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Full Length Research Paper

Appraisal of mammography in Nigerian women in a new teaching hospital

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The advent of newer imaging techniques has necessitated the need for us to evaluate the distribution pattern of common and significant imaging findings on mammography at the Lagos state University Teaching Hospital. A retrospective study on all the 300 patients referred to the radiology department of LASUTH from August 2003 to August 2006 for mammography was carried out and the imaging findings were recorded using the American College of Radiology (ACR) Breast Imaging Reporting and Data System (BIRAD) classification method to assess mammographic density. However, ultrasound scans were done in patients less than 35 years of age who had a mass. The mammography images result revealed that majority of the breasts, about 39 (13%) were mainly fatty, 11 (3.7 %) were glandular, whereas, 3 (1%) were mainly fibrous. However, 149 (49.7%) were mixed (fibro-fatty) and 98 (32.7%) dense in nature. Using the BIRAD classification, 41 (13.7 %) patients were classified as Birad 1 whereas the majority of the cases seen, 154 (51.3 %) were classified as Birad 2, while 57 (19%) and 48 (16%) were categorized into Birad 3 and 4, respectively. However, mammographic findings were normal in 164 (54.7%) patients seen. Various types of calcifications were seen in 87 (29%) of patients. Of these, 22 (7.3 %) were microcalcifications. However, two of the confirmed malignant masses had microcalcifications and dilated ducts were seen in 3 (1%) patients. The nipple was tethered and inverted in 3 (1%) patients, skin thickening was seen in 3 (1%) patients, widened subcutaneous tissue in 3 (1%), scar in 2 (%). One (0.3%) patient had postsurgical clips, while skin fold was seen in one (0.3%). Of the six histology reports obtained, 3 (1%) were confirmed malignant, 2 (0.7%) were not malignant and one (0.3 %) was a fibrocystic disease. We found out that most masses seen were benign, although 33.3% of suspected cancer picked up on mammography was confirmed malignant. Also, microcalcifications were a strong indicator of malignancy in this study.

Key words: Mammography, Nigeria women, teaching hospital, imaging techniques.

INTRODUCTION

Mammography is a radiological examination of the breast used to establish the diagnosis of palpable and non-palpable lesions. Mammography screening to detect early breast cancer is a part of the normal, nationwide health program in many developed countries. It is however not yet prevalent in Nigeria.

The breast is the most frequent site of cancer among women (Hardy et al., 1998) and is second only to lung cancer as the leading cause of cancer death in women (Armando, 1977) in the U.S.A. It has been shown in many studies that breast cancer screening using mammography reduces breast cancer mortality (Collette et al., 1992; Tabar et al., 1999; De-Koming et al., 1991). It has long been recognized that the radiographic appearance of the breast varies accordingly to the differences in the relative distribution of fat (Susan et al., 2003). Mammographic density reflects the amounts of stroma and epithelium in the breast (Heng et al., 2004). LASUTH is a

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Table 1. Presenting symptoms.

Complaint	Number of patients (frequency)	Percentage %
Routine Screening	125	41.7%
Breast Lump	70	23.3%
Breast Pain	54	18%
Nipple discharge (Milky, Purulent, Slimy, Bloody)	10	3.3%
Nipple Eczema	3	1%
Generalised breast swelling	6	2%
Breast discomfort	2	0.7%
Peppery sensation	2	0.7%
Mastectomy	3	1%
Previous lumpectomy	16	5.3%
Keloid	2	0.7%
Menopausal	121	40.3%
Strong Positive Family history of Breast Cancer	30	10%
Previous Mammography	20	6.7%

relatively new tertiary health institution servicing the very large cosmopolitan Lagos, the economic capital of Nigeria. Mammography is a newer imaging modality in this centre, and knowing the distribution pattern of the imaging findings will help the radiologist estimate the scope of work and set environmentally specific benchmarks with which they will be able to audit their practice.

MATERIALS AND METHODS

This study spanned a 3 year period and was done by reviewing the mammograms of three hundred women who were referred for screening or diagnostic mammography in the radiology department of LASUTH from August 2003 to August 2006. Women below 40 years were excluded, except they had a very strong family history of carcinoma of the breast. All the women were made to complete a health and lifestyle questionnaire. This addressed the date of birth, highest grade of education, reproductive history, cessation of menstrual periods, use of oral contraceptives, medical history, personal and family history of breast cancer in first degree relative (mother, daughter, sister), current or past history of use of exogenous hormones, alcohol, tobacco, awareness about mammography, weight and height in kilograms and meters, respectively.

