International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

Findings of a Mammographic Screening of the Breast

Agim Dokaj[1], Arsen Hoxha[1], Tahir Hysa[2]

[1]Regional Hospital of Shkodra, Albania

[2]University Hospital Centre "Mother Theresa", Tirana, Albania

Abstract: ***This is a prospective study. 1014 women were included in a screening program at regional hospital in Shkodra over the period 2012 -2013. Clustered and scattered microcalcifications were the main findings in the study. Age of women included in this study ranged from 30-80 years (mean 52 years). Microcalcifications were detected in 152 (15%) of screened women. 86% of women had clustered microcalcifications and 14% had scattered microcalcifications. In 47 (31%) of calcifications was detected a cancer. 47% women had <10 microcalcifications/cm^2, 22% had 10-20 microcalcifications/cm^2 and 10% had >20 microcalcifications/cm^2. Irregularity in size of microcalcifications was found in 48.7% of patients, while mean density of microcalcifications was founfd in 57 patients. The study highlights the effectiveness of the screening program in diagnosing microcalcification and malignancy in women***

Keywords: breast, microcalcifications, cancer, screening, mammography

1. Introduction

There are a number of different classes of abnormality that may be observed in mammograms. One of the most significant types of mammographic abnormality is microcalcification. Microcalcifications are tiny granule like deposits of calcium. They are relatively bright (dense) in comparison with the surrounding normal tissue, and are up to about 1 mm in diameter, with an average diameter of 0.3 mm. Microcalcifications are of particular clinical significance when found in clusters of three or more within a square-centimeter region of a mammogram. The breast develops from mammary ridges. After menarche, the young virgin breast contains more dense connective tissue. With progression in age the dense breast becomes mixed glandular pattern tissue, and with further progression in age, breast begins to involute into fatty tissue (1,3). Any aberration in this process leads to the susceptibility to a spectrum of localised pathologies like, hyperplastic and neoplastic changes. Of the various pathologies that affl ict the breast, cancers are most often encountered and are the most dreaded (2). Despite the gloomy prognosis, increased morbidity and reduced survival time, it can be controlled if detection and diagnosis are made in the earliest stages i.e., in the pre-invasive and clinically nonpalpable stage. Detection of breast cancer in its earliest possible stage is the ultimate goal in imaging the breast, and the role of the radiologist is therefore vital. Radiology chiefly includes MG (mammography) and USG (ultrasonography) followed by biopsy (3). The incidence of breast cancer deaths can be reduced by 30% by the routine screening of healthy women with MG (4,5). This is because breast changes like asymmetry, neodensity, distortion of fibroglandular architecture and microcalcifications are picked up earlier than lesions that become clinically palpable, or are sometimes detected by self-examination. Primary breast carcinoma is one of the commonest causes of cancer deaths among females1-2 and with many advances mortality rate for breast cancer remains challenging. Mammography using high resolution and low dose film screen is the established method for early detection of breast cancers.3-5 Approximately 25-43% of non-palpable cancers are detected on mammography as a result of calcifications (6,7). The presence of multiple fine, clustered, pleomorphic calcifications increases the suspicion of malignancy whereas large, solitary, round or ring like calcifications are unlikely to be associated with malignancy. The aim of this study was to determine the frequency of microcalcifications and malignancy in women included in a screening program.

2. Materials and Methods

This is a prospective study. 1014 women were included in a screening program at regional hospital in Shkodra over the period 2012-2013. Clustered and scattered microcalcifications were included in the study. Among clustered microcalcifications, the eight analytic mammographic criteria have been chosen for determining the diagnostic value of isolated clustered microcalcifications. These included the number of calcifications per square centimeter which are described as <10, 10-20, >20. The total number of microcalcifications per square centimeter was determined by moving a sheet of 1cm square hole in it over the mammogram. The count was made where number of microcalcifications was greatest. Total number of microcalcifications in the cluster are grouped as <10, 10-30, >30. The Irregularity of microcalcifications' density and size in the same cluster is evaluated by the experts (yes or no). The morphologic aspect of each cluster was evaluated. Observations were recorded as linear, branched or vermicular disposition, mean density of microcalcifications (high or low) and opinion of experts on the possible malignancy of the lesions. Results of the study were correlated with the histopathological analysis.

