**Rational Use of MRI in Clinical Stage 2 Breast Cancer**  
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### Background:
Patients with clinical stage 2 breast cancer present management challenges regarding sequencing of treatments, and the option of breast conserving surgery (BCS). Patients may be offered neoadjuvant therapy, or proceed directly to surgery. MRI is often added to the diagnostic workup, presumably to look for extent of ipsilateral disease, as well as for any contralateral disease. We postulated that if MRI is beneficial in this subgroup, we should see:

1) an increase in the use of BCS in patients who undergo MRI after diagnosis,
2) a decrease in recurrence, and
3) a high positive predictive value (PPV) for any occult contralateral disease.

### Methods:
This retrospective analysis identified all clinical stage 2 breast cancer patients treated at our institution from 2008-10, stratified by MRI use after diagnosis, and by use of neoadjuvant therapy, excluding certain subgroups (age>70, BRCA, males, prior breast cancer diagnosis, LCIS, nonsurgical). Groups were compared for BCS versus mastectomy, and locoregional recurrence. In patients with MRI, additional suspicious findings were noted, and pathology results analyzed.

### Results:
Results are tabulated. The groups were similar in age, average cT, average tumor grade, and average followup. Whereas in the non-MRI group, BCS was used more often after neoadjuvant therapy, the BCS rate was only 26% in the MRI group, whether neoadjuvant treatment or not. Locoregional recurrence was similarly low for both groups. In patients with MRI only before neoadjuvant therapy, only 3 of 26 (8%) had BCS. In patients with MRI after neoadjuvant therapy 7 of 12 (58%) had BCS. The PPV for MRI identifying contralateral cancer was 21%.

**Abstract #394**
Supported by a grant from the Georgia Cancer Coalition through the Georgia Cancer Distinguished Scholar Program

### Conclusions:
In the current context of multidisciplinary prospective management of the clinical stage 2 breast cancer patient, the surgeon has a primary priority to assure locoregional control in a cosmetically acceptable BCS procedure whenever feasible, or recommend mastectomy instead. Our study demonstrates that MRI actually is associated with a much lower BCS rate, unless it was done in the setting of neoadjuvant therapy, specifically after completion of treatment. Furthermore, with such a low PPV for the contralateral breast, MRI delivered unfounded anxiety and added procedures more often than true positive results.

We recommend that surgeons decide early on whether BCS can be an option for a clinical stage 2 breast cancer patient. If not, then MRI has little benefit as a routine test, since mastectomy will be the outcome regardless, and historical data establishes a very low likelihood of contralateral disease. If BCS is an option, or could be after neoadjuvant therapy, MRI may play a role in assessing response to treatment, before a final recommendation for BCS or mastectomy.