Two standard views were taken for each breast, cephalo-caudal and medio-lateral views; and where indicated spot compression views, using Melody Villa Sistemi Medicali stereotactic biopsy mammography machine. Mammographic density was assessed by using and adopting the method of Elad et al. (2004) in this study, where the Breast Imaging Reporting and Data System (BI-RADS) classification was employed. Here, BIRADS 1 is when the breast is almost entirely fat; BIRAD 2 shows scattered fibroglandular tissue; BIRAD 3 is heterogeneously dense and BIRAD 4 is extremely dense.

Ultrasound scan was done in all patients whose mammograms showed a soft tissue mass or those that had palpable breast masses, using a Dynamic Imaging Dedicated ultrasound Concept MC real time ultrasound machine, with a 7.5 MHz linear transducer.

RESULTS

The patients' age ranged from 35 - 82 years with a mean of 46.8 years ± 10.5. One hundred and twenty one (40.3 %) of them were menopausal, twenty (6.7%) have had mammography before, sixteen (5.3%) have had lumpectomy done before and 30 (10%) had a strong positive family history as shown in Table 1. Of the 300 patients, 125 (41.7%) came for routine screening without any complaint, while, 70 (23.3%) had lumps in either or both breasts. However, 54 (18%) and 10 (3.3%) of them had breast pain and breast discharge as their complaints respecttively. Generalised breast enlargement occurred in 6 (2%) and two (0.7%), each had breast discomfort and peppery sensation. Three (1%) have had mastectomy done in the past, others presented with keloid- two (0.7%) and nipple eczema- two (0.7%) and two (0.7%) were pregnant.

Findings on assessment of the mammography images (Table 2) revealed that 39 (13%) of the breasts features were mainly fatty and 11 (3.7%) were glandular, while, 3 (1%) were mainly fibrous. However, 149 (49.7%) were found to be mixed (fibro-fatty) and 98 (32.7%) dense in nature. Out of the 87 (29%) patients seen with different types of calcification, 22 (7.3%) of them were microcalcifications. The nipple was tethered and inverted in 3 (1%) patients, skin thickening was seen in 1(0.3%) patients, widened subcutaneous tissue in 3 (1%), Scar in 2 (0.7%) and tethered skin in 3 (1%) patients. One (0.3%) patient presented with postsurgical clips and skin fold respecttively.

Some of the common findings were breast masses found in 104 (34.7%) of patients and presented as either a cyst, f ibroadenoma, intramammary lymph node or a

Table 2. Findings on assessment of mammography images.

Findings	Number of patients (frequency)	Percentage %
Normal	164	54.7%
Masses	104	34.7%
Calcifications	87	29%
Prominent ducts	3	1%
Skin thickening	1	0.3%
Widened Subcutaneous tissue	3	1%
tethered skin and inverted nipple	3	1%
Skin fold	1	0.3%
Scar	2	0.7%
Postsurgical clip	1	0.3%
tethered skin	3	1%

Table 3. Distribution of masses on mammography.

Type of mass	Number of patients (frequency)	Percentage %
Single	52	17.3%
Multiple	13	4.3%
Stellate	9	3%
Intramammary/Axillary Lymph nodes	13	4.3%
Bilateral	11	3.7%

Table 4. Distribution of calcification on mammography.

Type of calcification	Number of patients (frequency)	Percentage %
Microcalcifications	22	7.3%
Rod-like	4	1.3%
Coarse	12	4%
Popcorn	3	1%
Vascular	7	2.3%
Skin/Secretory	31	10.3%
String/Worm-like	3	1%
Specs	22	7.3%
Amorphous	1	0.3%

Table 5. BIRAD classification.

BIRAD Classification	Number of patients (frequency)	Percentage %
1	41	13.7%
2	154	51.3%
3	57	19%
4	48	16%

cancer, followed by the various types of calcifications - 87 (29%) and prominent/ dilated ducts as seen in 3 (1%) patients (Table 3). However, most of the mammographic findings were normal in 164 (54.7%) patients. Also, these masses were either single or multiple in one or both breasts. Nine of them were stellate or speculated in nature and three of the spiculated masses were confirmed malignant by histology. Two of the confirmed malignant masses however, demonstrated presented with microcalcifications in the examined views (Table 4). Of the six

histology reports obtained, 3 (1%) were confirmed malignnant, 2 (0.7%) were not malignant and one (0.3%) was a fibrocystic disease.