3. Results and Discussion

Age of 1014 patients included in this study ranged from 30-80 years (mean 52 years). Microcalcifications were detected in 152 (15%) of screened women. One hundred thirty one (86%) had clustered microcalcifications and 21 (14%) had scattered microcalcifications. Cancer was detected in 47

(31%) of calcifications (table 1). The number and characteristics of microcalcifications are also presented in table 1. 71 (47%) women had <10 microcalcifications/cm^2, 33 (22%) had 10-20 microcalcifications/cm^2 and 15 (10%) had >20 microcalcifications/cm^2. In 86 (56.5%) patients microcalcifications were found in upper outer quadrant, in 44 (29.2%) patients in upper inner quadrant, in 19 (12.4%) patients in lower outer quadrant and in 12 (7.8%) patients in lower inner quadrant. Regarding the morfology 4 (2.5%) of microcalcifications were linear, 8 (5.3%) were segmental, 10 (6.7%) were regional and 3 (1.8%) were diffuse. Linear, branched or vermicular shape is one of important criteria in diagnosing a malignant cluster. Out of 47 patients with malignant disease, 3 had linear, branched or vermicular calcifications. Irregularity in density and size of microcalcification in a cluster is one of the reliable criteria to diagnose breast cancer. Out of 79 patients with irregular density, 21 were proven to have breast cancer. Irregularity in size of microcalcifications was found in 74 (48.7%) of patients, while mean density of microcalcifications was founfd in76 (50.3%) patients. Expert Radiologists' opinion on the necessity for biopsy of breast with microcalcifictions. These criteria are reliable enough for an expert radiologist to diagnose malignant calcifications. Among 152 patients with microcalcifications biopsy was advised for 47 patients by radiologist. Of these 23 patients were proven to have breast cancer by histopathology. Hence, yield of biopsy after expert radiologist opinion was 42% which is similar with the results described in literature, where the biopsy yield advised by radiologist is approximately 35%. Breast cancer is one of the commonest cause of cancer death among females (8,9). Mammography is the only investigation proven to be effective for the detection of early occult (T0) breast cancers. In this study 131 out of 152 (86%) had clustered microcalcifications while 21 patients (14%) had scattered microcalcifications. Clustered microcalcification can occur in benign as well as malignant conditions (10-13). In this study clustered microcalcifications were present in 70% of benign and 30% of malignant conditions. Certain criteria have been established to determine malignant clustered microcalcification. Cancer was detected in 35 (31%) patients with calcifications. Linear, branched or vermicular shape is one of important criteria in diagnosing a malignant cluster (14-16). Out of 47 patients with malignant disease, 3 had linear, branched or vermicular calcifications Irregularity in density and size of microcalcification in a cluster is one of the reliable criteria to diagnose breast cancer. Out of 79 patients with irregular density, 21 were proven to have breast cancer. Irregularity in size of microcalcifications was found in 74
(48.7%) of patients, while mean density of microcalcifications was founfd in76 patients. Diffusely and randomly distributed microcalcifications in a large volume of breast are usually associated with benign breast disease. Morphologically, a central area of lucency in a calcium deposit is virtually always associated with benign processes (17,18). Certain patterns, however should arouse concern, for example, extensive comedocarcinoma is associated with large areas of mammographically visible calcium deposits. Their mammographic pattern was characterized by a strikingly wild, chaotic appearance with profuse deposition of calcium, Many deposits may have typically benign morphology (19,20). Shape of microcalcifications is again important in such cases. The radiological suspicion should be raised, when these calcifications are interspersed with more irregular appearances resulting in overall heterogeneity (21). When such patterns occur, diffuse breast cancer should be suspected and follow up or biopsy of that area should be considered.

4. Conclusion

Clustered microcalcifications may be the only detectable manifestation of early breast cancer. Mammographic assessment of calcifications is an essential part of assessment of potentially abnormal screening mammograms. The incidence of malignancy associated with a mammographic abnormality of microcalcification in our study is comparable to results shown by other investigators. The study highlights the effectiveness of the screening program in diagnosing microcalcification and malignancy in women. In order to reduce mortality, early detection of breast cancer is important, because therapeutic actions are more likely to be successful in the early stages of the disease.

References

[1] Clarke D, Sudhakaran N, Gateley CA. Replace fi ne needle aspiration cytology with automated core biopsy in the triple assessment of breast cancer. Ann R Coll Surg Engl 2001; 83:110–2.
[2] Schoonjans JM, Brem RF. Fourteen-gauge ultrasonographically guided large-core needle biopsy of breast masses. J Ultrasound Med 2001; 20:967–72
[3] Morris KT, Vetto JT, Petty JK, Lum SS, Schmidt WA, Toth-Fejel S, et al. A new score for the evaluation of palpable breast masses in women under age 40. Am J Surg 2002; 184:346–7.
[4] Kerlikowske K, Smith-Bindman R, Ljung BM, Grady D. Ann Intern Med. 2003 Aug 19; 139(4): 274–84. Evaluation of abnormal mammography results and palpable breast abnormalities. Ann Intern Med. 2003 Aug 19; 139(4): 274–84.
[5] Chakraborti KL, Bahl P, Sahoo M, Ganguly SK, Oberoi C.Magentic resonance imaging of breast masses: Comparison withmammography. Indian J Radiol Imaging 2005; 15:381–387
[6] Pande AR, Lohani B, Sayami P, Pradhan S.Predictive value of ultrasonography in the diagnosis of palpable breast lump. Kathmandu Univ Med J (KUMJ). 2003 Apr-Jun; 1(2): 78–84.
[7] Fajardo LL. Screening mammography, sonography of dense fibrocystic breast tissue. AJR Am J Roentgenol. 2003 Dec; 181(6):1715.
[8] Dennis MA, Parker SH, Klaus AJ, Stavros AT, Kaske TI, Clark SB. Breast biopsy avoidance: the value of normal mammograms and normal sonograms in the setting of a palpable lump. Radiology 2001; 219:186 - 191
[9] Weinstein SP, Conant EF, Orel SG, Zuckerman JA, Czerniecki B, Lawton TJ. Retrospective review of palpable breast lesions after negative mammography and sonography. J Women's Imaging 2000; 2:15–18

