

The follow-up of post-mastectomy patients: Should the ipsilateral side be assessed with both mammogram and ultrasound?

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ABSTRACT

Aim: This study aimed to determine findings of axillary view mammogram (MMG) and ultrasound (USG) of the ipsilateral side in post-mastectomy patients and to document difficulty level in performing the axillary view and patients' pain level during the procedure.

Methods: Post-mastectomy patients who had MMG and USG on follow-up during an 18-months period were included. The MMG and USG findings of 183 patients were reviewed and histology results were recorded when available. Radiographers' difficulty and patients' pain level during the axillary view MMG were charted.

Results: On MMG, 172 cases were normal, eight cases were benign (Category 2) and three cases indeterminate (Category 3). On USG, 175 cases were normal, three cases were benign (Category 2) and five cases indeterminate (Category 3). Malignant lesions detected in two out of 183 patients (1%) were metastatic carcinoma in bilateral axillary lymph nodes and leiomyosarcoma at the mastectomy site. These two cases were Category 3 on USG with negative MMG findings. In majority of cases (79%), the radiographer had no difficulty performing the axillary view compared with contralateral MMG. Majority of patients (80%) experienced similar pain during axillary view compared to contralateral MMG.

Conclusion: Follow-up imaging of post-mastectomy patients should include (i) USG of the mastectomy site, both axillary regions, and the contralateral breast, and (ii) MMG of the contralateral side. Ipsilateral axillary view MMG is not necessary.

KEY WORDS:

Post-mastectomy, axillary view, mammogram, ultrasound, follow-up

INTRODUCTION

The early detection of local recurrence following mastectomy improves the chance of disease control and increases the opportunities for curative therapy. Physical examination is very important as local recurrence frequently involves the chest wall or skin.¹ However, it is not sufficient for the

evaluation of regional lymph nodes and for lesions deep to the surgical scar. Ipsilateral axillary view mammogram (MMG) is useful for assessing the axillary lymph nodes but not the mastectomy site while ultrasound (USG) is useful for assessing both sites.²⁻⁴

At the authors' institution, post-mastectomy patients had bilateral MMG and USG assessment. The axillary mediolateral oblique view was performed for the ipsilateral side. However, this axillary view was difficult to perform, painful to the patient, and involved exposure to ionizing radiation. The authors had raised the questions if dual assessment with MMG and USG were necessary for the ipsilateral axilla and if USG examination alone would suffice as it was easier to perform, painless and lacked ionizing radiation. Therefore, the aim of this study was to determine if ipsilateral MMG and USG in post-mastectomy patients were necessary. The authors aimed to determine the axillary view MMG and USG findings of the ipsilateral side in post-mastectomy patients, and to compare these findings with histology when available. The authors also aimed to ascertain the level of difficulty in performing the axillary view MMG and the level of pain felt by patients who underwent the examination.

MATERIALS AND METHODS

This study involved all patients who had undergone mastectomy and had MMG and USG on follow-up during an 18-month study period at the Radiology Department of the authors' institution. This study was a retrospective review and therefore informed consent for the data analysis in this study was waived by the institutional ethics committee.

For the initial nine-months, a 7.5 MHz linear array transducer was used (Siemens Sonoline G20 Imaging System; USA) and film-screen MMG was performed using Siemens Mammomat 300. For the subsequent nine-months, following up-grading of equipment, a 14MHz high frequency linear transducer was used (Siemens Acuson S2000 Ultrasound System; USA) and MMG was performed using the Hologic LORAD Selenia full field digital MMG machine.

The standard craniocaudal and mediolateral oblique views of the contralateral breast were performed. Positioning for the

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Table I: MMG and USG findings in post-mastectomy patients

MMG / USG Findings	Number detected on MMG (%)	Number detected USG (%)
Category 1	172 (94%)	175 (95%)
Category 2	8 (4%)	3 (2%)
Category 3	3 (2%)	5 (3%)
Category 4	0 (0%)	0 (0%)
Total	183	183

Table II: Category 2 lesions detected on MMG and USG

Findings	Number of cases detected on MMG	Number of cases detected on USG
Scattered calcifications	2	0
Vascular calcifications	2	0
Macrocalcification	3	0
Axillary lymph node with benign features	1	
Total	8	3

Table III: Category 3 lesions detected on MMG and USG

Case No.	Lesion	MMG Category	USG Category	1. Histology 2. Follow-up
1	Ipsilateral axillary lymph node	3	3	1. Biopsy tissue unsatisfactory 2. Benign features on follow-up USG
2	Ipsilateral axillary lymph node	3	3	1. No malignant cells
3	Bilateral axillary lymph nodes	1	3	1. Metastatic carcinoma bilaterally
4	Nodule at mastectomy site	1	3	1. Leiomyosarcoma
5	Ipsilateral axillary lymph node	2	3	Lost to follow-up
6	Microcalcifications	3	1	1. No biopsy 2. Noted as skin calcifications on follow-up

ipsilateral axillary view was performed with the patient's arm in abduction, approximately 90° perpendicular to the body. A 45° anteroposterior oblique view of the axilla was then obtained. Subsequently, the patient had bilateral USG by a radiologist-in-training in the MMG suite to assess the mastectomy site, chest wall, axilla, and the contra-lateral breast and axilla.

