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【Title】：Assessment of image characteristics in bone suppression processing software

Abstract：

【Purpose】

The aim of this study was to evaluate characteristics of bone suppression (BS) images in chest radiography. The modulation transfer function (MTF) is a comprehensive metric used to measure the spatial resolution of an imaging system. However, the BS processing is non-linear, and the processing that can be evaluated using MTF is limited to linear processing. In this study, we tried evaluating the BS processing by using task-based MTF which is used for CT image evaluation.

【Method】

We used a chest phantom subject with acrylic disks (thickness of 5 mm and 3 mm, diameter of 10 mm φ) as the lung nodules. We constructed the image to include only the nodules by subtracting an image without the nodules. The edge of the nodule was analyzed to determine the edge-spread function

(ESF). Our method reduces the statistical uncertainty of measurement by performing an averaging of repeated scans. An edge response was obtained by performing Fourier transformation on the differential value of ESF obtained by analysis, and defined as the task transfer function (TTF).Radiography conditions were 86 kV, 1.2 mAs, and 120 cm side-to-side difference (SSD). The BS processing software used ClearReadBS. The TTF, contrast, and contrast to noise ratio (CNR) of the nodules in the BS images were compared to original image.

【Result】

TTF, contrast, and CNR showed a decrease in the BS image.

【Conclusion】

Although the image quality index has decreased, improvements in sensitivity in the BS processing have been reported previously. The importance of the BS processing is the improvement in visibility, rather than the decrease in imaging ability. As a result of our study, it was suggested that lesion detection be performed on the BS image, and structural observation of the lesion be performed using the original image.