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Case Report

Multiple bilateral breast masses due to lymphoma metastases: A report of 2 cases highlighting the mammographic and sonographic features ☆,☆☆

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ABSTRACT

Metastases within breast usually occur due to a primary malignancy in the contralateral breast. Breast metastases from extra mammary malignancies are known to be very rare and the primary tumors are reported to be melanoma, lung cancer, gastro-intestinal primary tumors, neuroendocrine tumors, sarcomas, ovarian tumors and lymphomas. Breast lymphomas comprise 0.04%-0.7% of all cases of breast malignancies and may manifest either as a primary or a secondary variety. A primary breast lymphoma is known to be more infrequent than a secondary breast lymphoma. In patients with breast metastases the usual clinical presentation is with multiple palpable masses and imaging evaluation is the mainstay for initial diagnosis. We report the imaging features seen in 2 almost identical cases of secondary breast lymphoma. At mammography, multiple, round to elliptical, sharply circumscribed, high-density masses were seen, in which spiculation, calcification and architectural distortion were conspicuously absent. On sonography, these round /oval masses were homogenously hypoechoic, sharply circumscribed, showed a thin echogenic rim with posterior acoustic enhancement and were moderately to profusely vascular on color Doppler examination. These imaging features should suggest the possible diagnosis of metastases from a hematogenous malignancy and an ultrasound guided biopsy should be performed. Once the etiology of lymphoma is confirmed, a rigorous multi- modality imaging work up to identify the primary site, stage the disease and document other sites of dissemination is warranted.

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Fig. 1 – (Patient no. 1): Bilateral mammography in C-C (A) and MLO views (B) (performed at an outside clinic) shows bilateral, multiple, round to elliptical, sharply defined, very high density masses (red arrows).

Introduction

Metastases within breast usually occur due to a primary malignancy in the contralateral breast. Extramammary malignancy as a cause for metastases to the breast, however, are known to be very rare, due to poor vascularity in the fibrous tissue components [1,2]. The prevalence of the latter variety of metastases into the breast is reportedly between 0.5% and 6.6% of all malignant breast disease, with the primary tumors found to be melanoma, lung cancer, gastro-intestinal tumors, ovarian tumors, neuroendocrine tumors, sarcomas and lymphomas [2,3]. In an imaging review of breast lymphomas, Raj et al. reported that mammary lymphomas which comprise of primary and secondary varieties, have an extremely low prevalence, of approximately, 0.04%-0.7% of all breast malignancies [4]. Further, although the secondary variety of breast lymphoma has been less extensively reported than primary breast lymphoma, it is the most common metastasis to the breast [3,4].

We report the imaging appearances seen in 2 similar cases of secondary breast lymphoma, coincidentally encountered at 2 geographically distant institutions and attempt to highlight the leading imaging features. The first patient, a 52-year-old woman, was seen at a tertiary care teaching hospital in New Delhi, while the second one was a 91-year-old seen in a teaching hospital in New York. The clinical and imaging features were almost identical in both patients. In the first case the imaging diagnosis was accurately made on the initial presentation and biopsy, while in the second case the delayed diagnosis was due to misinterpretation of the initial biopsy obtained at an outside institution. The imaging approach was coincidentally identical in both the institutions. Mammography and sonography examination revealed characteristic imaging features which prompted an early image guided biopsy for lymphoma. This was followed by a rigorous work up to identify the stage, primary site and other sites of dissemination. The purpose of our report is to add to the existing knowledge on the rare entity of metastases to the breast, also to emphasize that these frequently occur due to lymphoma deposits and also to increase awareness of the characteristic imaging features of lymphoma metastases to the breast, which may facilitate early diagnosis in future cases.

Case reports

Case 1: Evaluated at author no 2's prior institute, New Delhi, India

A 52-year-old, immuno-competent female presented with a 2-month history of multiple, bilateral, painless, gradually enlarging breast masses. There was no history of nipple discharge, axillary swelling or other symptoms, nor was there a family history of breast cancer. Physical examination revealed cervical adenopathy and mild hepatomegaly in addition to the multiple fixed breast masses. The patient had a mammogram at an outside clinic which had shown bilateral, multiple, well circumscribed, non-calcified, high density, oval masses (Fig. 1); however, the attached radiology report was nonspecific.

Additional evaluation with sonography of both breasts and axillae was performed. The gray scale study showed multiple, bilateral, anti-parallel, hypoechoic, solid, round to oval masses, which were partially circumscribed and partially coalescing, with mild lobulations, located in all quadrants. Most of the masses showed a thin echogenic rim, posterior acoustic enhancement, however, architectural distortion and calcification were not found (Figs. 2 and 3). The color Doppler study revealed both internal and peripheral vascularity in most of

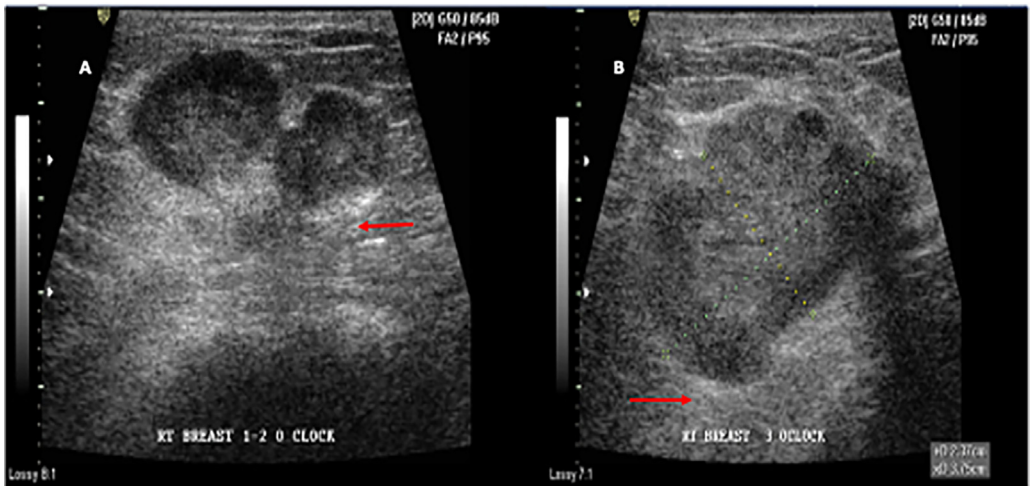

Fig. 2 – (Patient no. 1): Ultrasound of right breast 1-2 o'clock (A) and 3 o'clock (B) shows multiple solid, hypoechoic, sharply defined round to elliptical masses, few with gentle lobulations, which are in antiparallel orientation. The margins show a thin but well defined echogenic rim (red arrows). There is mild posterior enhancement in all the masses but no calcification is seen.

