

# Added value of Contrast Enhanced Mammography (CEM) in staging of malignant breast lesions – a feasibility study

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## SUBJECT AREAS

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*Breast cancer, preoperative staging, contrast enhanced mammography, CEM, contrast enhanced spectral mammography, CESM*

## Abstract

**Objectives:** The aim of this feasibility study was to evaluate the added value of contrast enhanced mammography (CEM) in preoperative staging of malignant breast lesions, beyond standard assessment with digital mammography and ultrasound, as a base for a future prospective randomized trial.

**Materials and methods:** Fifty patients, with confirmed or strongly suspected malignant breast lesions after standard assessment (digital mammography (DM) and ultrasound (US)), scheduled for primary surgery, were invited to undergo CEM as an additional preoperative procedure. The primary endpoint was change in treatment plan defined as mastectomy instead of partial mastectomy or contrariwise, bilateral surgery instead of unilateral or neoadjuvant treatment instead of primary surgery. Accuracy in tumour extent estimation compared to histopathology was evaluated by Bland Altman statistics. Number of extra biopsies and adverse events were recorded.

**Results:** The study cohort consisted of 47 patients. In 10/47 (21%), findings from CEM affected the treatment plan. Agreement with histopathology regarding extent estimation was better for CEM (mean difference -1.36, SD +/- 18.45) in comparison with DM (-4.18, SD +/- 26.20) and US (-8.36, SD +/- 24.30). Additional biopsies were taken from 19 lesions in 13 patients. Nine biopsies showed malignant outcome. No major adverse events occurred.

**Conclusion:** Feasibility of preoperative additional CEM was found to be excellent without any serious negative effects. Results imply an added value of CEM in preoperative staging of breast cancer.

Further evaluation in larger prospective randomized trials is needed.

## Full-text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed.

However, the manuscript can be downloaded and accessed as a PDF.

## Figures

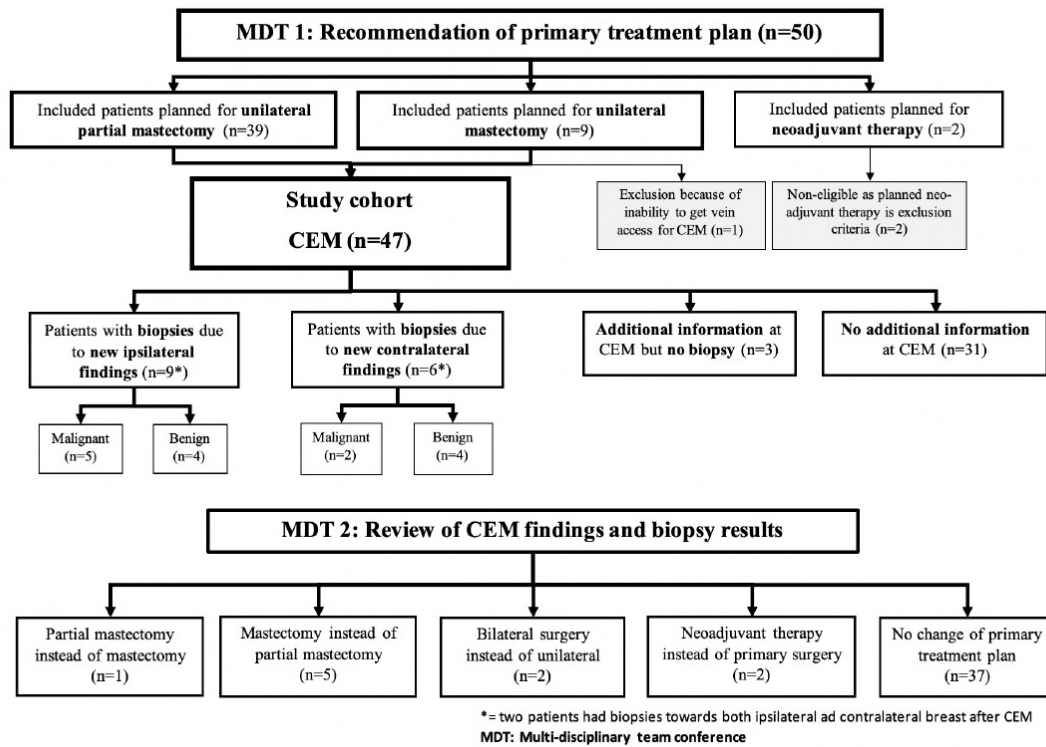
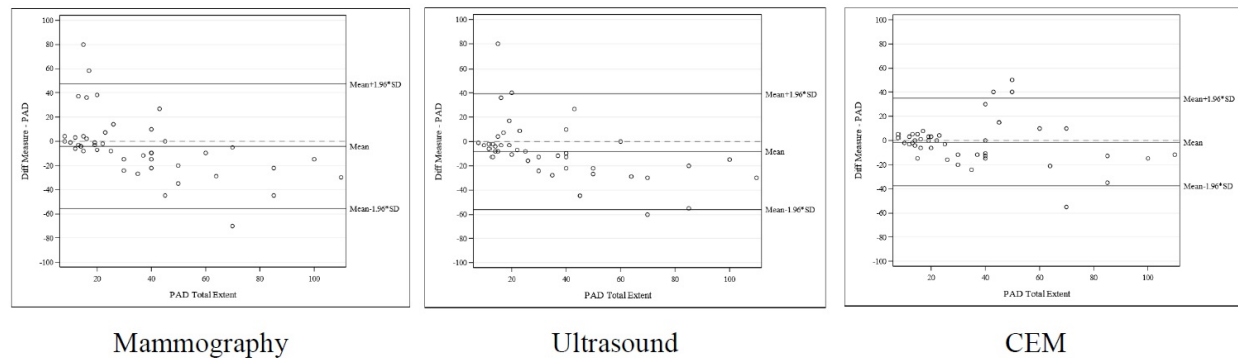


Figure 1

Flowchart of how the treatment plan was affected by CEM related findings and biopsies



Mammography, US and CEM images were compared to histopathological extent (used as the reference value. Mean difference for mammography measurements: -4.18 mm (95% LOA -55.534 to 47.179 mm), US: -8.14 mm (95% LOA -55.977 to 39.266 mm) and CEM: -1.36 mm (95% LOA -37.52 to; 34.812 mm).

CEM: Contrast Enhanced Mammography, LOA: Limits of agreement, PAD: Pathological anatomical diagnosis.

Figure 2

Bland-Altman plots: Estimated extent by mammography, ultrasound and CEM compared to histopathology (PAD) Mammography,

