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Mammographic Density Pattern in Enugu, South-East Nigeria: An audit and review of the literature

#*Okere PCN, *Aderibigbe ASO, *Iloanusi NI, *Itanyi DU, *Okoye IJ
*Department of Radiation Medicine, University on Nigeria Teaching Hospital, Ituku-Ozalla, Enugu
#All correspondences: pcnokere@yahoo.com, +2348033938372

ABSTRACT

Purpose: Mammographic density portends critical radiologic and clinical implications. It is not only a limiting factor to the sensitivity of mammography in the detection of breast cancer;it has also been shown that the dense breast may upregulatethe risk of future breast cancer. It has thus generated a lot of scholarly interest. Accordingly many modifying variables of breast density have been identified and described. There is a paucity of local data on this issue.We present here a descriptive retrospective analysis of mammographic breast density pattern among patients (screening and diagnostic) seen over a four-year period, 2007-2010 at the radiodiagnosis department of the University of Nigeria Teaching Hospital (UNTH), Enugu in South-East Nigeria.

Method: Records of mammographic exams done at the Radiology Unit of the University of Nigeria Teaching Hospital Itiku-Ozalla, Enugu assembled, sorted and collated. Relevant parameters extracted from the records included patients' ages, mammographic breast densities and the American College of Radiology Breast Imaging Reporting and Data System(ACR BIRADS) assignment. All reports selected were accompanied by films and each mammogram was re-assessed for mammographic density by a radiologist using the same mammography viewing box. The radiologist was blinded to the accompanying radiologist's report and the mammographic breast pattern contained therein.The previous and review mammographic breast density patterns were compared and only concordant reports were accepted for the study. Bilateral mammograms which had widely varying mammographic densitieswere excluded. All mammographic densities were recorded as dense, fibro-glandular or fatty replaced. For convenience breasts in varying phases of involution were all regarded as fatty replaced.

Result:

The predominant breast type is the fibroglandular pattern seen in a total of 161 patients (50.5%) of the total number of patients seen. This breast pattern is seen to peak among the age group 35-49 years where 129 patients or 79% patients have fibroglandular pattern. A total of 153 patients (48%) are seen with fatty replaced breast type. In all 206 patients are below the age of 50 years. Of this, 70 patients representing 34% of the total have already transited to a fatty replaced breast type leaving 66% of patients below the age of 50years with fibroglandular or dense breast patterns.

Conclusion:

Majority of breast density patterns encountered in our study is the fibroglandular type. This is followed by the fatty replaced pattern. A significant proportion of women, 50 years and above still retain risk-conferring high mammographic density pattern. High mammographic density apart from its association with increased risk of breast cancer may also mask cancers already present and reduce sensitivity of mammographic detection. Complimentary imaging like ultrasonography should be optimized especially in our environment where cancers occur in comparatively younger females who are expected to have mammographically dense breasts.

Key words: mammography, mammographic density, breast cancer

INTRODUCTION

Mammography, an x-ray examination used to establish a diagnosis of palpable and non-palpable breast lesionsmay either be for the purposes of screening[1-3] or diagnosis[4]. Over the years, mammographic appearance of the breast has received widespread interest especially as a marker for the risk of breast cancer[5-9]. Situations

of high mammographic density have been known toimpair lesion detection hence the need for additional imaging techniques for accurate diagnosis[10-13]. There is paucity of data in our local environment concerning not only the distribution of mammographic breast density patterns across the various age groups but also the role of factors[14-17]which are known to influence or modify it.

MATERIALS AND METHODS

Three hundred and nineteen (319) patients who had mammography in the UNTH from 2007-2010 were recruited for the study. Relevant records including mammographic reports and films were accessed.Parameters extracted from these records included patients' ages, mammographic breast densities and the ACR BIRADS assignments. All cases were accompanied by films and each mammogram was re-assessed for mammographic breast density by a radiologist using a common mammography viewing box. The radiologist was blinded to the original mammography report and the mammographic breast pattern therein. Only those reports with concordant assessments for mammographic density patterns were recruited. Bilateral mammograms which had widely varying mammographic densities were seen in a few cases. These patients were excluded from the study. Mammographic densities were recorded as dense, fibro-glandular or fatty replaced. For convenience breasts in varying phases of involution were all regarded as being fatty replaced. All indices were entered on a computer software spreadsheet against each patient's age and the final BIRADS assessment.

RESULTS:

The mammographic breast densities of 319 female patients were collated. Out of this 62 patients underwent screening mammography while 257 were seen for diagnostic work-up for various breast related complaints.

Table 1: showing the distribution of screening and diagnostic mammography patients over the period under review 2007-2010.

