Pattern of Mammography Findings among Symptomatic Females Referred for Diagnostic Mammography at a Tertiary Center in South-East Nigeria

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ABSTRACT

Background: Breast symptoms are not uncommon among Nigerian adult females. Most worrisome are symptoms associated with the possibility of breast cancer. Mammography is an imaging technique being introduced in third world practice as an aid for screening and diagnosis of patients with breast symptoms. **Objective:** To document the pattern of mammographic findings in symptomatic females referred for mammography. **Methodology:** Patients with breast symptoms of palpable lump, pain or nipple discharge referred to the mammography unit of the Radiology department were recruited into the study at Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Nigeria between June, 2012 and May 2013. Two standard views (cranio-caudal-CC and medio-lateral oblique-MLO) were done on both breasts for each patient. **Results:** Study population comprised seventy-one patients aged 20 to 79 years with a mean age of 48.3 years ±9.5, and range of 20 - 70 years. Of these, forty (56.3%) presented with breast pain, twenty-five (35.2%) had palpable breast lump, while fourteen (19.7%) presented with nipple discharge. 74.65% percent of participants showed positive mammographic findings. These were a well circumscribed breast opacity (35.2%), asymmetric soft tissue density (39.4%), calcification (39.4%), breast asymmetry (8.5%), nipple retraction (7.0%), tissue retraction (4.2%), skin thickening (1.4%), and axillary nodes (9.9%). Mammography calcifications were noted in 28 cases. Four of these (14.3%) were micro-calcification, while 24 (85.7%) were various forms of macro-calcifications. **Conclusion:** Asymmetric soft tissue density, calcification and well circumscribed breast opacity were the commonest mammographic findings among symptomatic women in our environment. Follow-up imaging or minimally-invasive image-guided biopsy or cytology may be indicated for further evaluation.

Key words: Breast; mammography; symptoms

Introduction

Breast disease among Nigerian women is not uncommon in clinical practice, with the majority of cases reportedly benign and affecting the young and premenopausal.[1,2] Globally, breast diseases, especially cancer are of great public health importance due to their high morbidity and mortality.[1] In South-East Nigeria, Anele *et al*.[2] reported fibroadenoma as the most common breast disease (47.5%), followed by carcinoma of the breast (30.4%) and fibrocystic disease (10.1%). Symptoms of breast disease may be trivial and readily respond to treatment, or they may be persistent and a source of concern to the patient and clinician.[3] Most worrisome are symptoms associated with the possibility of breast cancer. Common breast symptoms include palpable lump, breast pain and nipple discharge.[4,5] Others are breast lumpiness, skin changes, skin ulceration, large breasts, axillary lump and nipple retraction.[4,5] Ayoade *et al*.[3] reported breast lump as the most common breast symptom among adult females in Western Nigeria, and benign in 60% of cases. Breast pain is, however, the most common symptom associated with breast cancer in South-West Nigeria.[3] A similar finding was reported from South-East Nigeria by Egwuonwu *et al*.[6] who additionally described breast lump as a source of great anxiety to females when discovered.

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Symptomatic patients are evaluated by the triple assessment technique which includes clinical breast examination (CBE),[7] breast imaging such as mammography, breast ultrasound and magnetic resonance imaging (MRI),[8] as well as breast cytology or biopsy for histological diagnosis.[9] Diagnostic mammography serves as an adjunct tool in the diagnosis of breast disease.[10] Clinical findings in symptomatic females such as palpable breast lump, persistent focal area of pain, nipple discharge or skin changes can be further assessed using mammography.[10] Mammography features of breast opacity, parenchyma architectural distortion, suspicious calcification, skin thickening, tissue or nipple retraction may all be suggestive of breast disease.[8] Micro-calcifications detected on mammograms may be an early sign of breast cancer.[8] The modality may also facilitate the discovery of an occult lesion within the contra-lateral breast. An important limitation of mammography is that breast disease may be more difficult to detect in women with radiographically dense breasts.[11] Breast density is influenced by stage of the menstrual cycle, parity, obesity, ethnicity and age, with younger women tending to have dense breasts, and thus usually having mammograms that are difficult to interpret.[11]

Reports from several Nigerian studies suggest a generally low awareness about mammography and its value in the diagnosis of breast disorders among the female population.[12-15] Furthermore, Bello *et al*.[14] reported a low level of physician referrals for mammography. These reports may explain the relatively few symptomatic women in the South-Eastern environment undergoing diagnostic breast imaging. There is a general low level of awareness of breast disease amongst the Nigerian population, the physicians inclusive, resulting in late diagnosis with advanced disease.[4,16]

Documentation of the pattern of mammography findings among females presenting with common breast symptoms will highlight the prevalent features of breast anomalies as seen on mammography among symptomatic females in the South-East Nigerian environment. It will help to determine what proportion of this group that will benefit from further diagnostic investigations and or treatment. Study findings may also have the potential to demonstrate the relevance of diagnostic mammography in the assessment of breast disease with a view to creating greater awareness about breast imaging among physicians and patients.