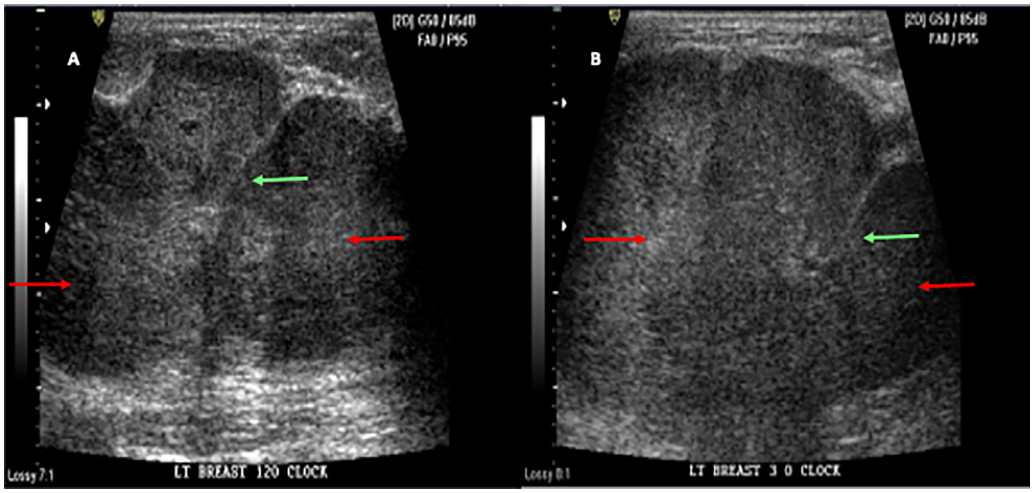

Fig. 3 – (Patient no. 1): Ultrasound of left breast at 12 o'clock (A) and 3 o'clock (B) shows multiple, solid, hypoechoic, partially circumscribed and partially coalescing masses, which are antiparallel in orientation (red arrows). The margins have a thin but echogenic rim (green arrows), posterior enhancement is seen but calcification is conspicuously absent.

the masses (Figs. 4 and 5). The pattern was dominantly of an arterial flow. On spectral analysis, a pattern of RI of 0.8 and a PI of 1.46 was documented in majority of the masses (Figs. 4 and 5). Normal morphology lymph nodes were seen in the axillae. BIRADS 5 category was assigned to both breasts. Correlation of the clinical presentation, previous mammogram and the current ultrasound study, all suggested multiple metastases in both breasts and in the cervical lymph nodes. A possibility of primary lymphoma in cervical nodes with metastases to the breast was also considered. Ultrasound of the abdomen showed hepatomegaly and a heterogeneous mass in the left lobe of the liver (Fig. 6A) with abdominal lymphadenopathy in pancreatic and left renal regions (Fig. 6B). The presence of large abdominal lymph nodes further reinforced the likely diagnosis of a primary lymphoma of cervical lymph nodes, causing multiple breast and abdominal lymph node metastases. An ultrasound guided Fine Needle Aspiration Cytology (FNAC) from a mass in the right breast, showed features of lymphoma (Fig. 7). A core biopsy of a representative mass in each breast was obtained (Fig. 8); a cervical lymph node was excised and the left hepatic lobe lesion was also biopsied. All 4 biopsies revealed Non-Hodgkin's lymphoma of large B cell variety and a final diagnosis of stage IV lymphoma, with a primary in the cervical nodes and metastases in the breast was arrived at. A complete staging of disease was done using whole body CT, as the patient's financial constraints precluded a PET–CT staging. Additional involvement of mediastinal lymph nodes was documented. A full chemotherapy -radiotherapy regime of treat-

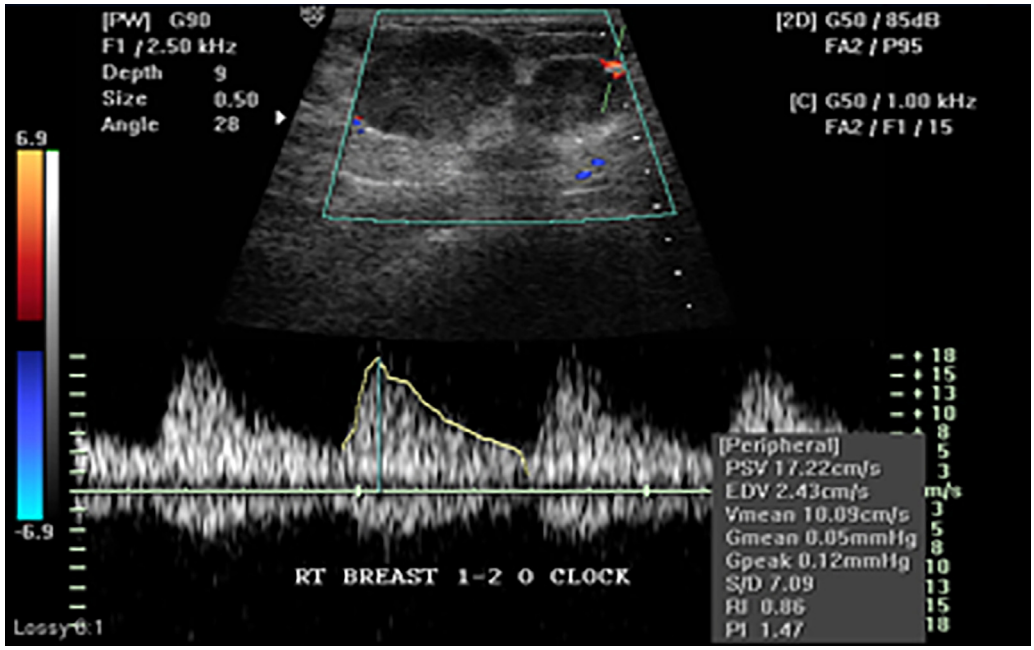

Fig. 4 – (Patient no. 1): Color Doppler in right breast, at 1-2 o'clock location shows peripheral vascularity, the pattern is of arterial flow. The RI is 0.8 and PI is 1.47, a feature suggesting malignancy.