Year	Screening mammography	Diagnostic mammography
2007	13	21
2008	33	72
2009	16	87
2010	0	77

Table 2: showing age distribution of screening and diagnostic mammography patients

Age group in years	Screening mammography	Diagnostic mammography
<20	0	0
20-24	0	1
25-29	0	1
30-34	0	3
35-39	4	34
40-44	17	63
45-49	18	65
50-54	7	42
55-59	6	17
60-64	8	21
>65	3	9
Total	62	256

Table 3: showing the age distribution of mammographic density patterns

Age range in years	Mammographic breast pattern		
	Dense	Fibroglandular	Fatty replaced
<20	0	0	0
20-24	0	1	0
25-29	0	1	0
30-34	0	3	0
35-39	1	22	13
40-44	1	55	26
45-49	2	50	31
50-54	1	14	34
55-59	0	7	16
60-64	0	6	24
>65	0	2	9
Total	**5**	**161**	**153**

The predominant breast type is seen to be the fibroglandular pattern. A total of 161 patients or 50.5% of the total number of patients seen have this mammographic breast density pattern. This pattern appears to peak among the age group 35-49 years where 129 patients or 79% patients are seen. A total of 153 patients or about 48% are seen with mammographic breast density assigned as fatty replaced. Out of a total 206 patients are below the age of 50 years, 70 patients representing 34% have already transited to a fatty replaced breast type. This means that 66% of patients below the age of 50years have mammographic breast density pattern assigned as either fibroglandular or dense.

DISCUSSION

Breast lesions especially malignant ones are demonstrated mammographically mainly as densities[18] or microcalcifications[19,20]. Using observed mammographic appearances, the breast can be considered as being composed on one hand of connective tissue stroma and glandular tissue together known as fibroglandular tissue and fatty tissue on the other hand. This results in varying areas of opacities and lucencies on the mammographic image[21,22]. Various workers have developed differing methods of assigning or classifying mammographic breast densities[5,23,24-26]. In our study we used the method which classifies mammographic densities into dense, fibroglandular or fatty replaced. Akinola*et al*.[27] reported breast types as fatty, glandular, fibrous, fibro-fatty and dense. The differing classifications clearly may cause difficulty in comparing results and so become confusing. The interest in mammographic density pattern has stemmed from findings which identifies it as a strong determinant for breast cancer risk[28,29]. Accordingly, some authors have reported an associated risk of up to 4-6-fold with increased mammographic density [30]. Others workers have put the risk at 1.8-6-fold[7] while some have stated firmly that high-risk mammographic patterns were associated with high-risk pathological features[31]. A change of breast pattern with age has been previously noted [32,33]. Salminen*et al*.[34] found that the incidence of fatty breast increased with increasing age. In our study, out of 113 patients who were ≥50 years, 30 patients representing 26.5% still retained either the fibroglandular or dense breast patterns and should be regarded as high risk. However some workers suggest that high mammographic densities in themselves do not constitute a risk factor, rather the effect is caused by the greater difficulty of detecting breast cancer in dense breasts compared to patients with fatty replaced breast patterns[35-38]. Kolb *et al*.[10] found that mammographic sensitivity in detecting cancers declined significantly with increasing breast density. Due to the fact that breast cancers in our environment occur predominantly in young women[39]where higher mammographic densities are expected, a deliberate strategy to optimize other imaging modalities including ultrasonography to increase detection rate has become a necessity.

Other modifying variables of mammographic density pattern have been identified and studied. These include patient's weight[40, 41], parity and age at first birth[32]. A substantial greater proportion of women on contraceptive pills were found to have low-risk mammographic pattern[42]. However hormone replacement therapy (HRT) may increase mammographic density[16,43-45,47-49]. In our local environment at the moment,no data exists that attempts to comprehensively address these modifying variables including the possible role of breast feeding patterns on mammographic density. Clearly this should be an area where future research efforts mustbe directed.

CONCLUSION:

Majority of breast density patterns encountered in our study is the fibroglandular type. This is followed by the fatty replaced pattern. A significant proportion of women, 50 years and above still retain risk-conferring high mammographic densities. High mammographic density apart from its association with increased breast cancer risk may alternatively mask cancers and reduce sensitivity of detection. It can therefore be said that factors which reduce mammographic density not only increase lesion detection but reduces the risk of breast cancers. Complimentary imaging like ultrasonography needs to be optimized especially in our environment where cancers occur in comparatively younger females who are expected to have mammographically dense breasts. Age, contraception, diet and hormonal replacement therapy are some of the known modifying variables affecting breast density. No local data

on this is at the momentavailable. Different breast density classifications exist as put forward by various authors. There is the need to adopt a common or unified breast density classification in order to avoid confusion.

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