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Case

51 year old female who originally underwent left mastectomy for intermediate grade ductal carcinoma in situ (DCIS) and moderately to well differentiated invasive ductal carcinoma with transverse rectus abdominus myocutaneous (TRAM) flap reconstruction and adjuvant chemotherapy, maintained on Arimidex. 4 years post-operatively she underwent screening mammogram which demonstrated fine linear branching calcifications in the central region anteriorly which underwent stereotactic biopsy with histopathologic diagnosis of high grade DCIS. She underwent left partial mastectomy of the TRAM flap and flap closure advancement. She remains on tamoxifen and there is no mammographic evidence of recurrence 1.5 years later.

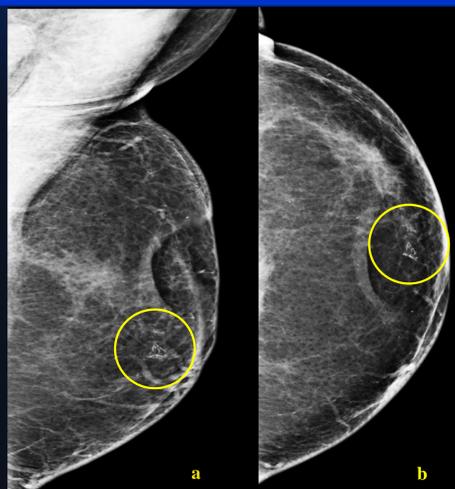


Figure 1. Screening mammogram demonstrates linear calcifications on MLO (a) and CC (b) views.

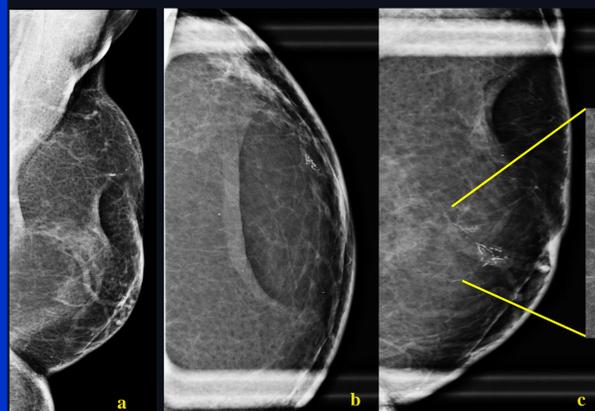


Figure 2 (left). Straight Lateral (a) and spot magnification views in the LCC (b) and LM (c) projections show linear branching calcifications in the TRAM flap.

Post-TRAM surveillance

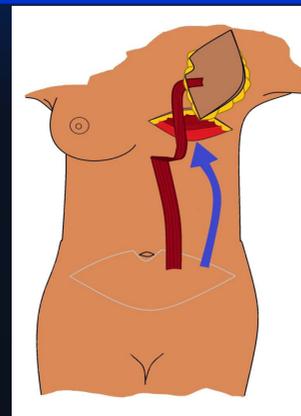
Mammographic imaging of TRAM flaps is controversial issue, with some studies supporting it (4, 7, 9) and other opposed (8). Lee et al observed that in 264 patients who had undergone TRAM flap reconstruction, the rate of detection of recurrent nonpalpable cancer with mammographic screening was 0%, with a 95% confidence interval (CI) of 0.0% to 1.4% (8). About half presented with either stage 0 (DCIS) or stage 1 cancer at diagnosis. Routine screening of breast reconstructions is less effective than mammographic screening of asymptomatic women in their 40's.

In the supporting studies, patients with extensive DCIS and invasive cancer showed the most benefit with a 1.9% mammographic detection rate for recurrent cancer (9). Extensive DCIS and invasive cancer were present in 2 of the 3 patients with recurrence. Previous studies have also shown a high frequency of extensive DCIS as the original malignancy in TRAM recurrence (9). Interestingly, the 95% CI of this study overlaps with the study done by Lee et al, suggesting that more studies need to be done before a definitive conclusion can be made in regards to the efficacy of post-reconstruction mammographic screening (8).

TRAM Flap Reconstruction

Autologous myocutaneous flaps are a common method for breast reconstruction following mastectomy in patients with breast cancer and involve transposition of skin, fat, and muscle from other parts of the body to the chest for breast reconstruction. The TRAM flap is most commonly performed.

The TRAM flap procedure involves a modified abdominoplasty, in which an ellipse of lower abdominal skin and fat is moved on a musculovascular pedicle to reconstruct the breast (2). These procedures can be performed on single, bilateral, ipsilateral or contralateral pedicles (1). Advantages include an abundant volume of skin and fat for reconstruction, long term durability, no synthetic materials and radiolucency, allowing for better mammographic imaging (3, 4).



Mammography of TRAM

Normal mammographic findings in TRAM flaps have a predominantly fatty appearance with variable density due to the muscle component and postoperative scarring (1). The muscle component is seen more frequently on the mediolateral oblique view (6) anterior to the pectoralis muscle (6). Surgical clips are visualized posteriorly (1). There are six predictable radioopaque lines that correspond to surgical scars from the reconstruction, which have been described by Loyer et al (6) [See below].

Mammographic imaging of TRAM flaps has been a controversial issue (4, 7, 9, 8). In the studies that support it, the type of cancer that is most likely to benefit from post-TRAM flap screening mammography is multifocal DCIS (9).