To standardise the findings, the 5-point breast imaging classification system was used. For both MMG and USG Category 1 is normal, Category 2 indicates a benign lesion, Category 3 is probably benign or indeterminate, whereas Categories 4 and 5 are suspicious of malignancy and highly suspicious of malignancy respectively.

The radiographer had been instructed to record how much difficulty was involved in performing the axillary view using a 3-point difficulty level classification: Level 1: Required similar examination time compared with contralateral side, Level 2: Needed longer examination time compared with contralateral side, and Level 3: Too difficult to perform, required repeat imaging. The radiographer recorded how much pain the patient felt using a 3-point pain level classification: Level 1: Similar pain experienced as with contralateral MMG, Level 2: More pain experienced compared with contralateral MMG, and Level 3: Unbearable pain.

RESULTS

All post-mastectomy patients seen at the authors' institution for follow-up imaging during the 18-months study period were included. There was a total of 183 patients aged between 22 and 78 years with a mean age of 53 years. The majority of patients (44%, n=80) were aged between 50-60 years and only 15% (n=28) were aged less than 50 years.

On MMG (Tables I to III), 172 cases were reported as normal, eight cases were categorised as benign (Category 2), and three cases as indeterminate (Category 3). On USG (Tables I to III), 175 cases were reported as normal, three cases were categorised as benign (Category 2), and five cases as indeterminate (Category 3).

A total of six patients had Category 3 classification on either MMG or USG or on both modalities (Table III and Figures 1 to 6). These Category 3 lesions either had percutaneous biopsy or short-interval imaging follow-up. Malignant lesions were detected in two out of 183 patients (1%). These lesions were detected solely on USG and were occult clinically and on MMG. One patient (Figure 3) was proven to have metastatic carcinoma of bilateral axillary lymph nodes on histology. This patient had right mastectomy for infiltrating ductal carcinoma three years prior. The other patient (Figure 4) was proven to have leiomyosarcoma at the mastectomy site. This patient had right mastectomy for infiltrating ductal carcinoma six years prior. She had received chemotherapy and radiotherapy.

In majority of cases (79%, n=145) the radiographer had no difficulty (Level 1) in performing the axillary view compared with the mammogram of the contralateral side. In only 21% of cases the radiographer had Level 2 (19%, n=35) and Level 3 (2%, n=3) difficulty. The majority of patients (80%, n=147) experienced similar pain (Level 1) as with the contralateral side. Only 20% of the patients experienced Level 2 (13%, n=24) or Level 3 (7%, n=12) pain.

DISCUSSION

Breast cancer patients require routine follow-up after primary treatment. Surveillance is necessary to detect early recurrence as treatment is more effective the earlier the recurrence is detected. In a study which reported 9% locoregional recurrence, 78% of patients presenting with locoregional recurrence without evidence of distant disease were rendered disease free with aggressive multimodality therapy.¹ Patients who had early detection of recurrence before the onset of symptoms had better survival when compared with patients who were symptomatic because of late detection of recurrence.⁵

Ipsilateral lymph node recurrence was found to be a predictor of distant metastasis in asymptomatic patients.² Distant metastases were found more frequently in patients with ipsilateral lymph node recurrence (62%) than in those without (2.3%) (P <0.0001).² In our study, a patient with bilateral abnormal axillary lymph nodes detected on USG proved to have axillary lymph node recurrence after USG-guided biopsy. This patient had right mastectomy for infiltrative ductal carcinoma three years prior. At the time of diagnosis, the liver USG and bone scintigraphy were normal but there was a right lower lobe lung nodule. Following mastectomy and axillary node dissection, histology showed that out of three axillary lymph nodes, one was positive for metastasis. Following confirmation of the bilateral axillary lymph node recurrence, re-staging of the disease showed multiple metastases in the lungs, liver and bones.