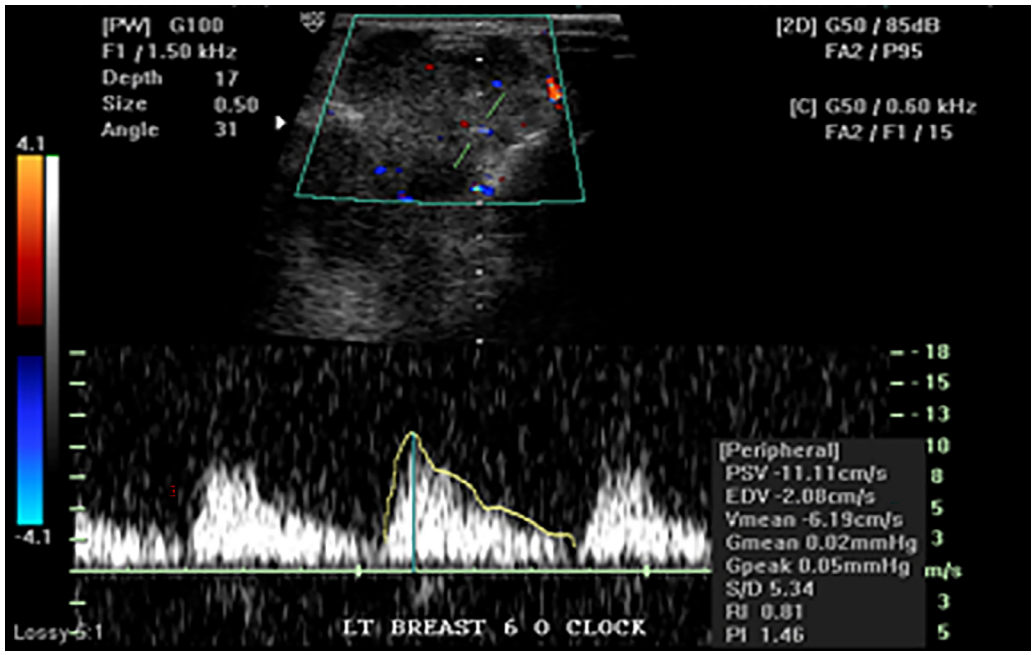

Fig. 5 – (Patient no. 1): Color Doppler in left breast, at 6 o'clock location shows peripheral vascularity, the pattern is of arterial flow. The RI is 0.8 and PI is 1.47, suggestive of malignancy.

ment was initiated immediately after the biopsy and CT, but the patient unfortunately succumbed within a few weeks of therapy.

Case 2: Evaluated at New York, USA

A 91-year-old female was referred for repeat biopsies of rapidly enlarging bilateral palpable breast masses. The patient denied any family history of breast or ovarian cancer or any major illness and any systemic symptoms. Review of mammograms and ultrasounds performed at an outside facility 4 months earlier for bilateral palpable masses was undertaken. Prior diagnostic mammography using digital breast tomosynthesis had been performed and demonstrated a circumscribed non-calcified hyperdense mass in the 9:00 clock position of the right breast and a focal asymmetry in the 2:00 clock position

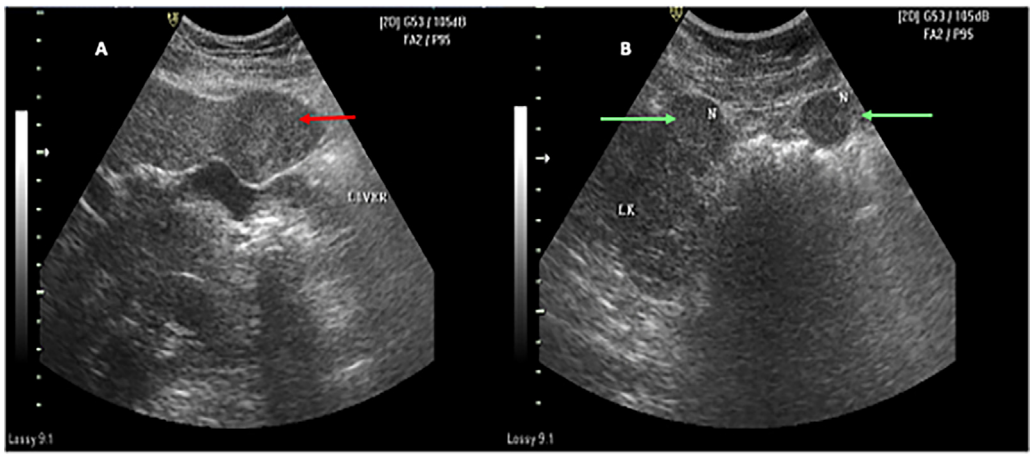

Fig. 6 – (Patient no. 1): Ultrasound of the abdomen shows a large mass in the left hepatic lobe (A, red arrow), with peri-pancreatic and para-renal lymphadenopathy (B, green arrows).

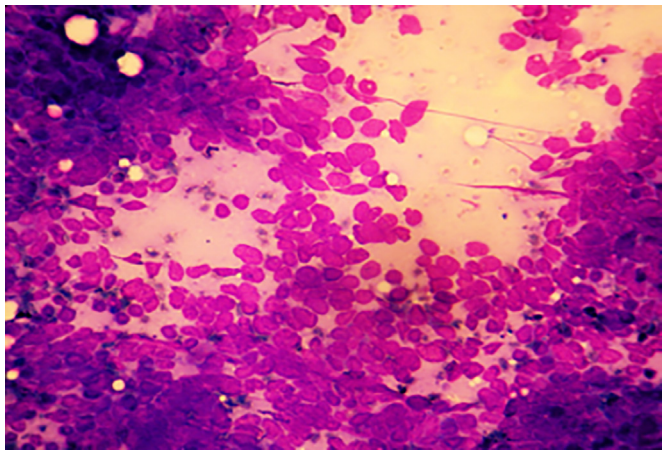

Fig. 7 – (Patient no. 1): FNAC smear from left breast lump stained with May-Graunwald Giemsa (MGG) stain, showing a dispersed monomorphic population of lymphomatous cells, with high nucleocytoplasmic ratio and scanty to moderate amount of cytoplasm. The nuclei show 1-2 conspicuous nucleoli (200×).

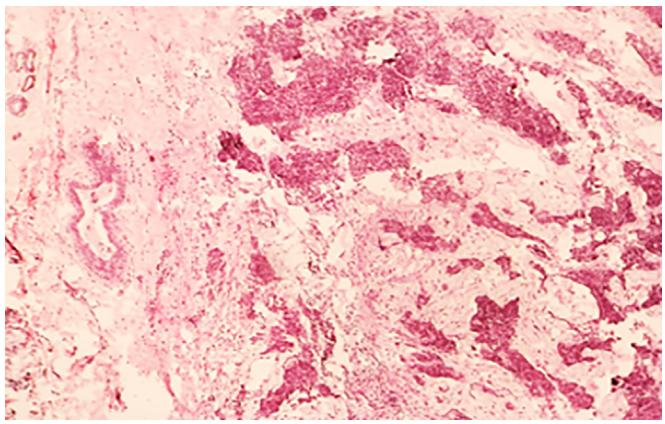

Fig. 8 – (Patient no. 1): Biopsy from right breast lump H and E stain, showing a normal breast parenchyma on left side of the field. The right side of the field shows breast parenchyma infiltrated by aggregates of large lymphomatous cells, with high nucleocytoplasmic ratio and scanty to moderate amount of cytoplasm (100×).

