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Clinical Breast Examination for Screening of Asymptomatic Women: The Importance of Clinical Breast Examination for Breast Cancer Detection

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Abstract

Of 489 asymptomatic women who were referred to our institute from other screening clinics, 46 were eventually proven to be breast cancer patients, and this number equated to 8.1% of the 565 breast cancer patients treated in our institute during the period of January 1997 to December 1998. Among the 46 cancer patients of the initial 489 asymptomatic women, twenty-five (54.35%) were detected by mammogram alone, six (13.04%) by clinical breast examination (CBE) alone, and the remaining 15 (32.61%) by both mammogram and CBE. In context with age, the mammographic sensitivity for cancer detection was 100% for women aged over 60, 91% for 50s, 78.9% for 40s, and 75% for 30s, and inversely correlated with the patient's age. Among the 25 cancers detected by mammogram alone, 18 (72%) belonged to DCIS or stage I. In contrast, four (66.7%) of six cancers detected by CBE alone and nine (60%) of 15 cancers by both CBE and mammography were included in stage IIa or IIb. However, the total incidence of early cancers (stages 0 and I) was significantly higher in the screening group than in the symptomatic group ($p<0.01$). These results suggest that the role of mammography is important in the detection of cancers in their earlier stage and CBE is helpful in reducing false negative results in breast cancer screening. In conclusion, film mammography is the best tool for the detection of microcalcification and is useful for the detection of earlier lesions, but is not perfect for the detection of breast cancer particularly in young women. A careful CBE is an essential part of breast screening in order to reduce false-negative results.

Key Words: Breast cancer, screening mammography, clinical breast examination (CBE)

INTRODUCTION

In Korea, breast cancer ranks as the 3rd most common female cancer, accounting for 12% of all cancers in women.[1] The prevalence of breast cancer is 10.9 per 100,000 women[2] and is estimated at about one-eighth of that of the United States, but the incidence is reportedly increasing.[1,2]

Breast self examination (BSE), clinical breast examination (CBE), and film mammography are known to be the best methods for the early detection of breast cancer. Although the mammographic sensitivity for breast cancer detection had been quite low in early 1960s and 1970s, the rate of minimal cancer has been increasing due to recent improvements in imaging diagnostic tools and techniques. Mammography has come to be regarded as being synonymous with breast cancer screening and CBE or BSE are considered to have a subsidiary role.

Over the past three decades, mammography was the primary (or only) screening modality in all randomized trials and case-control studies that have demonstrated that screening for breast cancer can reduce mortality from the disease, at least among women older than 50.[3,4] Although mammography detects many non-infiltrating and small, non-palpable tumors before they are apparent on CBE, we do not know whether these would ever cause symptoms or threaten the woman's life or ensure that breast cancer mortality will be reduced.[5] Most mammographic breast screening programs have shown a very similar recall rate of 8-10.6% and a cancer detection rate of 3.8 to 6.2 per 1,000 women.[6-10] In Korea, two

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reports have shown a 10.5% to 14.3% recall rate and a 0.12% to 0.15% cancer detection rate,[11,12] which implied a similar recall rate but a much lower breast cancer incidence than that observed in other countries. Interestingly, a study of breast screening by CBE alone in Japan showed a 2.8% recall rate and 0.06% cancer detection rate.[13] Though the sensitivity of CBE was lower and the specificity was higher, Minami et al.[12] suggested that the role of CBE in breast cancer screening has substantial advantages over mammography in terms of both psychological and economic costs. CBE screening would eliminate the anxious waiting period and the anxiety and trauma associated with localization of non-palpable lesions, which account for 40−50% of tumors detected by mammography.[14]

Since most breast screening is performed by film mammography alone without clinical breast examination, we carried out this study in order to evaluate the importance of CBE in comparison with the advantages of mammography in breast cancer screening.

