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Original Article

Role of low dose state of multislice CT mammography in the evaluation of postoperative and post-radiation changes

Naglaa Abdel Razek *, Ahmed Ezzat Essa

The Radiology Department, Faculty of Medicine, Cairo University, Egypt
The Medical Oncology Dept, Faculty of Medicine, Ain Shams University, Egypt

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ABSTRACT

Detection of recurrence of breast cancer after conserving breast surgery and radiotherapy still represents a challenge because of changes in breast tissue after treatment. The aim was to assess the value of Multislice CT mammography in the detection of recurrent breast cancer in patients with previous conservative surgery and radiotherapy. *Subject and Methods:* The study included 126 consecutive patients with breast cancer treated with conservative surgery and radiotherapy. CTM scans were evaluated by morphological and dynamic characteristics. CTM diagnosis was compared with histology results. *Results:* MD-CTM findings were compared with histology in 126 patients. CT mammography (CTM) showed 80% sensitivity, 99% specificity, 97% positive predictive value and 92% negative predictive value for detection of recurrence on the surgical.

1. Introduction

Breast conservation therapy has gained acceptance as treatment for limited disease due to breast cancer. Recurrence of breast cancer lesions on the surgical scar after conservative surgery and radiation therapy has been reported to occur in at least 1–2% of cases per year [1,2]. The proper follow-up of these patients usually includes periodic clinical examination, mammography and ultrasonography [3]. Detection of recurrence on the prior lumpectomy site still represents a challenge because of changes in breast tissue after treatment. Clinical examination, mammography or ultrasonography can raise a suspicion but an additional evaluation is frequently mandatory to avoid unnecessary biopsy or surgery [4].

2. Purpose

The purpose of this study was to determine whether dynamic CT mammography using 64-slice MDCT could assist in differentiating between fibrotic postoperative scar and cancer recurrence in patients underwent breast conserving surgery.

3. Material and method

A prospective study was conducted after ethical committee approval.

Abbreviations: Bl-RADS, Breast Imaging Reporting and Data System; MD-CTM, multidetector CT mammography; CTM, CT mammography; AGD, average glandular dose (AGD); FNB, fine needle biopsy; CNB, core needle biopsy; OB, open biopsy.

* Corresponding author at: Radiology Dept, Faculty of Medicine, Cairo University, Egypt.
E-mail address: naglaabdelrazek@yahoo.com (N. Abdel Razek).
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Contrast enhanced MDCT mammography was performed in 126 female patients with previous breast conserving surgery, having a fibrotic postoperative post radiation indeterminate scar (classified as BIRADS 3 or 4 on mammography and ultrasonography).

3.1. The technique of radiotherapy

In the present study, the 3D conformal radiotherapy plans consisted of two opposed tangential beams of 6–10 MV energies. Patients are usually placed in the supine position on an angled breast board with one or both arms stretched above the head. The position of the patient is kept similar in treatment and simulation. The patient is placed on an angled breast board to correct the sloping of the sternum. In addition to these tangential fields, regional nodal irradiation is given when needed. Multi-leaf collimation (MLC) was used to shield the heart and the lungs. 30–45 degrees physical and dynamic wedges were used when indicated. A total dose of 40–42.5 Gy in 5–10 fractions plus a boost dose of 10–16 Gy in 4–8 fractions were used when indicated (see Fig. 1).

3.2. The technique of MSCT

The optimal method for creating 3D-MDCT tumor images was determined after the first 10 patients (learning set). We used the state of the art 64-multidetector CT (Aquilion)-Toshiba system.

- The patients were scanned in the prone position using especially designed CT-compatible home-made fitting device of cardboard and urethane sponges simulating the MR-designed breast coils. The examination was performed in 5 phases: first phase was a precontrast scan to assess for microcalcification. Second phase was performed after 30 s from the start of contrast injection of a total amount of 100 ml non-iodinated contrast at

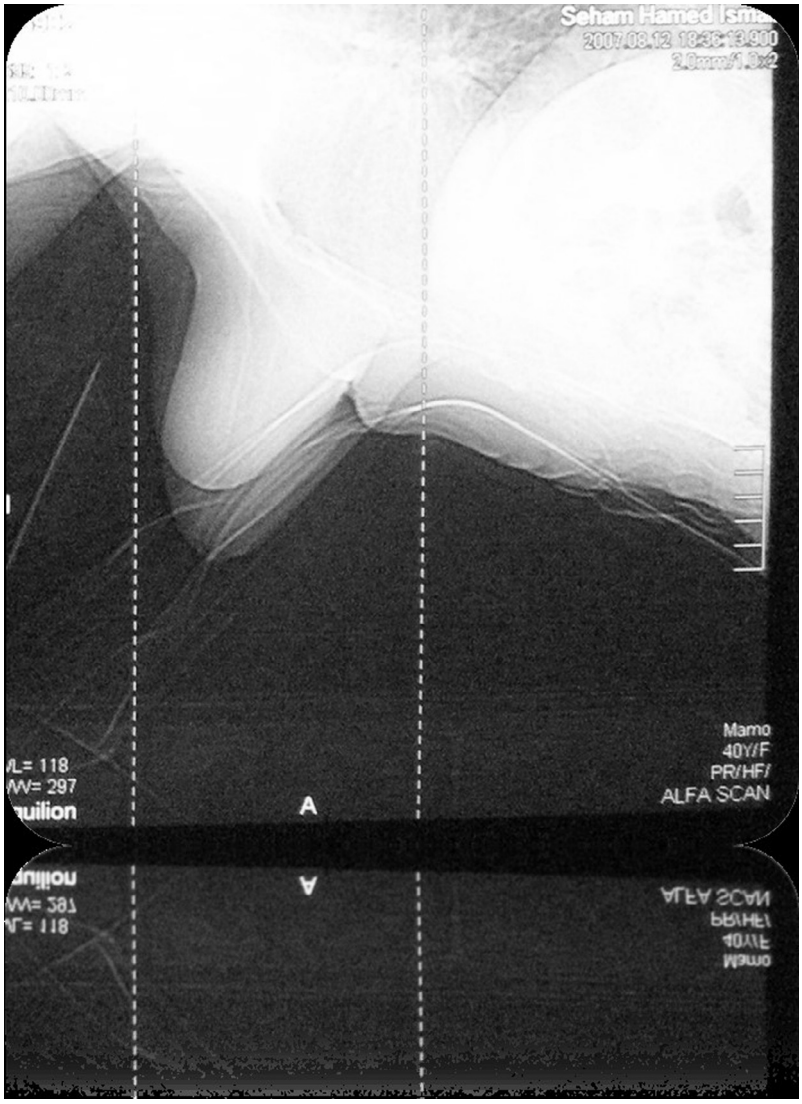

Fig. 1. Patient position within the CT gantry.