Study objective

To document the pattern of mammography findings in females presenting with palpable breast lump, breast pain and nipple discharge.

Methodology

The participants in this prospective study were all 71 female patients aged 40 years and above with breast symptoms referred to the Radiology Department, Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Nigeria for diagnostic mammography between June 2012 and May 2013. Females aged below 40 years with a positive family history of breast cancer were included. A data sheet was completed detailing patient's biodata and the referral clinician's examination findings.

Mammographic technique

The general electronics-performa mammography machine MGF-110 was used in this study. Subjects were asked to remove clothing and artifacts from the region of the breast and axilla. Two standard views, craniocaudal (CC) and mediolateral oblique (MLO) were done on both breasts for all participants. For the CC view, table height was set at the level of infra-mammary crease. The breast was placed in firm contact with the film in a horizontal plane and wrinkles or skin fold were smoothened out with the patient's nipple in profile. Each patient was made to stand with back straight and shoulders relaxed, arm at side; head turned away from the side being examined. After close collimation and compression were ensured, the imaging scientist allowed the central ray to pass through the center of base of the breast, perpendicular to film - 18 cm × 24 cm or 24 cm × 30 cm film sizes, as appropriate for patient's breasts. For the MLO view, each patient was made to stand in the erect position with breast oriented in oblique sagittal position and supported by the film holder in the same direction. The patient was rotated 45° with nipple in profile. After close collimation and compression were ensured, the imaging scientist allowed the central ray to pass as done in the CC view.

Table 1: Age frequency distribution of study population

Age range (years)	Number	Percentage
<40	12	16.90
40-44	11	15.49
45-49	20	28.17
50-54	11	15.49
55-59	09	12.68
60-64	03	4.23
65-70	05	7.04
Total	71	100.00

Table 2: Frequency distribution of breast symptoms within the study population

Symptoms	Number	Percentage
Breast lump only	25	35.20
Breast pain only	40	56.30
Nipple discharge only	14	19.70
Breast lump and pain	17	23.90
Breast pain and nipple discharge	09	12.70
Breast lump and nipple discharge	06	8.50
All listed symptoms	06	8.50

Mammograms were evaluated by either of the two radiologists involved in the study for various findings, such as presence of breast mass, evidenced by circumscribed breast opacity (with documentation of the mass's features such as size, widest dimension, shape, outline and density). Other relevant findings such as asymmetric density, suspicious calcification, nipple retraction, architectural distortion, tissue retraction, and skin thickening were also documented when present.

Data management

Statistical analysis of data were done using Statistical Package for the Social Sciences (SPSS) version 17 for Windows. (IBM Corporation).

Results

During the period of study, 71 symptomatic females with a mean age of 48.3 years ± 9.5 underwent diagnostic mammography. The age distribution is shown in Table 1, with the largest proportion of patients in the 45–49 years bracket (28.2%), while the age range of least frequency (4.2%) was 60–64 years.

Patient symptomatology is presented in Table 2, which shows that forty patients (56.3%) presented with breast pain, 25 (35.2%) had palpable breast lump, while 14 (19.7%) presented with nipple discharge. Some patients presented with a combination of symptoms. 17 patients (23.9%) with painful breast lump, 9 (12.7%) had breast pain and nipple discharge, while 6 (8.5%) presented with breast lump and nipple discharge and same percentage had all the three symptoms.

The most prevalent mammographic breast pattern was the heterogeneous-dense fibroglandular, that is, American College of Radiology – Breast Imaging Reporting and Data System (ACR-BIRADS) "3" (39.7%). Positive findings were noted on mammography images in 53 cases (74.65%) while 18 patients (25.35%) had normal mammograms. Table 3 shows that 25 patients (35.2%) had multiple mammographic findings, while 9 (12.7%) had mammogram, which showed bilateral findings. Mammographic findings include, single and multiple, breast opacity (35.2%), asymmetric soft tissue density (39.4%), calcification (39.4%), breast asymmetry (8.5%), skin thickening (1.4%), tissue retraction (4.2%), nipple retraction (7.0) and axillary nodes (9.9%). Table 3 also shows that out of the 25 mammograms with breast opacity, 5 (20%) showed speculations, while 20 (80%) showed non-speculated outline. Furthermore, of the 28 patients with calcification, 4 (14.3%) were micro-calcification, while 24 (85.7%) were various forms of macro-calcification.