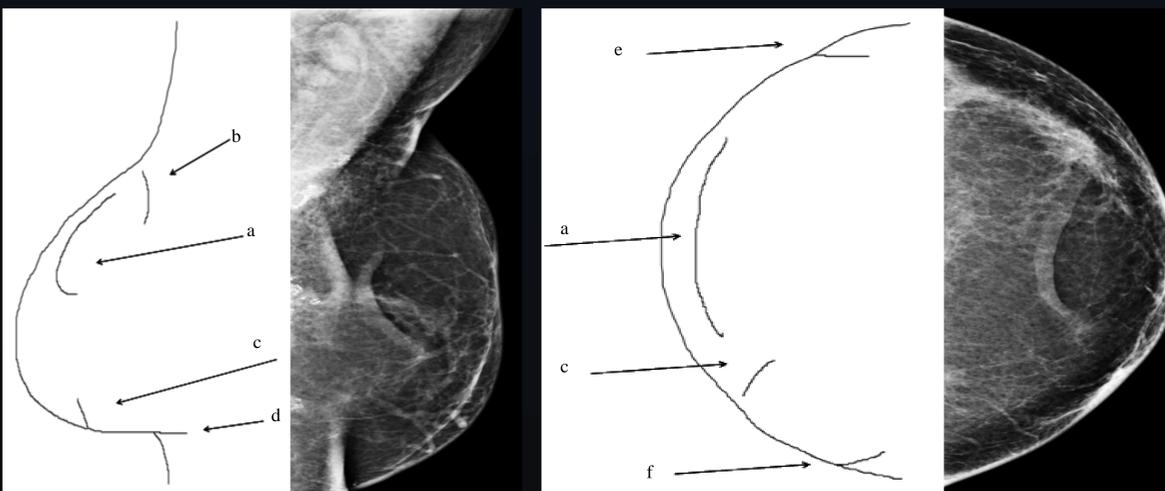


Figure 3. MLO (a) and CC (b) diagram of potential post-surgical lines following TRAM flap and corresponding mammographic image of our patient following original mastectomy and TRAM flap.

- a. Superior line of flap: May be seen on both MLO and CC
- b. Lateral edge of flap: Occasionally seen on MLO
- c. Sutured Umbilicus defect: Can be seen on both MLO and CC
- d. Inferior edge of flap: Only seen on MLO
- e. Lateral edge of flap: Rarely seen on CC
- f. Medial edge of flap: Rarely seen on CC

MRI of TRAM

MRI may also be a beneficial adjunct to TRAM flap imaging. MRI is superior for visualization of the normal TRAM flap appearance and for differentiating between benign and malignant changes (10). The normal MRI appearance includes replacement of the normal glandular breast tissue with lower abdominal fat and the presence of atrophied rectus abdominis muscle along the anterior chest wall (11). There is a thin curvilinear line that parallels the breast contour, and represents the de-epithelialized layer of the lower abdominal tissue (11). This line separates the native chest wall anteriorly and the abdominal wall fat posteriorly (11). Many benign lesions associated with reconstructive surgery, such as fat necrosis, may mimic carcinoma on imaging (10). Other benign features include skin thickening, a seroma or hematoma, and fibrosis (11).

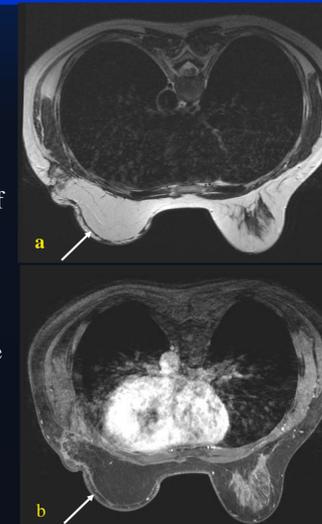


Figure 4. Axial FSE T2W (a) and post-gadolinium MRI (b) of left TRAM flap with de-epithelialized layer of lower abdominal tissue (arrows).

CT of TRAM

Patients may also undergo CT post-operatively. The normal changes visualized in CT include a predominance of fat attenuation as opposed to the irregular soft-tissue attenuation of fibroglandular tissue mixed with fat seen in the native breast (12). Similar to MR findings, a thin curvilinear soft tissue band is seen, which represents de-epithelialized skin from the abdominal wall (12). This band, as in MR imaging, separates the superficial native chest wall fat from the deep, transposed abdominal wall fat and the thickness may correlate with presence of infection, inflammation, or recurrent breast cancer (12). Recurrence of cancer should be strongly suspected when a soft tissue mass is present within this band (12).

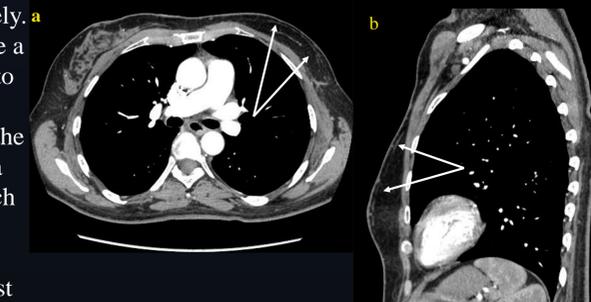


Figure 5. Axial (a) and Sagittal (b) CTA for pulmonary embolism demonstrates left TRAM flap and thin band of de-epithelialized skin (arrows).

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