After mastectomy, axillary node dissection, and adjuvant chemotherapy, the chest wall and the supraclavicular nodes are the most common sites of local breast cancer recurrence.⁶ In the past, imaging had not been commonly used to assess the mastectomy scar site and axilla. This is probably because recurrent tumours to the chest wall can be detected on clinical examination. In post-mastectomy patients, only the

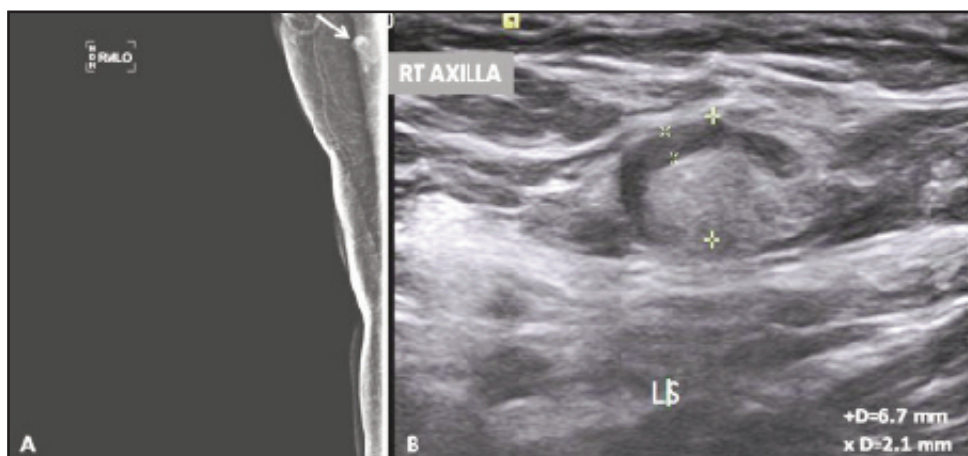


Fig. 1: Case 1, reported as Category 3 on both MMG and USG. A) The MMG showed a dense axillary lymph node (arrow). B) The USG showed an axillary lymph node with thickened cortex. The biopsy tissue was unsatisfactory for histology assessment. However, on follow-up ultrasound the lymph node was downgraded to Category 1.

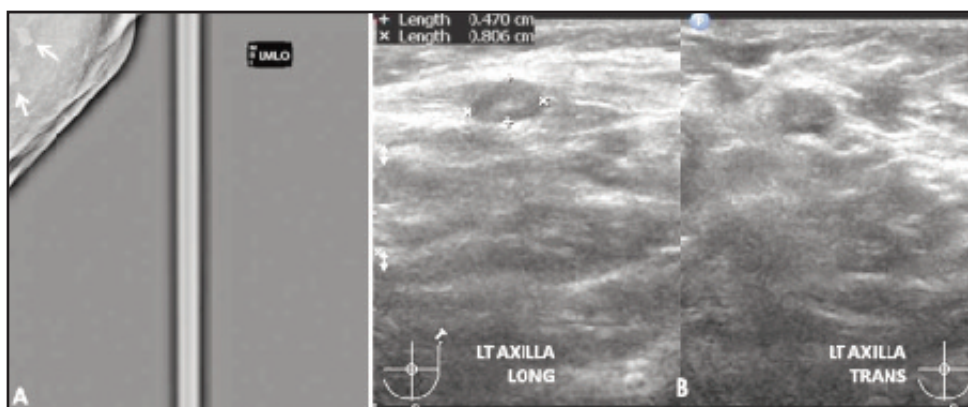


Fig. 2: Case 2, reported as Category 3 in both MMG and USG. A) The MMG showed axillary lymph nodes with no fatty hilum (arrows). B) The USG showed multiple axillary lymph nodes with thickened cortex. However, histology did not reveal any malignant cells within these nodes.