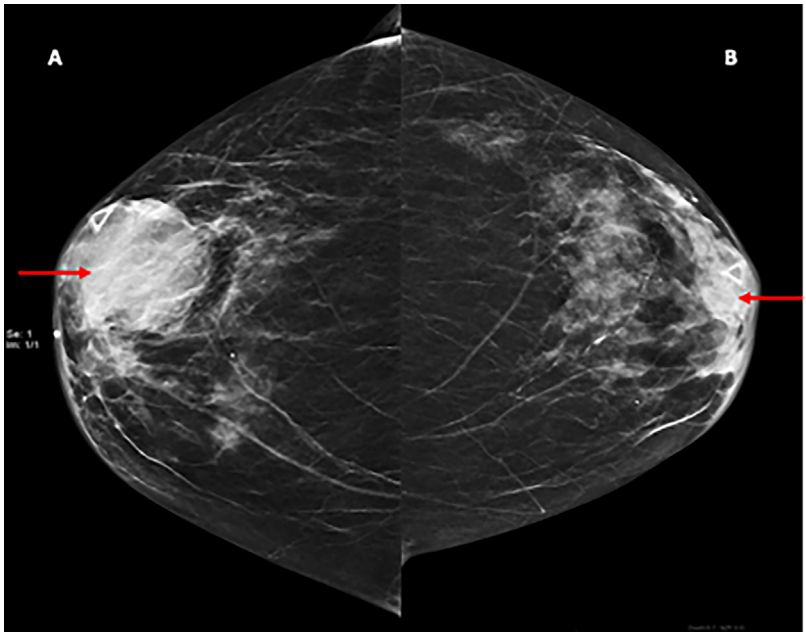

Fig. 9 – (Patient no. 2): Mammogram CC view, from outside institution showing a hyperdense mass in the right breast (A) at 9 o'clock position and focal asymmetry in the left breast (B) at 3 o'clock position (red arrows).

of the left breast, both corresponding to the palpable masses. There was no axillary lymphadenopathy (Fig. 9). Bilateral ultrasound had revealed well circumscribed oval masses in the right breast 9:00 position and in the left breast 3:00 position with posterior acoustic enhancement and internal vascularity which corresponded to the palpable masses and mammographic findings. FNAC of the palpable masses performed at the same outside facility was reported as poorly differentiated carcinoma (insufficient for receptors but suggestive of triple negative carcinoma) and the left palpable mass was reported as benign. A review of prior imaging studies was considered as discordant with the recorded pathology results.

Due to rapid enlargement of the masses and discordant pathology results, the patient reported for repeat diagnostic evaluation and biopsies. The reasons for interim absence from medical care were unclear. At presentation, the patient reported mild pain and tenderness in both breasts, no fever, night sweats or weight loss. Physical examination revealed a palpable, hard and fixed mass, of approximately 7 × 8 cm in the upper outer quadrant of right breast, which involved the overlying skin, manifesting as ulceration. Multiple, surrounding satellite skin lesions were palpable. The left breast revealed a 3 × 4 cm retro-areolar palpable mass, fixed to the skin. The left nipple was inverted and bilateral axillary adenopathy was present.

A repeat bilateral mammogram and ultrasound were both performed, prior to undertaking the prescribed biopsies. Digital Breast tomosynthesis demonstrated an increase in size of the hyperdense mass in the right breast which was now spanning from 9:00 to 12:00 and was associated with a new abnormality of overlying skin thickening in the peri-areolar region. The left breast revealed an oval hyperdense mass at the site of prior asymmetry in the 3:00 position of the left breast, which had increased in size (Fig. 10). New bilateral axillary adenopathy was also documented (MLO image not shown). Ultrasound of both breasts was performed. At the right breast 9 o'clock location, 3 new masses had developed and the original mass showed an interval increase in the size. These masses in the right breast were solid, multiple, partially circumscribed, partially coalescing, oval, heterogeneously hypoechoic, with parallel orientation and showed dense posterior acoustic shadowing. On color Doppler, internal vascularity with low venous pattern flow, was seen in these masses of the right breast (Fig. 11). In the same location, surrounding interlobular edema and overlying skin thickening was evident (Fig. 12). The left breast 3 o'clock showed a solid, heterogeneously hypoechoic, sharply circumscribed mass with parallel orientation, which had angular margins with posterior acoustic shadowing. On color Doppler, low flow internal and peripheral vascularity was seen (Fig. 13). Bilateral axillary lymph nodes were enlarged and markedly hypoechoic, with complete loss of hilar echogenicity (Fig. 14). These imaging appearances, correlated with evidence of disease progression, suggested a possibility of malignancy and BIRADS 5 category was assigned to both breasts. The clinical history and imaging features suggested metastatic disease to the breast and axillae from an occult hematogenous malignancy such as lymphoma. Ultrasound-guided core biopsies with a hand-held 14 gauge needle were performed of the right breast 9-12 o' clock mass, left breast 3 o'clock mass and of a single abnormal lymph node in each axilla. Two cores were placed in formalin and Roswell Park Memorial Institute Medium (RPMI). Pathology and immunohistochemistry evaluation, yielded a Non-Hodgkin's aggressive large B-cell lymphoma from all biopsy sites (Figs. 14–16) and the flow cytometry result (Fig. 17) supported the biopsy result. A final diagnosis of secondary lymphoma metastases to

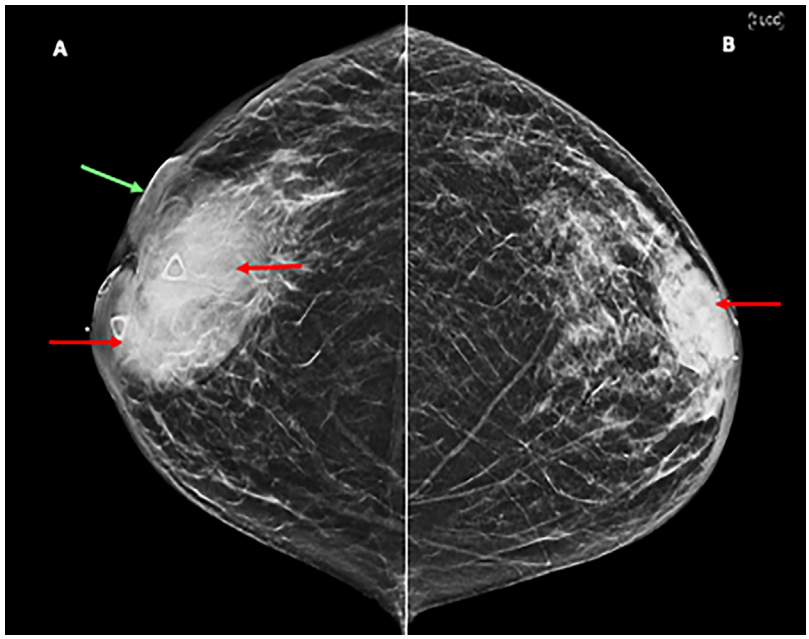

Fig. 10 – (Patient no. 2): Diagnostic mammogram CC view, performed at our institution after 4 months showing interval increase in size of the right breast mass (A) extending from 9:00 to 12:00 (red arrows) inseparable from adjacent skin thickening (green arrows), and interval development of a distinct, oval hyperdense mass at the site of previously visualized asymmetry in the left breast (B, red arrows).

