

PREOPERATIVE MRI MEASUREMENT OF INVASIVE BREAST CANCER POST-NEOADJUVANT CHEMOTHERAPY (NAC): COMPARISON WITH OPERATIVE HISTOLOGY IN A UK BREAST UNIT

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Background

Contrast enhanced MRI is the gold standard for assessing invasive breast cancer pre and post NAC. Accurate interpretation is required to evaluate response to NAC, to guide further patient management including surgery.

Aims

Our aim was to determine the relationship between invasive disease measurement at the post NAC preoperative MRI and at final excision pathology.

Methods

MRI workstation records identified all patients who underwent evaluation of breast cancer response to NAC between October 2012 and June 2018

- 43 month retrospective analysis of these records was performed
- Inclusion criteria:
 - Patients who underwent evaluation of breast cancer response to NAC
- Exclusions:
 - Incomplete data available
 - Any residual disease that was non-invasive at final pathology when the biopsy proven cancer site is excised.
- The largest MRI residual tumour dimension recorded was compared with largest measurement documented at final operative pathology
- Where there was invasive and non invasive disease the largest invasive tumour dimension was recorded
- Regression analysis was performed.

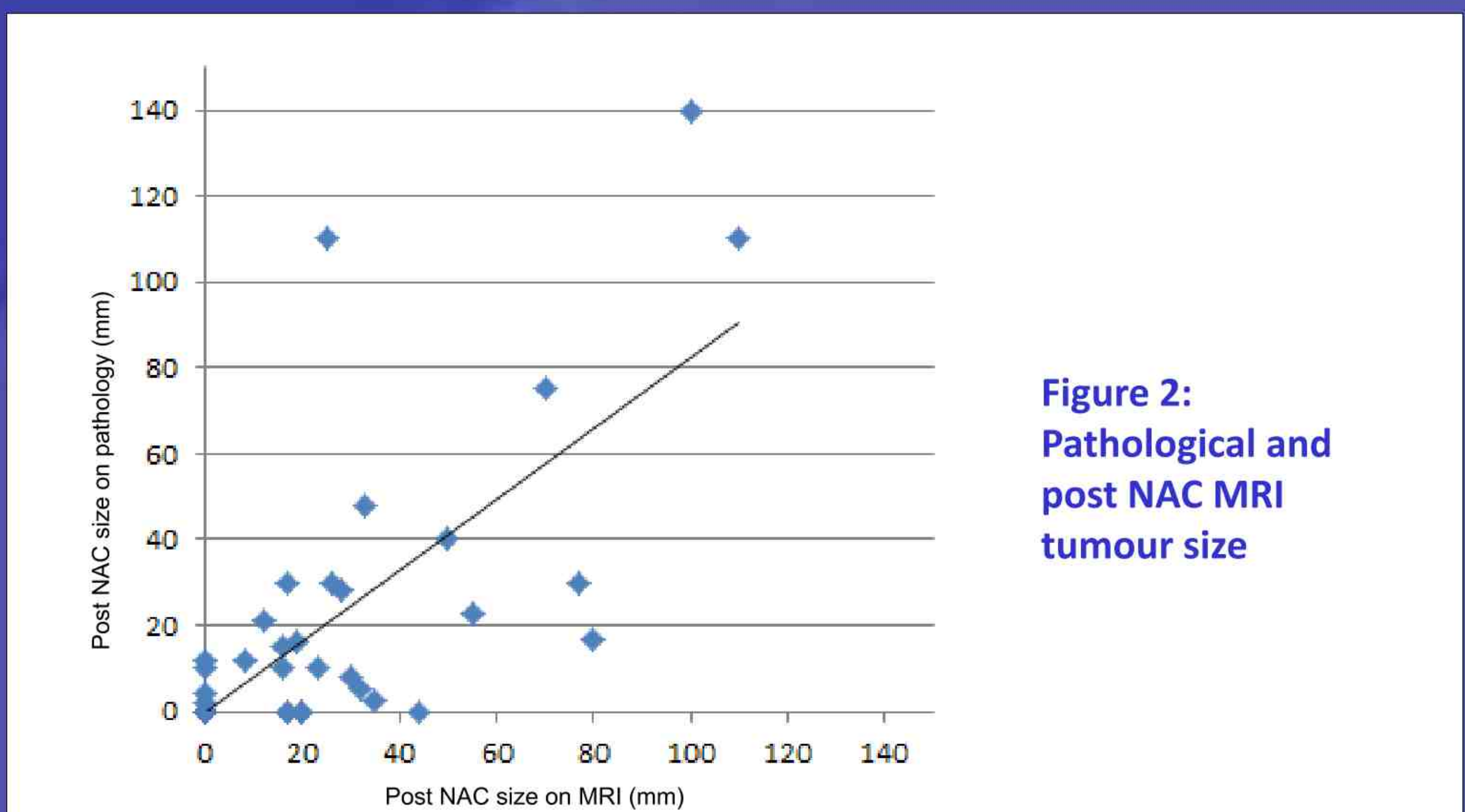
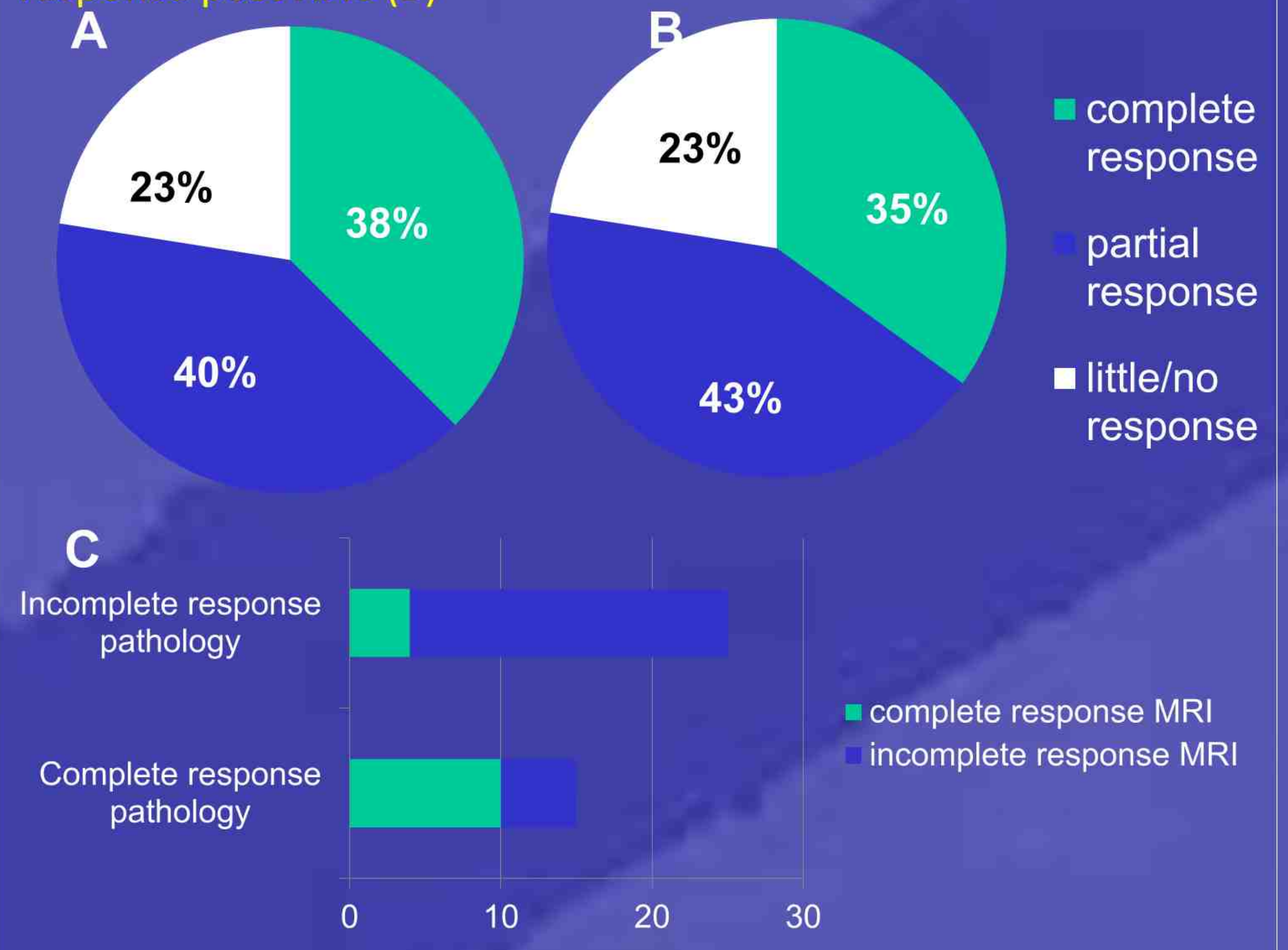
Results

