

**Purpose:** Liquid-crystal displays (LCDs) with a higher contrast ratio (CR) have been recently developed. However, only a few studies have been reported regarding the CR of the LCDs required for displaying medical images. The purpose of this study was to investigate the CR of LCDs required for displaying medical images.

**Methods:** A two-megapixel monochrome LCD (GS220, maximum 1,000 cd/m<sup>2</sup>, recommended 500 cd/m<sup>2</sup>, Eizo Nanao, Japan) was used in this study. This LCD was calibrated to the grayscale standard display function (GSDF) with different maximum-luminance settings such as 250, 500, and 700 cd/m<sup>2</sup> for mammograms and 175, 500, and 700 cd/m<sup>2</sup> for chest radiographs. The minimum luminance of the LCD was kept at 0.7 cd/m<sup>2</sup> for each calibration. The CR was calculated from the maximum and minimum luminance of each luminance setting. Mammograms (40 images) and chest radiographs (10 images) were selected as research subjects. To examine the maximum luminance ( $L_{max}$ ) and the minimum luminance ( $L_{min}$ ) in each image, region of interests (ROIs) were set based on the histogram analysis. Then, luminance corresponding to ROIs was calculated by using the GSDF curve with different maximum luminance settings. Finally, luminance ratio ( $LR_{img}$ ) in mammograms and chest radiographs were obtained from the  $L_{max}$  and  $L_{min}$  in each image.

**Results:** The average  $LR_{img}$  of mammograms with the maximum-luminance setting of 250, 500, and 700 cd/m<sup>2</sup> was 209:1, 388:1, and 523:1, respectively. On the other hand, the average  $LR_{img}$  of chest radiographs with the maximum-luminance settings of 175, 500, and 700 cd/m<sup>2</sup> was 37:1, 70:1, and 86:1, respectively.

**Conclusions:** We found that the CR of the LCD required for displaying mammograms and chest radiographs ranged from 209:1 to 523:1 and 37:1 to 86:1, respectively. A significant difference in the CR of LCD required for displaying medical image was observed between mammograms and chest radiographs.