Using the BIRAD Lexicon classification, most of the patients, 154 (51.3 %), were classified as Birad 2, while 57 (19 %) and 48 (16 %) of them were classified as Birad 3 and 4 respectively. However, 41 (13.7 %) patients were classified as Birad 1 (Table 5).

DISCUSSION

High quality mammography screening can be considered a major public health achievement (Duffy et al., 2005), as it reveals the various types of lesions in the breast, apart from assessing the breast density. Mammography is, therefore, the gold standard for early detection of breast cancer (Nandi et al., 2006). The extent of mammographically detected fibroglandular breast tissue has been referred to as parenchymal patterns or percentage of breast density, and is one of the strongest known risk factors for breast cancer (Susan et al., 2003). It has long been recognised that the radiographic appearance of the breast varies according to differences in the relative distribution of fat (Susan et al., 2003). Several studies have shown that it is possible to use the parenchymal patterns displayed on mammography to differenttiate various groups with a high risk of developing breast cancer (Witt et al., 1984).

Mammographic density, which reflects the amounts of stroma and epithelium in the breast, has consistently been found to be a strong risk factor for breast cancer (Elad et al., 2004; Heng et al., 2004). Also, the radiographic appearance of breast parenchyma provides a method of predicting who will develop breast cancer (Wolfe, 1976). Thus, women with extensive dense breast tissue visible on mammogram have a high risk of breast cancer that is 1.8 to 6.0 times that of women of the same age with little or no density (Boyd et al., 2002). In this study, it was found that 16% had a dense breast and should be regarded as high risk, and therefore followed up. The density of breast tissue on a mammogram is a strong predictor of breast cancer risk and may reflect cumulative estrogen effect on breast tissue (Elad et al., 2004). This is supported by the fact that most of the dense breasts were found in women around 40 years of age when they are mainly exposed to the effects of estrogen. The study by Witt et al. (1984) showed that those in the group with pronounced fibroadenomatous changes, have an incidence of breast cancer three times as high as that found in the population as a whole. These findings in this study was similar to that of Pak et al. (2004), which showed that BIRAD 2 classification was the most common breast density pattern of presentation.

Study done by Varela et al. (2006) was able to show the various impact of different approaches used, such that mammography was capable of detecting 94.5% of breast carcinomas; breast sonography detects 91% and palpation detects 87%. However, combinations of these approaches such as mammography and sonography or mammography and palpation detected 99% of carcinomas, while, sonography and palpation detected 95% of carcinomas. Nevertheless, ultrasound is significantly more accurate in determining tumor size (Ashraf, 2006). As supplementary methods to preoperative clinical examination, mammography and breast sonography are mutually complementary, high-resolution imaging techniques of utmost importance in the preoperative diagnosis and surgical treatment of breast cancer patients (Meden et al., 1995).

Fine needle aspiration biopsy or ultrasonography is recommended as the first diagnostic test of a palpable breast abnormality to distinguish simple cyst from solid masses (Kerlikowske et al., 2003). However, in this study, ultrasound scan was done in only in patients whose mammograms revealed masses, for effective characterization of the mass. Of the masses detected in this study, 9 (11.4%) were spiculated in nature, while all others had relatively well defined margins. The three histologically confirmed cancer cases in this study were all speculated on mammography; thus supporting the findings by Varella et al. (2006) that suggested that the border and the outer areas of masses seen in mammography, contained the most valuable information for differentiating between benign and malignant masses. Nine (11.4%) patients had spiculated masses with parenchymal distortion, which is slightly more than the findings by Pakart et al. (2004).

The earliest mammographic presentations of cancer include clusters of microcalcifications and spiculated or multilobular masses. Microcalcifications were seen in 22 (7.3%) patients and rod like calcification in four patients. Between 30 and 50% of non palpable breast cancers present themselves as microcalcifications alone and these constitute one of the earliest presenting features of carcinoma, which can be detected mainly with mammography (Melten et al., 2003). Also calcifications were seen much more frequently in this study than found by Pakart et al. (2004). However, they found prominent ducts in more patients than we did. Prior studies have indicated that benign vascular calcifications seen on routine screening mammogram are more prevalent in women with diabetes and coronary artery disease (Dale et al., 2006). The same association has been shown for women with peripheral vascular disease. However, finding in this study revealed vascular calcification in only 7 (2.3%) of patients.

Conclusion

Breast masses and microcalcifications are the commonest types of pathology found in mammography apart from assessment of the density of the breast lesion. The outcome of this study has helped to facilitate the selection of patients for follow up to exclude cancer and also facilitate preoperative selection of patients.

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