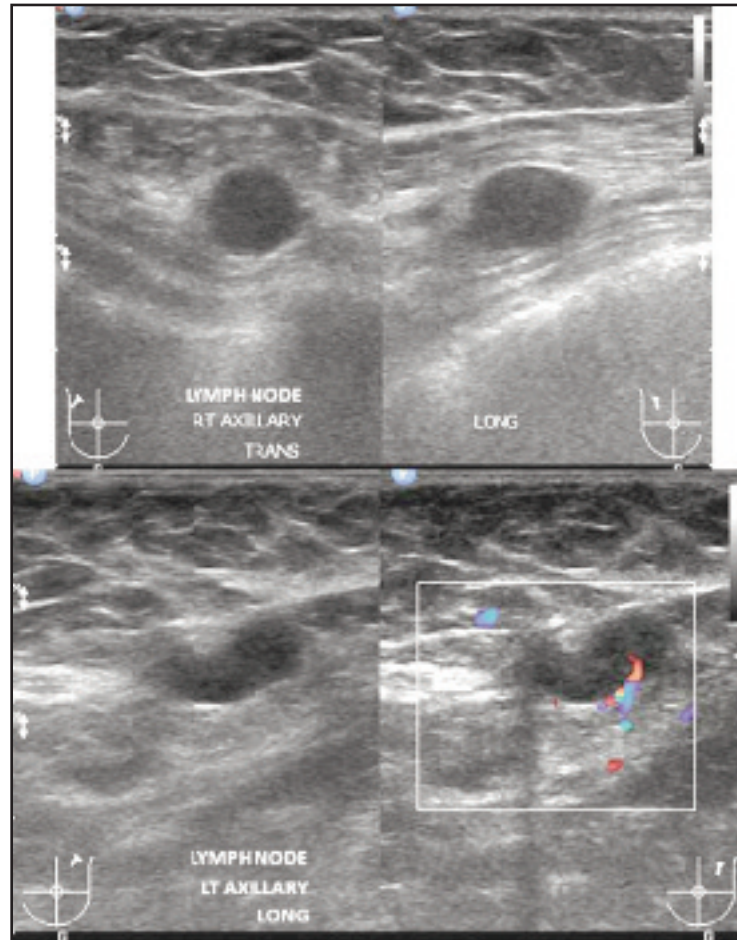


Fig. 3: Case 3, reported as Category 1 on MMG and Category 3 on USG. The USG showed bilateral axillary lymph nodes with no fatty hilum. The Doppler study showed a blood vessel entering directly into the lymph node parenchyma instead of via the hilum. Histology confirmed bilateral metastatic carcinoma.

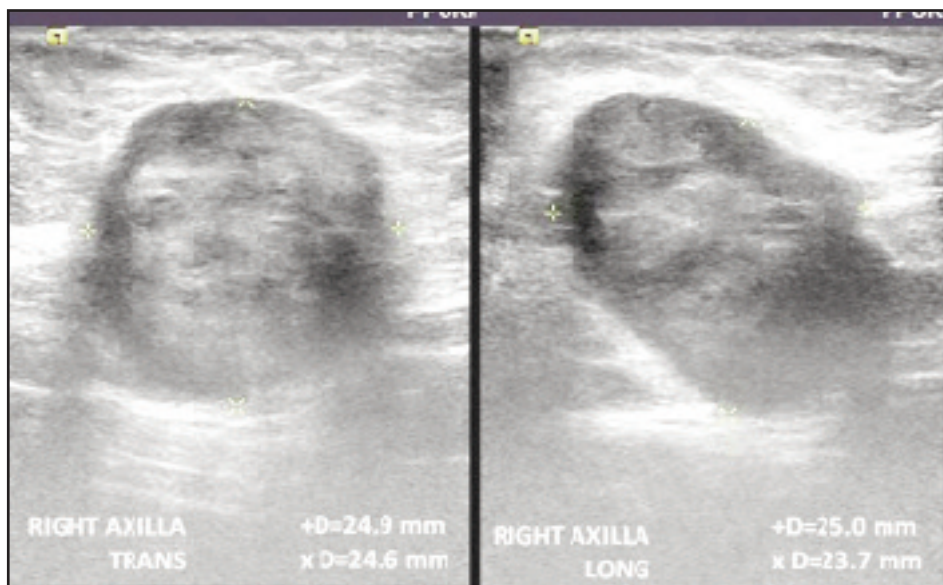


Fig. 3: Case 4, reported on USG as Category 3. There was an indeterminate lesion seen under the scar. Axillary view MMG of course did not include the mastectomy site. Histology revealed leiomyosarcoma.

