of plexiglass plates with the CD phantom, and evaluated by five observers on a liquid crystal display for medical use. The automated analysis program provided the CD curve and the image quality figure (IQF). The size of circular region of interest (ROI) was adjusted to each signal in CD phantom image for increasing the signal detection. **Results:** In all images, the computerized analysis showed higher signal detection than human observers. In the case that the plexiglass plate with 8 cm thickness was used, the IQF obtained by a computer was 5.5, which was superior to the averaged IQF, 4.0 ± 0.3 by human observers. There was no variation in evaluation by the computer, whereas there were remarkable variations among human observers. A strong correlation ($R = 0.91$) between computed analysis and human observers was shown in the IQF. **Conclusion:** The automated analysis program provides a fast and objective evaluation of CD phantom images for quality control.