[10] Kerlikowske K, Smith-Bindman R, Ljung BM, Grady D. Evaluation of abnormal mammography results and palpable breast abnormalities. Ann Intern Med 2003; 139:274–84.
[11] Shetty MK, Shah YP, Sharman RS. Prospective evaluation of the value of combined mammographic and sonographic assessment in patients with palpable abnormalities of the breast. J Ultrasound Med 2003; 22:263–8.
[12] Kumle M, Weiderpass E, Braaten T, Persson I, Adami HO, Lund E. Use of oral contraceptives and breast cancer risk: the Norwegian-Swedish Women's Lifestyle and Health Cohort Study. CancerEpidemiol Biomarkers Prev 2002; 11:1375–81.
[13] Budai B, Szamel I, Sulyok Z, Nemet M, Bak M, Otto S, et al. Characteristics of cystic breast disease with special regard to breast cancer development. Anticancer Res 2001; 21:749–52.
[14] Osuch JR, Reeves MJ, Pathak DR, Kinchelow T. BREASTAID: clinical results from early development of a clinical decision rule for palpable solid breast masses. Ann Surg 2003; 238:728–37.
[15] Berg WA, Campassi CI, Ioff e OB. Cystic lesions of the breast: sonographic-pathologic correlation. Radiology 2003; 227:183–91.
[16] Kolb TM, Lichy J, Newhouse JH. Comparison of the performance of screening mammography, physical examination, and breast US and evaluation of factors that infl uence them: an analysis of 27,825 patient evaluations. Radiology 2002; 225:165–75.
[17] Barlow WE, Lehman CD, Zheng Y, Ballard-Barbash R, Yankaskas BC, Cutter GR, et al. Performance of diagnostic mammography for women with signs or symptoms of breast cancer. J Natl Cancer Inst 2002; 94:1151–9.
[18] Leichter I, Buchbinder S, Bamberger P, Novak B, Fields S, Lederman R. Quantitative characterization of mass lesions on digitized mammograms for computer-assisted diagnosis. Invest Radiol 2000; 35:366–72.
[19] Obenauer S, Luftner-Nagel S, von Heyden D, Munzel U, Baum F, Grabbe E. Screen fi lm vs full-fi eld digital mammography: image quality, detectability and characterization of lesions [published correction appears in Eur Radiol 2002; 12:2388]. Eur Radiol 2002;12:1697–702.
[20] Lewin JM, Hendrick RE, D'Orsi CJ, Isaacs PK, Moss LJ, Karellas A, et al. Comparison of full-fi eld digital mammography with screenfilm mammography for cancer detection: results of 4,945 pairedexaminations. Radiology 2001; 218:873–80.
[21] Westenend PJ, Sever AR, Beekman-De Volder HJ, Liem SJ. A comparison of aspiration cytology and core needle biopsy in the evaluation of breast lesions. Cancer 2001; 93:146–50.

Author Profile

Dr. Agim Dokaj is in Regional Hospital of Shkodra, Albania

Prof. Dr. Tahir Hysa, PhD is Lecturer, Researcher in University Hospital Centre "Mother Theresa" Tirana, Albania

Table 1: Characteristics of microcalcifications

Calcification Characteristic	*N*	*%*
Clastered	131	86
Scatered	21	14
Benign	105	69
Malign	47	31
No. of microcalcifications/cm2	0	
<10	71	47
10-20	33	22
>20	15	10
Location	0	
Upper outer quadrant	86	56.5
Upper inner quadrant	44	29.2
Lower outer quadrant	19	12.4
Lower inner quadrant	12	7.8
Morphology	0	
Linear	4	2.5
Segmental	8	5.3
Regional	10	6.7
Diffuse	3	1.8
Irregularity in density of microcalcifications	79	52.1
Irregularity of size of microcalcifications	74	48.7
Mean density of microcalcifications	76	50.3