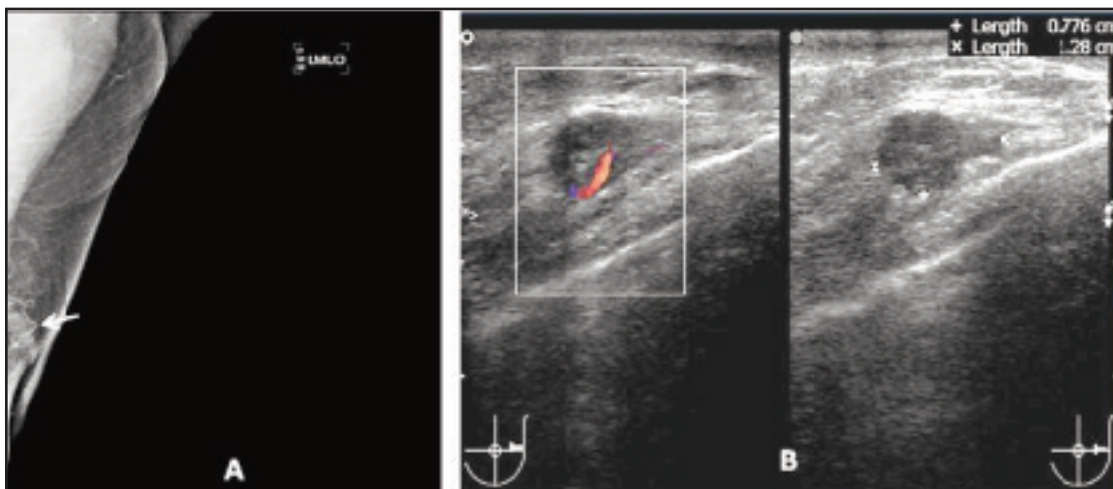


Fig. 5: Case 5, reported as Category 2 on MMG and Category 3 on USG. A) The axillary view showed vascular calcifications (arrow). B) USG showed axillary lymph node with no fatty hilum. This patient did not have any follow-up at authors' institution after the imaging. Biopsy was not performed.



Fig. 6: Case 6, reported as Category 3. Specks of non-clustered microcalcifications (arrows) noted in axillary view MMG. These were noted to be skin calcifications and downgraded to Category 2 on follow-up.

skin, subcutaneous tissue and pectoral muscles at the axilla are visualized on MMG. On USG, both the mastectomy site and the axilla can be assessed.^{7,8} Recurrent cancers appear as irregular, ill-defined, hypoechoic lesions with intra-tumoral vascularities on USG.⁵⁻⁸ Some of these lesions have the anteroposterior diameter larger than the transverse diameter. Metastatic lymph nodes show thickened cortex and the echogenic fatty hilum is absent or flattened.

The sensitivity of USG for the detection of local recurrence is superior to palpation and mammography.⁶ However, the yield of finding recurrent cancer with imaging in the asymptomatic patient is low. A study of 468 patients who had USG screening for the detection of nonpalpable locoregional recurrence after mastectomy showed 2.1% detection rate.⁸ In another study of 874 asymptomatic post-mastectomy patients, the detection rate of clinically occult locoregional occurrence was 1.7%.⁵ In a larger study involving 1968 post-surgery patients, 1.2% had recurrence in the regional lymph nodes, in the breast or at the mastectomy site that were occult both clinically and on MMG.⁴ In our study of 183 post-mastectomy patients, one patient had bilateral axillary lymph node recurrence resulting in a 0.5% detection rate of recurrence that was occult clinically and on MMG. Some authors believe it is not beneficial to screen asymptomatic post-mastectomy patients because of the low yield. Others believe imaging should be done because these patients are at high risk of disease recurrence and patients who had early detection of recurrence before symptoms occurred had better survival.⁵

In our study, a nodule detected at the mastectomy site on USG was proven to be leiomyosarcoma. The 52-year-old patient had right mastectomy for infiltrative ductal carcinoma six years prior when she was post-menopausal. She had received chemotherapy and radiotherapy. The leiomyosarcoma was considered to be a second malignancy. A study involving 5,248 women treated for breast cancer, reported an increased risk of second malignancies associated with radiotherapy for breast cancer, especially for women treated after menopause.⁹ The study reported that the relative risk for second cancers appeared to be highest for the 50 to 65 years age-at-treatment group during the period of five or more years after radiotherapy. The types of second malignancies included leukaemia and contralateral breast cancer.

Compared to MMG, USG has many benefits. It does not involve ionizing radiation, scanning can be done in multiple

planes, it shows real time images, is readily available and inexpensive, and in the event of a positive finding, it can be used to guide biopsy.⁸

In our study about one-fifth of axillary view MMG required a longer time to perform and about one-fifth of patients experienced more pain during the axillary view compared with the contralateral MMG. Although these numbers are small, these are significant findings especially since the axillary views did not detect any lesions that were of significance. At the completion of this study our institution stopped performing the ipsilateral axillary view.

CONCLUSION

Malignant lesions that were occult clinically and on MMG were detected by USG in 1% of post-mastectomy patients on follow-up. These were ipsilateral and contralateral axillary lymph node recurrence in one patient and a second malignancy at the mastectomy site in another patient. Although ipsilateral axillary view MMG was not difficult to perform in the majority and did not cause undue pain in the majority, it was of little value when compared to USG. The authors recommend that follow-up imaging of post-mastectomy patients should include (i) USG of the mastectomy site, both axillary regions and contralateral breast, and (ii) MMG of the contralateral side. Ipsilateral axillary view MMG is not necessary.

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