

Optimized tube voltage setting for contrast of the mammogram films

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Introduction

In analogue mammography, single-side emulsion mammographic films (s-s film) had been used. However, double-sided emulsion mammographic films (d-s film) were developed in 2010. The contrast of d-s films is higher than s-s films (Fig. 1).

Therefore, to optimized image contrast in the breast of the d-s films, the tube voltage is intended to increase to adjust image contrast. ^{1), 2)} The image contrasts in the breast among the s-s film, the d-s film, and d-s film with tube voltage adjusted were analyzed. The image contrast in the breast was adjusted between s-s film and d-s film with increase tube voltage.

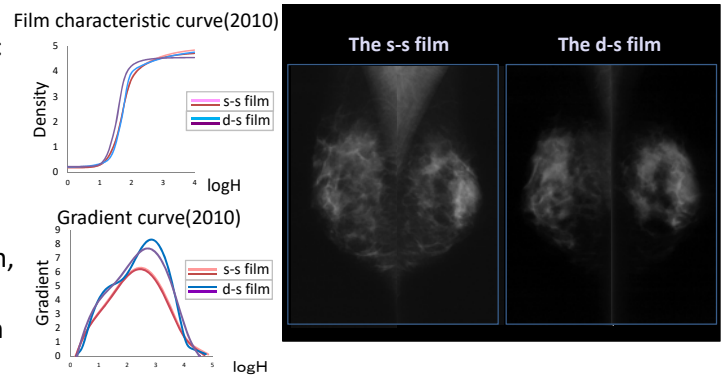


Fig.1 The contrast of d-s films is higher than s-s film.

Methods

Thirty series of mammograms were evaluated among three groups. To determine of contrast, the density between mammary gland areas and fat areas were measured films (Fig. 2). One-way analysis of variance (ANOVA) among three kinds of images was carried out and post hock test was performed (SPSS Ver.2, IBM). Statistical significant level was set at 5 %. The study was conducted with the permission of the ethical review board of facilities.

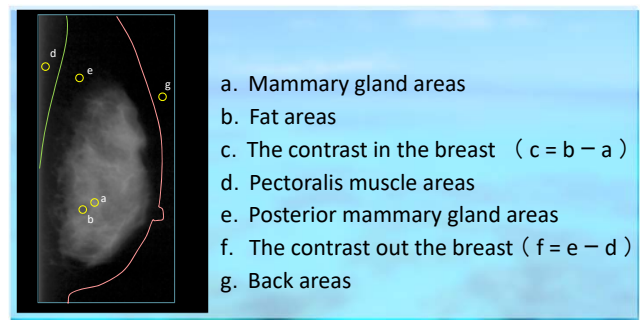


Fig.2 Measurement points

Results

The contrasts in the breast between the s-s films (0.87 ± 0.29) and d-s film with adjusted tube voltage (0.96 ± 0.28) were no statistical significant ($p > 0.05$). However, the contrast in the breast between the s-s films (0.87 ± 0.29) and d-s films (1.17 ± 0.35) were statistically significant ($p < 0.01$). In addition, the contrast in the breast between the d-s films (1.17 ± 0.35) and d-s films with adjusted tube voltage (0.96 ± 0.28) were also statistically significant ($p < 0.01$) (Fig. 3). The tube voltage for s-s film and d-s film with adjusted tube voltage was increased from 26.3 ± 0.15 kV to 27.2 kV ± 0.16 kV. to adjusted optimized tube voltage (Fig. 4).

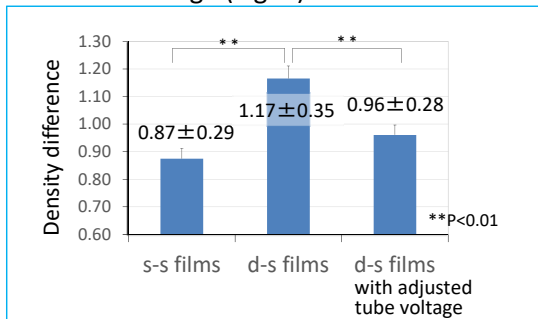


Fig. 3 The contrasts in the breast.

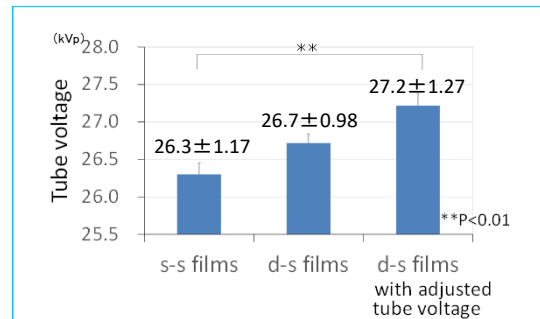


Fig. 4 The tube voltage

Conclusions

To adjust contrast in the breast of the d-s film was same as s-s film, tube voltage should be increased 1 kV. Therefore, the similar contrast image in the breast was obtained by using d-s film.

References

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