**BACKGROUND:** Margin status is one of the most important predictors for local recurrence following breast cancer surgery. An accurate preoperative imaging staging, allowing the correct assessment of disease extent, helps to plan an appropriate surgical treatment, reducing the re-excision rate and its consequences.

**PURPOSE:** The aim of this study was to evaluate the re-excision rates of patients with newly diagnosed breast cancer, who underwent Breast-Conserving Surgery (BCS) after the preoperative staging with multimodal imaging [including Digital Mammography (DM), Digital Breast Tomosynthesis (DBT), Ultrasound (US), Breast MRI].

**MATERIALS AND METHODS:** A retrospective study was conducted on 1548 consecutive surgical treatments in patients with newly diagnosed breast cancer, treated in our Breast Centre between January 2010 and December 2016. Patients undergoing neoadjuvant chemotherapy were excluded. Based on the preoperative imaging modalities, patients were divided into 4 groups:
- **Group A:** DM+US
- **Group B:** DM+DBT+US
- **Group C:** DM+US+MRI
- **Group D:** DM+DBT+US+MRI

They were also sub-grouped on the basis of the surgical treatment that they had: BCS versus mastectomy.

For patients who underwent BCS, the re-operation rate was determined by the presence of positive surgical resection margins at pathology, considered as gold-standard. All cases were discussed at the Multidisciplinary Breast Meeting. A statistical analysis was performed comparing the re-excision rates among the 4 groups (Chi-square test, Fisher’s exact test). Statistical significance was set at p<0.05.

*Patients underwent MRI according to EUSOMA guidelines for preoperative cancer staging*

**RESULTS:** Out of 1548 surgical treatments, 892 (57%) were BCS: in 88/892 (9.9%) cases, a surgical re-excision was performed. Based on the preoperative imaging modalities, the reoperations rates were:

- **12.2%** (56/460) in Group A
- **10.1%** (12/119) in Group B
- **6.1%** (6/99) in Group C
- **6.5%** (14/214) in Group D

Overall, patients undergoing MRI (C+D Groups) had a re-excision rates of 6.4% (20/313), significantly (p=0.015) lower than patients in A+B Groups [11.7% (68/579)], who did not undergo preoperative MRI, with a statistically significant difference for T1* (p=0.009) and T2* tumors (p=0.001), but not for Tis* (p=0.48).

Patients who underwent MRI (C+D Groups) had a lower re-operation rate than Patients who had only DM (Group A) (6.4 vs 12.2%; p=0.01) and DBT (Group B) (6.4% vs 10.1%; p=0.27), but for the latter the difference was not statistically significant. Patients undergoing DBT (Group B) had lower re-excision rate than those having DM only (Group A) (10.1% vs. 12.2%, respectively), although no statistically different (p=0.63).

**DISCUSSION:** The addition of DBT in the preoperative breast cancer staging has been already investigated, reporting encouraging results for tumor detection and size assessment, implementing conventional breast imaging modalities, such as DM and US. Although MRI is increasingly being used in the preoperative evaluation of breast cancer for its high sensitivity in detecting ipsilateral and contralateral occult lesions, there are still controversial results regarding its impact on the reduction of reoperation rate and on the margin status.

In our study, the re-operation rate in Patients who underwent MRI was statistically significant lower than in Patients who underwent only conventional imaging, although the statistical significance was not confirmed versus Group B (DM+DBT+US).

Our study has some limitations: it is a retrospective monocentric observational study, non randomized and with different sample sizes of the patients groups.

**In conclusion**, in our experience, patients undergoing MRI in addition to conventional imaging had a significant reduction in the re-excision rate, particularly in T1 and T2 tumors. The use of DBT with respect to DM decreased the reoperation rate, although not statistically significant.