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**Title:**

Quality control study of image registration in 40 breast cancer MR imaging patients using Confirma CADstream software

**Purpose**

To evaluate registration of breast cancer MR images using Confirma CADstream software

**Methods and materials:**

Forty subjects were selected retrospectively from a consecutive series of breast cancer MR imaging patients (Siemens Symphony 1.5 Tesla, both breasts, fat saturation, axial, 348 x 512 matrix, 1.6 mm slice thickness, 88 slices). One pre- and five post-contrast one minute series' were obtained. Patients were coached to remain motionless.

Women with different breast sizes were excluded. Ten patients were selected in each of four cup size groups. Patient identifiers were removed from all images. Uncorrected subtracted images were generated by the Syngo Siemens software package at time of study acquisition. Subtracted images corrected for registration were generated by the Confirma CADstream software package. Uncorrected and corrected subtraction images were randomized as to order of evaluation.

All evaluations were scored on a 4 point scale. Unsubtracted images were evaluated for intrinsic motion artifact. Corrected and uncorrected subtraction images were blindly evaluated for skin, vessel/duct, and tissue registration artifact (false positive, false negative, and margins), compared to unsubtracted images. Uncorrected subtraction images were blindly compared directly to corrected subtraction images, and the one thought to be better registered was recorded. Registration artifacts were described.

**Results:**

Intrinsic motion artifact was not significant in 22 cases, mild in 17 cases, and moderate in 1 case. Of 360 evaluations, more artifacts were seen on uncorrected (18) than on corrected (8) images ( $p < 0.01$ ). In 37/40 cases (92.5%), the corrected subtraction series was chosen as better registered; in 1 case (2.5%) the uncorrected series was chosen, and in 2 cases (5%) no difference was seen. Three types of registration artifact were noted: skin, tissue, and dropout. The first two were well corrected by the registration process. No significant artifacts were noted to have been introduced by the registration process.

**Conclusion:**

In a well coached population of breast cancer MR imaging patients, registration significantly reduced the small number of artifacts observed, in comparison to unsubtracted images. When corrected subtraction images were blindly compared directly to uncorrected subtraction images, artifact was seen to be reduced by registration in 37/40 patients, increased in 1/40 patients, and was not different in two patients. No additional artifact was noted to have been produced by registration.

**Acknowledgement:** UCSD is a research site for Confirma, Inc., and we are grateful for the loan of a system for evaluation before planned purchase.