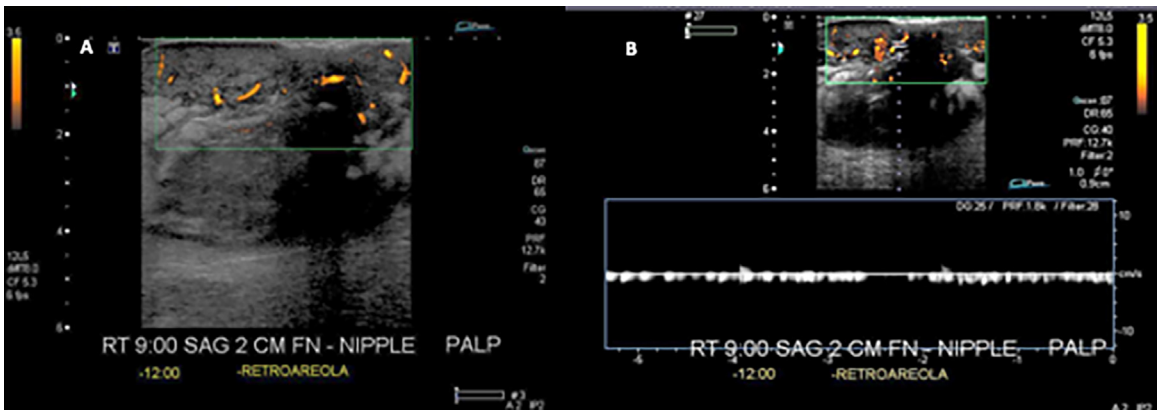

Fig. 11 – (Patient no. 2): Ultrasound with color Doppler of right breast at 9 o'clock location shows multiple, solid, hypoechoic, partially circumscribed and partially coalescing, with parallel orientation and dense posterior acoustic shadowing (A). There is internal and peripheral vascularity on color Doppler, which on spectral analysis (B) displays a very low flow, venous pattern.

the breast, was arrived at, based on the clinical course, imaging features and pathology. The patient was referred to the Oncology department for further management of the disseminated hematological malignancy.

Discussion

The incidence of breast cancer is approximately 24.2% of all female malignancies across the world [3]. In this context, the early categorization of a breast mass as benign or malignant remains extremely vital. The imaging and management guidelines for solitary breast masses has wide consensus, whereas those on bilateral breast masses can at its best, be considered as still evolving and somehow, most Authors tend to postulate that multiple breast masses are more frequently benign cysts or fibroadenomas [5,6]. Multiple masses are definitely infrequent and known to be detected only in 1.7% of routine screening mammograms and in 6.2% of breast screening US examinations performed by physicians for women with elevated risk of cancer [5]. Therefore, the possibility for sec-

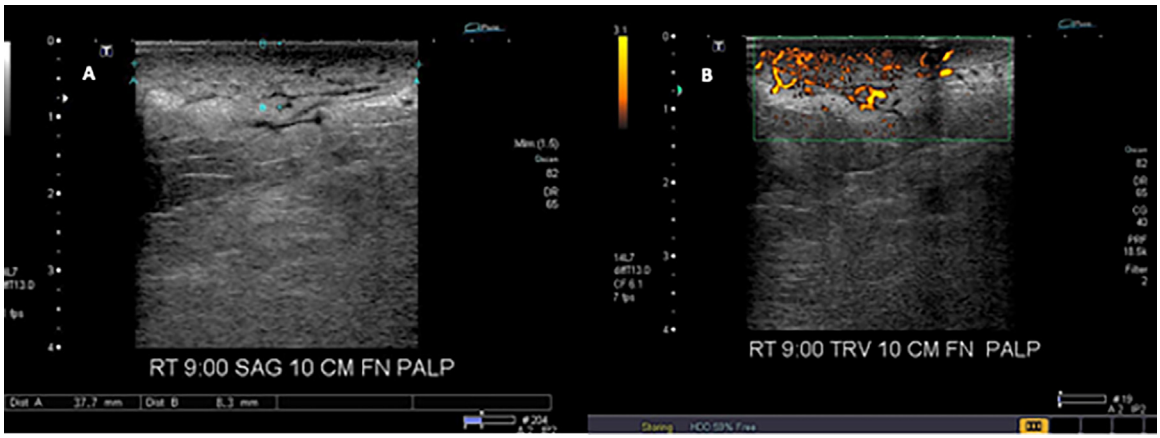

Fig. 12 – (Patient no. 2): Ultrasound of right breast at 9 o'clock location shows skin edema overlying the masses at this location (A), with increased vascularity on color Doppler (B).

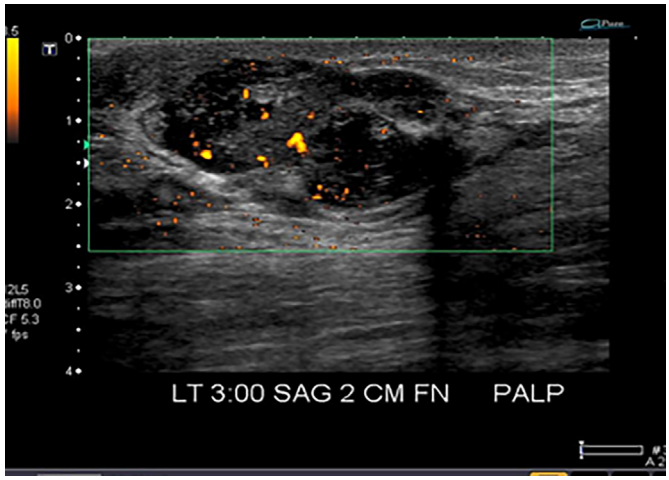

Fig. 13 – (Patient no. 2): Ultrasound of left breast at 3 o'clock location shows a solid, heterogeneously hypoechoic, well circumscribed, gently lobulated mass in parallel orientation which has angular margins, with posterior acoustic shadowing and has low flow internal and peripheral vascularity on color Doppler.

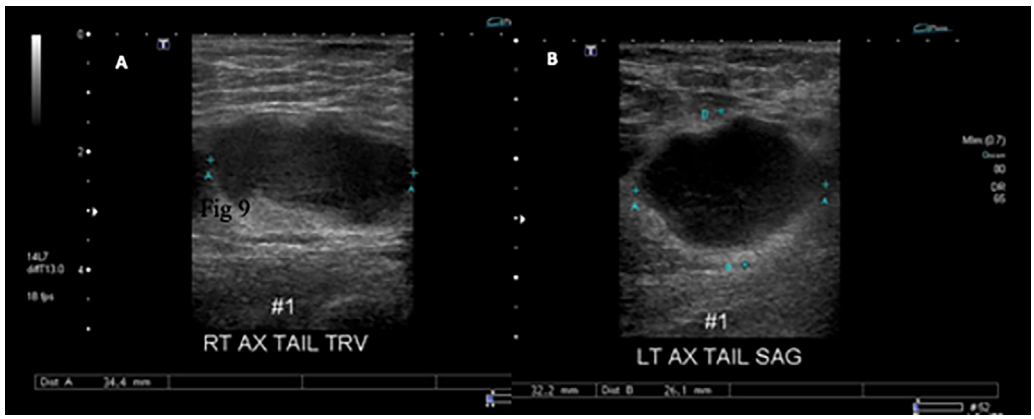

Fig. 14 – (Patient no. 2): Ultrasound of right axilla (A) and left axilla (B), both show enlarged, rounded, hypoechoic lymph nodes with gently lobulated margins and complete loss of fatty hila, indicating disease infiltration.

