281P | **Effect of thioredoxin 1 quantity detection to complement the mammography in breast cancer diagnosis**

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Background: Breast cancer is one of the leading cancers for women worldwide. Mammography is the most widely used to screen breast cancer, although it is inaccurate in young women or women with dense breasts in Korea and Asian countries. Since tumor cells are often under extremely high oxidative or hypoxia, it is widely accepted that Trx1 express high level in malignant cells. Trx1 as a biomarker in blood for breast cancer detection by studies of Trx1 gene and protein expression differences in many malignant tissues and bloods from various cancer patients. It has been shown that gene expression level of Trx1 was the highest in breast cancer tissue among many different cancers in contrast to the lowest in normal breast tissue. Therefore, it would be interesting to examine whether the quantitation of Trx1 from blood could be a tool to detect breast cancer and to complement mammography.

Methods: We have developed an ELISA kit quantitating Trx1. Trx1 levels of bloods from 116 normal healthy women, 140 confirmed breast cancer patients with stage from 0 to 4, and each 30 confirmed patients of lung, ovarian, gastric, colorectal, and cervical

cancer have been estimated by the kit. The test results were analyzed by ROC curve, one-way ANOVA test, and unpaired t-test.

Results: The mean value of Trx1 level from normal women was 7.506 (U/mL) and that from breast cancer patients was 37.75. The Trx1 level clearly differentiated breast cancers from normal cases with sensitivity of 96.4% and specificity of 99.1% (AUC 0.990, $p < 0.001$). Each level of Trx1 from lung (16.7), ovarian (15.50), gastric (15.66), colorectal (16.39), and cervical (22.51) cancer was below the cut-off value (22.8 U/mL) for breast cancer detection. We compared normal women to breast cancer patients' Trx1 levels and BI-RADS categories. Among the normal women, the false positive rate of mammography was 26% whereas that of Trx1 quantitation was 1%. Among the breast cancer patients, the false negative rate of mammography was 24.82% and that of Trx1 quantitation was 3.76%.

Conclusions: These results indicated that the blood level of Trx1 quantitation estimated by the ELISA kit could be an effective and specific modality to detect breast cancer from blood and also could complement current limits of mammography for small and dense breasts.