

A Comparative Study Of Mammography Versus Breast MRI

In demonstrating the extent of high grade ductal carcinoma in situ (DCIS).

Background

DCIS was once a rarely seen disease which was treated by mastectomy following clinical presentation with a mortality rate of 2% at 10 years¹. Breast screening has led to an increase in diagnosis, particularly of smaller lesions, resulting in more cases being treated with Breast Conserving Surgery (BCS). However since this change patients treated with BCS have shown a much higher recurrence rate which could affect mortality². This suggests that the true extent of HG DCIS is not being identified using traditional imaging methods preoperatively and not being fully excised³.

Breast MRI (bMRI) has shown a very high sensitivity for the assessment of invasive breast cancer though it is inconclusive for DCIS⁴. Developments in MRI technology and scanning protocols have lead to further studies in the use of bMRI for DCIS and demonstrated mixed results.

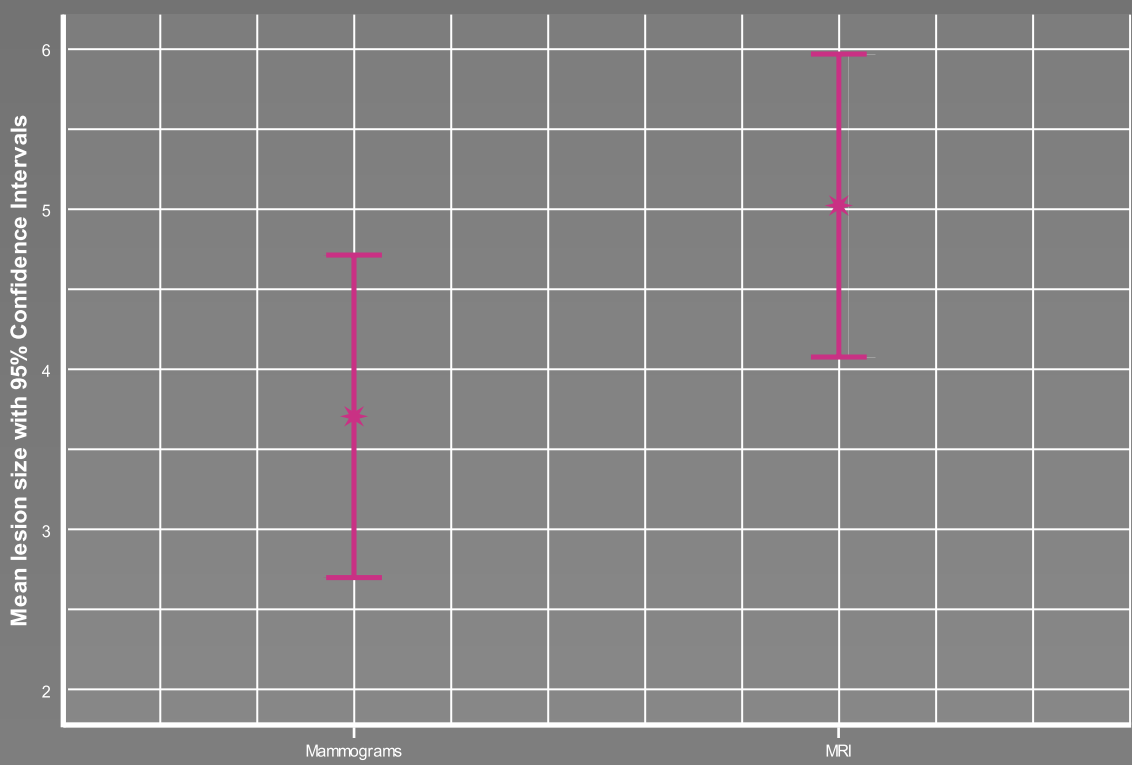
This study aimed to evaluate the use of bMRI in demonstrating disease extent for patients with core biopsy diagnosis of high grade DCIS in comparison to mammography using the pathological measurement of disease extent as the gold standard.

Methodology

34 patients from a district general hospital, with a core biopsy diagnosis showing high grade DCIS were retrospectively identified at random between July 2009 and June 2012. Ethical approval was obtained by NHS National Research Ethics Service.

Two-view analogue or digital mammography (FFDM) was done followed by bMRI using a Phillips 1.5T MRI scanner using a body coil. The abnormal area was measured in three planes x, y and z, to show the greatest dimensions, by two separate readers. In each case the greatest dimension was identified and the mean average measurement calculated. Data was entered into IBM SPSS 19. Frequency analyses, Pearson product moment correlations and matched pairs t tests were undertaken on the data.