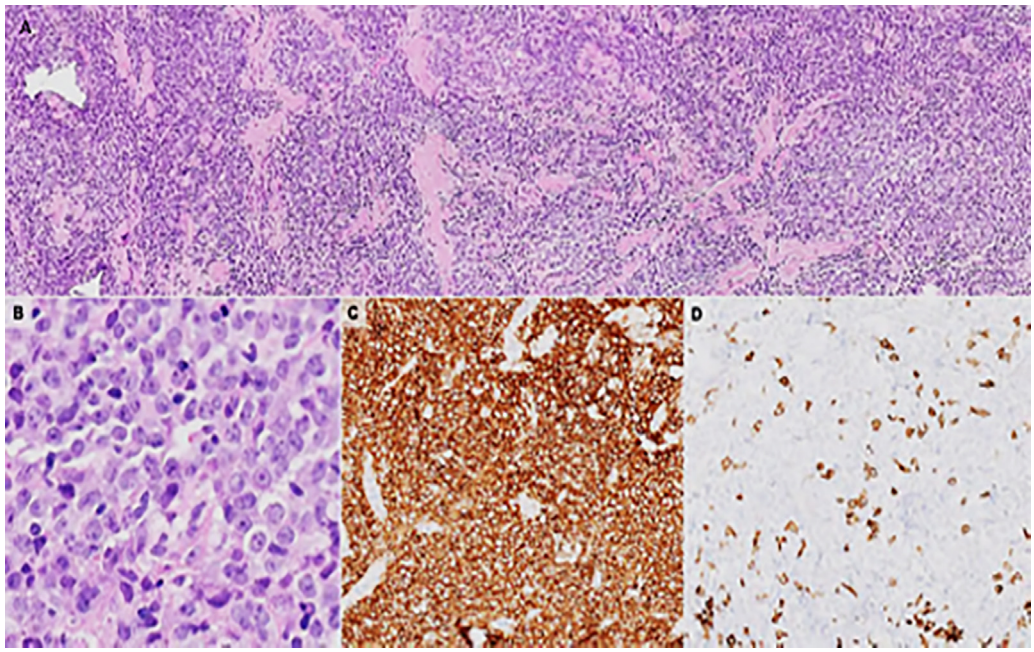

Fig. 15. (A) – H&E sections reveal a diffuse lymphoproliferative process involving an atypical lymphocyte population. (B) The atypical cells are moderately pleomorphic, medium to large in size with abundant amount of cytoplasm, enlarged nuclei with vesicular chromatin, irregular nuclear contours and one to multiple prominent nucleoli. (C) CD20 highlights the majority of cells are of B-cell lineage, while CD5 stain (D) is negative in the atypical cells.

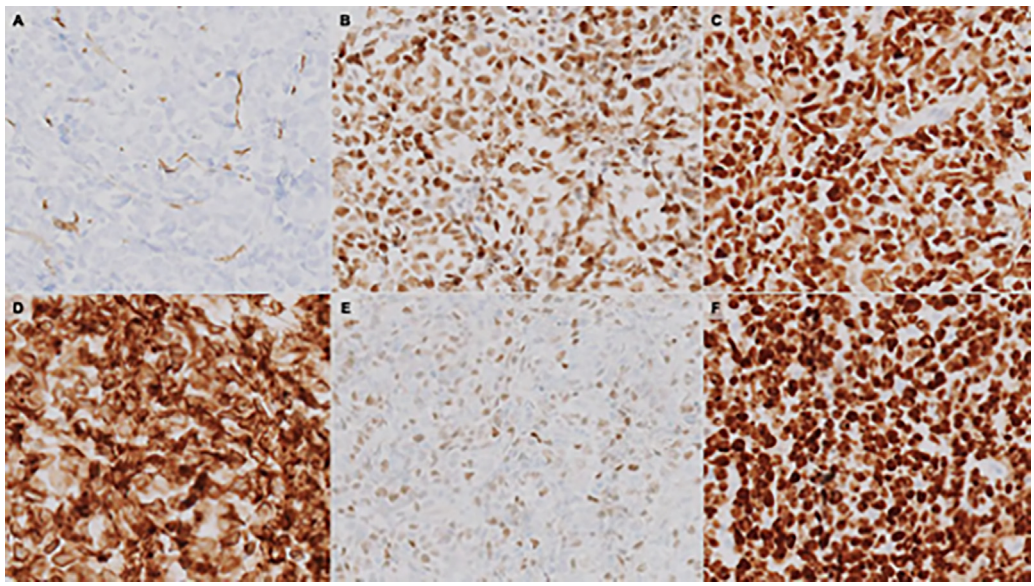

Fig. 16 – The atypical cells are negative for CD10 (A) and positive for BCL6 (B) and MUM1 (C), giving a non-germinal center phenotype using Han's algorithm for DLBCL classification. (D) BCL2 stain shows strong expression in >50% of cells, while MYC (E) shows weak to moderate staining in >40%, classifying this DLBCL as a "Double Expressor" for BCL2 and MYC proteins. (F) Proliferation is approximately 90%-95% by Ki-67 labeling, suggestive of high tumor aggressiveness.

ondary metastases as an etiology for multiple breast masses is relatively underemphasized. Furthermore, the frequently considered etiology for multiple metastases, is a primary in the contralateral breast, since extramammary malignancies metastasizing to the breast are rare and are most often encountered as brief series or isolated case reports [1–3,7–11]. The common clinical presentation for extramammary malignancy metastasizing to the breast is either a solitary or more frequently multiple, bilateral palpable, painless breast masses [2,3,8–11]. The occurrence of breast metastases is also clini-