Table 3: Mammographic findings

Mammographic findings	Number	Percentage
Multiple findings	25	35.2
Bilateral findings	09	12.7
Circumscribed breast opacity	25	35.2
Speculated opacity	5 (20.0%)	7.0
Nonspeculated opacity	15 (80.0%)	21.1
Asymmetric soft tissue density	28	39.4
Calcification	28	39.4
Micro-calcification	4 (14.3%)	5.6
Macro-calcification	24 (85.7%)	33.8
Breast asymmetry	06	8.5
Nipple retraction	05	7.0
Tissue retraction	03	4.2
Axillary node	07	9.9
Skin thickening	01	1.4

Discussion

The commonest mammographic breast pattern noted among females in this study population was the heterogeneous dense fibroglandular. This appears to corroborate the previous study findings by Okere *et al*.[17] who reported the fibroglandular breast pattern as predominant among females in their study population in South-East Nigeria. Approximately three quarters of our study population showed positive findings on mammography (74.7%) indicating a fairly high detection rate by this imaging modality for breast disease. This finding is similar to that by Kavanagh *et al*.[18] who reported a high mammography sensitivity (80.8%) in the detection of breast lesions among symptomatic Australian adult females.

The commonest mammographic findings in this study are asymmetric soft tissue opacity and calcification accounting for 39.4% each and well-circumscribed opacity (35.2%). An asymmetric soft tissue density may be observed in mammograms of normal breasts where there is often no associated straightened breast trabeculae or architectural distortion.[8] However, this mammographic feature may also be due to a breast malignancy, usually when small in size or detected at an early stage.[8] Further, breast evaluation using an alternative imaging technique such as ultrasound or MRI may be indicated for those whose breasts show mammographic asymmetric soft tissue density.

Calcification may be associated with benign or malignant lesions.[8] Micro-calcifications are the sole radiological abnormality in 25% of screening detected carcinomas.[8] In this study, focal micro-calcifications were noted on mammograms of four individuals corresponds to 14.3% of all mammograms with calcifications, and 5.6% of all participants. This is not dissimilar to the findings by Akinola *et al*.[19] who reported a prevalence of 7.3% for micro-calcification in diagnostic and screening mammograms for women in Western Nigeria. Such individuals will benefit from stereotactic biopsy or wire-localization, followed by surgical biopsy from the site of micro-calcification for histopathological evaluation

and definitive diagnosis.[9] Benign macro-calcifications are predominant in this study (85.7% of all mammograms showing calcification) and are of varying origin and forms, including microcystic (adenosis), vascular, parasitic and dermal. These may respond favorably to conservative management.

In this study, 5 out of 25 mammograms (20%) showed breast opacity with speculated outline, which may be suggestive of malignancy. This proportion appears greater than the 8.7% (9 cases of speculated opacities out of 104 breast masses) reported from South-West Nigeria by Akinola *et al*.[19] The authors studied a combined population of females for screening and diagnostic mammography. However, our study population consisting wholly of symptomatic females for diagnostic mammography may account for the difference in study findings. It is however noted that speculated breast opacity may also be due to radial and surgical scars, both differentiable from carcinoma by histology.[8]

Other documented mammographic findings in this study include breast asymmetry (8.5%) and skin thickening (1.4%), both of which may result from edematous breast changes. 80% of mammographic opacities in this study show a fairly smooth or lobulated outline and are possibly due to one of the several benign lesions such as fibroadenoma, phylloides tumor, simple cyst and lipoma. Other possibilities include adenolipoma, breast abscess and intramammary lymph nodes.[8] An ultrasound-guided fine needle aspiration and cytology, or histology following core needle biopsy or surgical biopsy will usually confirm diagnosis of breast lesion.[9] Enlarged axillary lymph nodes were noted in almost 10% of mammograms. These may be hyperplastic in response to an inflammatory process (benign nonneoplastic), or they may be enlarged due to breast malignancy.

A total of 25 mammograms showed circumscribed breast opacity (35.2%) while 28 mammograms showed asymmetric density (39.4%) with some overlap. Both mammographic features may be associated with breast mass lesions, and when combined, exceed the 25 patients presenting with palpable breast lumps (35.2%). This suggests that some breast mass lesions may be occult, seen on mammography, but missed on self-breast examination, or CBE, highlighting the relevance of imaging in breast evaluation. Biggs and Ravichandran[20] reported a prevalence of 3 out of 71 study participants for whom mammography was not initially considered by the clinician, but eventually showed breast anomaly on mammography, two of which were confirmed to be breast cancers. Mammography findings may be grouped in line with the ACR-BIRADS categories.[21] Management recommendations are proffered for each category.

Conclusion

Positive mammography findings in this study include asymmetric soft tissue density, breast calcification and well-circumscribed breast opacity. These features may be suggestive of specific forms of underlying breast disease and are noted in a majority of mammograms of symptomatic women referred from the breast clinic at NAUTH, Nnewi, South-East Nigeria. Follow-up imaging or minimally-invasive image-guided biopsy or cytology may be indicated for further evaluation.

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