Of 66 patients undergoing an MRI for NAC, 40 patients were included for analysis

25% (10/40) exhibited complete response on both MRI and surgical pathology, 15.5% (5/40) exhibited complete response on pathology but not MRI, and 10% (4/40) had complete response on MRI but residual disease on pathology. Fig 1 (C) shows correlated results for complete response on MRI and pathology.

Results continued

Figure 1: Pathological response from final histology (A) and MRI response post NAC (B)



The longest dimension of residual invasive malignancy on MRI correlated with final histological tumour size ($r^2=68\%$, $p=0.00001$), but MRI tended to overestimate disease. (Fig 2) There was no significant difference in MRI performance between tumour grades 2 and 3 ($r^2=0.73\%$ grade 2, $r^2=0.70\%$ grade 3) (Fig 3) or ER status (negative $r^2=0.63$, positive $r^2=0.66$); correlation between MRI and pathology measurements was greater for HER2 negative disease ($r^2=0.76$) than positive disease ($r^2=0.53$).

Figure 3: Pathological response related to tumour grade

Tumour grade	Complete response	Partial response	Little/no response
grade 1	0	2	0
grade 2	8	8	5
grade 3	7	6	4
Total	15	16	9

Conclusion

In conclusion, although contrast enhanced breast MRI post NAC is an effective means of predicting size and presence of residual invasive disease at surgical excision, it has a tendency to overestimate disease.