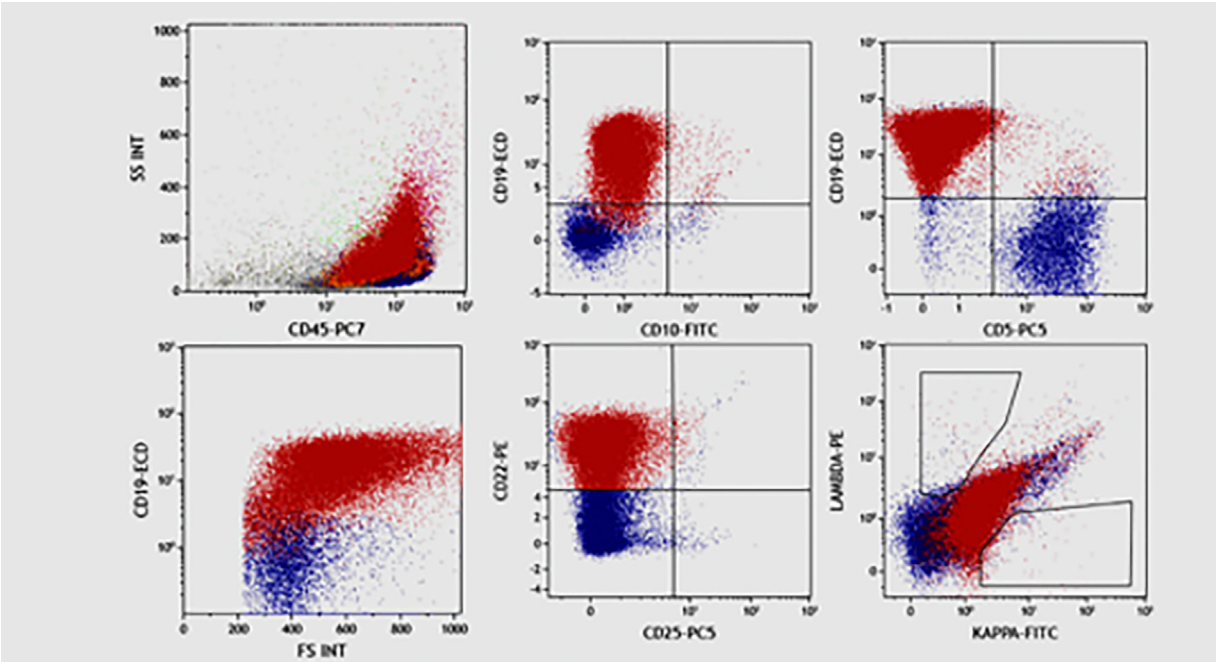

Fig. 17 – Flow cytometry findings reveal the presence of atypical lymphoid cells (58% of total) that are CD45 and CD19 positive with high forward scatter (FS). The large atypical cells are positive for CD22 and negative for CD10, CD5, CD25 and both kappa and lambda surface light chains.

cally significant in that, these may be the primary presentation of the malignancy in 12%-50% of cases [2,8].

Breast lymphomas are very rare and account for 0.04%-0.7%, of all malignant breast disease; however, 17% of secondary breast metastases are due to lymphomas [4]. Breast lymphoma may also occur as a primary breast involvement. Distinguishing between a primary breast lymphoma and a secondary one is vital, since differences exist in tumor biology, aggressiveness and treatment regimens [4,9]. The frequent histological type in both varieties is non-Hodgkin's lymphoma, predominantly B-cell lymphoma (diffuse large B cell variety) accounting for 85%-95% of all cases, followed by T-cell, Burkitt, mucosa-associated lymphoid tissue lymphoma (MALT), and extranodal natural killer lymphoma nasal types (ENKTL), which together account for the remaining 5%-15% of patients. The non-B cell variety are known to be more frequently encountered in Asian patients [1,4,9,12].

Primary breast lymphoma accounts for less than 1% of breast malignancies and less than 2% of extranodal non-Hodgkin lymphomas (NHL) [4]. Primary breast lymphoma is more aggressive and has a worse prognosis in comparison to that of extranodal NHL of all other sites [4]. The accepted criteria for diagnosing a primary breast lymphoma are those proposed by Weisman and Liao in 1972. Primary breast lymphoma is defined as one that is limited to the breast and ipsilateral axillary lymph nodes, in the absence of disseminated/known lymphomatous disease. Therefore, primary breast lymphoma comprises only stage I (lymphoma limited to the breast) and stage II tumors (lymphoma confined to the breast and axillary lymph nodes), whereas in secondary breast lymphoma, the breast is involved, but through the secondary infiltration of a systemic disease [4,9,12]. Both our patients fulfilled the criteria for a secondary breast lymphoma and both had non-Hodgkin's, large B cell histological variety.

The usual reported symptomatology for secondary breast lymphoma is multiple painless breast mass/es, whereas, nipple abnormalities, discharge and skin involvement are believed to be infrequent [2,4,12,13]. Systemic symptoms such as fever, night sweats, weight loss are reportedly uncommon in secondary breast lymphoma and occur only in 8%-9% of cases [1]. Our first patient had bilateral, painless breast masses, while she had observed gradual enlargement in majority of masses, without any systemic or local signs; the patient number 2, complained of bilateral breast pain and the local examination revealed skin involvement on the right, with nipple involvement on the left side. The clinical presentation in our second patient was certainly a less frequently documented one. Both our patients did not have systemic symptoms.

The imaging approach in a patient above 40 years with bilateral breast masses, calls for a mammogram followed up with ultrasound correlation and the same protocol was followed in both index cases. Mammographic findings of secondary lymphoma are known to include, multiple, bilateral, high density, noncalcified, oval or round masses which may or may not be circumscribed. Architectural distortion and calcification are known to be typically absent. Hyperdense masses at mammography are postulated as being characteristic of breast lymphoma and said to occur in 81% of cases [1,4]. Spiculation and architectural distortion are less common in all types of breast metastases, due to lack of desmoplastic reac-

tion and this helps to differentiate it from a primary breast carcinoma [2,4,12]. Both patients seen by us, had the typical mammographic features with multiple, circumscribed, hyperdense, noncalcified masses at initial presentation. In the second patient, the left breast initially had a focal asymmetry which rapidly evolved into a defined mass within 4 months. This manifestation is also a feature of breast lymphoma and reported in 20% of cases [4]. Skin involvement, seen in the right breast of our second patient is known to occur in only 8% cases of secondary lymphoma [2,4,12]. We postulate that the skin involvement in secondary breast lymphoma possibly occurs only in advanced cases with loco regional lymphatic obstruction and was documented in our second patient, as the diagnosis was relatively more delayed in her case.

On ultrasound, breast lymphoma resembles other metastases in frequently presenting as multiple, round to oval shaped, hypoechoic, noncalcified, nonspiculated masses, without architectural distortion, with either circumscribed or indistinct margins and a few may have gentle lobulations. Lymphomatous metastases are usually parallel in axis and the internal echotexture is heterogeneous echogenicity or hyperechogenicity. There may be a thin echogenic rim or onion peel appearance, resembling a capsule in some of these masses. Breast lymphoma can show posterior acoustic enhancement, and hypervascularity on Doppler [1,2,4,7,9,12–14]. Ultrasound examination in both patients had shown characteristic findings. In the first patient, the only 2 unusual features were, that in the first patient the masses were antiparallel in orientation, while one mass in the left breast of the second patient revealed posterior acoustic shadowing. The involvement of skin, subcutaneous tissues of breast and axillary lymph nodes, although less frequent, has been described in previous reports on lymphoma metastases to the breast and was present in our second patient [4,7,12].