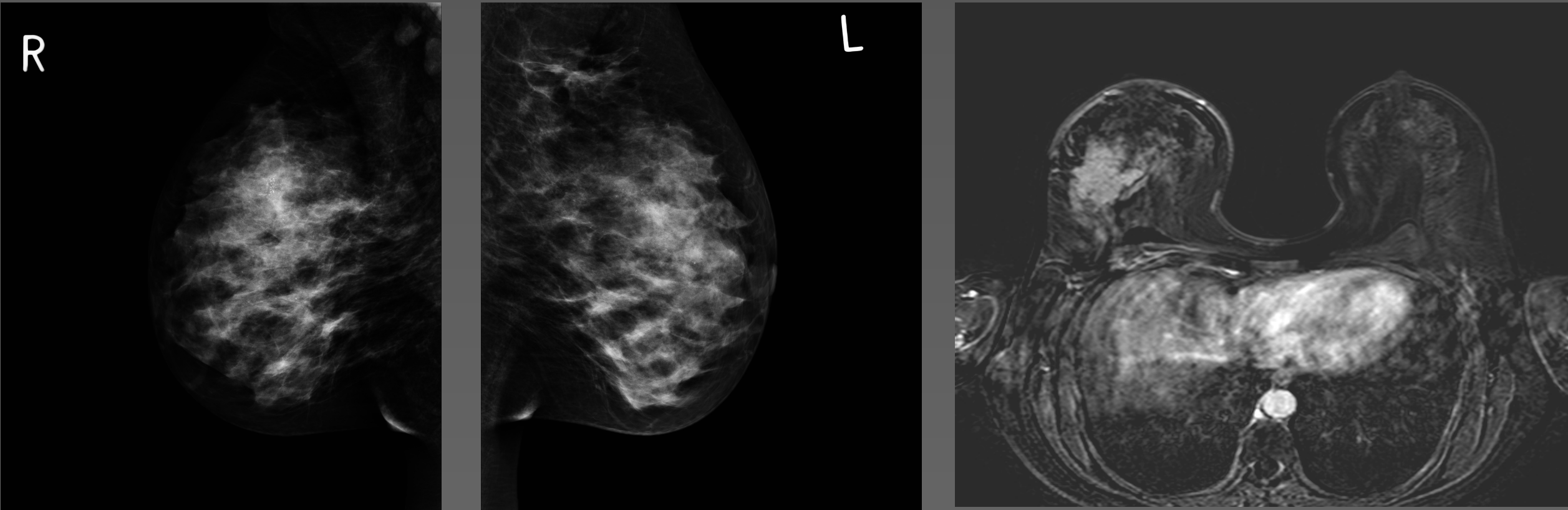
Results



The measurement of HG DCIS is more accurately shown using bMRI in comparison to mammography as a whole (analogue and FFDM) when compared with the pathological measurement of disease extent. Measurements using FFDM correlated to statistical significance with the pathological disease extent; no significant correlation is shown for analogue mammography.

The matched pairs t test demonstrated that bMRI provides far better correlation with the final surgical pathology measurements in comparison to mammography as a whole. The measurements given by FFDM were also found to be in correlation with bMRI but those done by analogue mammography were not.

In these cases many patients were shown to have greater disease extent shown by bMRI than mammography which led to mastectomy in 58% of the cohort.



Conclusion

bMRI demonstrated a more accurate measurement of disease extent when compared with mammography as a whole (analogue and FFDM).

Measurement of disease extent shown by FFDM was comparable to bMRI and concordant with pathological disease extent, whilst analogue mammography did not.

The type of surgery done related well to bMRI measurement of disease extent. i.e. the smaller lesions shown by bMRI had breast conserving surgery and the larger ones had mastectomy. This was not true for the measurement of disease extent shown by mammography, particularly analogue.

Without the use of bMRI in these cases more patients would have needed re-excision due to close or disease involved surgical margins due to mammography not showing the true disease extent.

Due to occult cases for each modality, neither can be used in isolation. If there is a significant discrepancy between these two imaging modalities, further confirmation is required by core or vacuum assisted biopsy prior to more extensive surgery or mastectomy.

References

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2. Dixon, J.M. and Page, D.L. (1998) Ductal carcinoma in situ of the breast. The Breast, 7(5), pp239-242.
3. Kim, D.Y., Moon, W.K., Cho, N., Ko, E.S., Yang, S.K., Park, J.S., Park, I., Cha, J.H. and Lee, E.H. (2007) MRI of the breast for the detection and assessment of the size of ductal carcinoma in situ. Korean Journal of Radiology, 8(1), pp32-39.