The presence of axillary lymphadenopathy is a hall mark of advanced malignancy in ductal and lobular carcinoma but may also occur in lymphomatous metastases [1,2,4,12]. The first patient seen by us did not have axillary nodes. The second patient had large necrotic nodes with complete loss of hilar echogenicity. The imaging features of axillary lymph nodes are nonspecific and therefore, other than a manifestation of disease extent, do not specifically help to differentiate the etiology of the breast mass, in this context.

The role of MRI is for evaluating extent of disease and for local staging prior to therapy, and assessing post-treatment response, especially if resources preclude access to PET-CT. MRI features of breast lymphoma are nonspecific and resemble those of any other malignancy. The tumor mass is known to be hypointense on T1W, hyperintense on T2W and show type II or III kinetic curve on dynamic contrast enhanced MRI studies [1,2,4,12,13]. Skin involvement another known feature of breast lymphoma is believed to be better delineated on MRI [1,2,4]. However, skin involvement was exquisitely demonstrable by ultrasound in our second patient. Following the mammography and ultrasound evaluation both our patients underwent image guided biopsy to complete the work up and arrive at a diagnosis and MRI was not deemed necessary for further evaluating the etiology.

The unchallenged advantage of PET-CT remains its ability for whole body (local and distant) staging of any malignancy. PET-CT should ideally be performed for whole body pretreatment staging in breast lymphoma, so as to be able assess response to therapy, by comparison with a baseline study [13]. PET-CT will show high FDG activity in the sites of involvement within the breasts, axillae and other sites. In our first patient whole body CT was done for staging as the best alternative to PET-CT, in view of financial constraints.

The differential diagnosis for bilateral multiple breast masses to be considered at imaging studies, includes multiple benign fibroadenomas in young women below 40 years and multiple benign cysts in both younger women and perimenopausal women [5,6]. Clinical correlation with a history of rapid enlargement in the multiple masses is an important clue towards multiple breast metastases [1–3]. Mammography features of fibroadenoma are characteristic and Ultrasound confirms the diagnosis. Ultrasound features are confirmatory in majority of benign cysts as well. For both pre- and perimenopausal age groups, metastases from a primary in the breast and an inflammatory carcinoma are also likely. On mammography, carcinoma usually has spiculations, calcifications and architectural distortion, features which are conspicuously absent in majority of secondary metastases in the breast, including those due to lymphoma [2,4]. Furthermore, the rare breast carcinomas such as medullary and mucinous varieties which do manifest as circumscribed masses, are by and large solitary masses. In case the multiple breast masses show calcification, a possibility of metastases from a primary ovarian or gastrointestinal carcinoma should be considered [2,7]. Characteristic imaging features of multiple, bilateral, round to oval, hyperdense, noncalcified masses, were seen in both our patients on mammography. On sonography, masses due to breast carcinoma show spiculation and posterior acoustic shadowing, whereas lymphomatous deposits usually show smooth margins without spiculation and the hypoechoic nature causes posterior acoustic enhancement rather than shadowing, the latter is a characteristic feature of carcinomatous masses. Inflammatory carcinoma may be under consideration in patients with significant skin thickening, however, at mammography and sonography inflammatory carcinoma shows predominant features of diffuse skin thickening, trabeculations, asymmetric densities and architectural distortion, with or without a focal mass lesion [15]. These features are significantly distinct from lymphoma metastases, which predominantly show, well defined multiple masses, whereas, focal skin thickening and trabeculations are occasional additional findings [4,15]. The imaging features described in the 2 reported cases, correlated with the clinical history of multiple enlarging masses, should alert radiologists in thinking of the possibility of multiple metastases, especially arising from lymphoma [4].

The diagnosis is initially suggested by cytology and finally confirmed by obtaining biopsy from the breast mass and performing histology and immunohistochemistry studies. At pathology, diagnosis of lymphoma requires demonstration of lymphoid cell proliferations, which are seen as round cells of variable size [4]. Most breast lymphomas are the B-cell type, express B-cell antigens such as CD20, and show monotypic light-chain restriction (of κ or λ chains) [4]. Characteristic features for high grade B cell lymphoma were demonstrated in the pathology studies in both our patients. The subtyping is

important for deciding the exact treatment regimes, indolent varieties requiring less aggressive therapy in contradistinction to the high-grade variety [4,9].

The recommended treatment of secondary breast lymphoma includes a combination of radiation therapy, anthracycline based chemotherapy and surgery [4,13]. The most important prognostic factor is the histological subtype and the clinical stage, according to the Ann Arbor system [13]. Overall, the prognosis is poor for patients diagnosed with breast metastases, with a reported median survival time of 10 to 29 months opined by various investigators [8,9].

Conclusion

The imaging and management guidelines for solitary breast masses has wide consensus, whereas most breast imagers and surgeons tend to postulate that multiple breast masses are more frequently benign cysts or fibroadenomas. Although multiple masses are definitely infrequent, the possibility for secondary metastases as an etiology for multiple breast masses, needs emphasis. Secondary breast lymphoma is reported to be the among most common metastases to the breast and the clinical presentation as painless or painful, bilateral, multiple masses, with history of rapid enlargement should raise the flag for this entity. Mammographically, multiple, bilateral, hyperdense, noncalcified, round to oval masses, with circumscribed or gently lobulated margins, in the absence of architectural distortion, are fairly characteristic. Sonographic correlation shows a similar pattern, with bilateral, multiple, hypoechoic, noncalcified masses, which exhibit posterior acoustic enhancement, along with peripheral and internal vascularity. In the presence of these characteristic clinical and imaging features, biopsy should be obtained and the pathologist alerted for the likely diagnosis of hematological malignancy. Our experience in the reported, strikingly similar cases, interestingly documents an identical imaging approach by breast Radiologists in distant countries and also underscores the likelihood of encountering rare entities in a busy day to day breast practice, anywhere across the globe. Furthermore, this report not only adds to the body of imaging literature about this rare entity, but also highlights the characteristic imaging features, so as to prevent a delayed diagnosis in future cases.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of the manuscript entitled: Multiple bilateral breast masses due to lymphoma metastases: A report of 2 similar cases highlighting the mammographic and sonographic features, the author(s) did not use any AI tool/service, the author(s) personally constructed and edited the content as needed and take(s) full responsibility for the content of the publication.

Patient consent

Regarding the manuscript entitled: “Multiple bilateral breast masses due to lymphoma metastases: A report of 2 similar cases highlighting the mammographic and sonographic features,” the authors confirm having obtained written consent of both patients (and/or their close relatives), in their local language (as applicable) for permission to publish the case report/s, with assurance of maximum efforts to maintain anonymity.

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