MATERIALS AND METHODS

We analyzed the records of 489 patients without subjective symptoms who were referred to the breast clinic at Yonsei University Medical Center for breast reevaluation. They underwent clinical breast examination (CBE) and we reviewed mammograms they brought from other clinics during a period of January of 1997 to December of 1998. We ordered film mammography using Sonography DMR (GE, Wisconsin, USA) for those women who either did not carry mammograms or had mammograms with poor quality. For women who showed a dense mammographic pattern, we also performed ultramammography using an ATL HDI 3000 scanner and 7.5 MHz transducer (Advanced Laboratories, Bothell, Washington, USA). The medical records of 519 symptomatic breast cancer patients who underwent surgical treatment at Yonsei University Medical Center during the same period were also reviewed.

We analyzed the medical data, focusing on patient's age, mammographic sensitivity, and pathologic stages of cancers by detection modalities. Statistical significance was evaluated by chi-square test.

RESULTS

We previously presented Health Center-based breast cancer screening data from 13,889 women (30 to 85 years of age), which demonstrated a cancer detection rate of 1.22/1,000 women.[12] In a hospital setting screening, women aged 40 to 49 were most common and constituted 40.9 %, then women in their 50s, 30s, 60s, and 20s in order (Table 1). All of these 489 women were referred to our institute, but they were asymptomatic when they first visited other breast clinics before referring. We separated these 489 women into four groups according to the abnormal findings: 255 (52.1%) showed normal findings on both film mammography and CBE, 183 (37.4%) showed abnormal findings only on film mammography, 31 (6.3%) showed abnormal findings on both film mammography and CBE, and 20 (4.1%) showed abnormal CBE alone (Table 1). Among the 183 abnormal lesions detected by mammography alone, we reevaluated 72 lesions in dense mammogram with ultramammography. Thirteen benign-looking calcification lesions were not detected and six (14%) of 43 benign-looking masses showed normal ultramammographic findings. Ultramammography detected all of the 16 malignancy-suggesting mammographic lesions, irrespective of the patients' age (Data not shown). Next, we carried out ultramammogram for 202 out of 255 women who never had shown abnormal findings on either mammography or CBE. 68 cases showed abnormal findings such as ductectasia, cyst, or benign mass, and the incidence of abnormal findings was mostly dependent on the patient's age (Fig. 1). How-

Table1. Age Distribution and Results of Asymptomatic Women in Hospital Setting Screening

Age	MMG (+)	CBE (+)	Both (+)	Both (−)	Total
20−29	3	5	2	2	12
30−39	40	5	11	48	104
40−49	62	9	12	117	200
50−59	54	1	5	63	123
Over 60	24	0	1	25	50
Total	183	20	31	255	489

MMG, film mammography; CBE, clinical breast examination; Both, film mammography and clinical breast examination.

ever, to date we have not experienced any cancers detected by ultramammography alone. These results suggest that film mammography is the best tool for the detection of microcalcifications and ultramammography may provide more information that can be helpful in the characterization of mammographically or physically detected abnormal mass-like lesions and the screening of the breasts of younger women who usually show a dense mammographic pattern. We found 20 cases of mammography-missed lesions by CBE. The incidence was quite different depending on the patient's age. There were five cases (41.7%) of mammography-missed lesions out of 12 women in their 20s, five cases (4.8%) out of 104 women in their 30s, nine cases (4.5%) for the 40s, and one case (1%) for the 50s (Fig. 2A). Among the 20 mammography-missed cases, six lesions one in 30s, four in 40s, and one in 50s-were discovered to be malignant (Fig. 2B). Although the study population was too small to draw an exact conclusion, this result suggests the need for different diagnostic tools depending on the patient's age and the mandatory nature of a careful CBE to reduce false negative imaging diagnoses, particulalry for young women. The total number of cancer cases was 46 (9.4%) out of 489 women; twenty-five (54.35 %) were detected by mammography alone, six (13.04 %) by CBE alone, and the remaining 15 (32.61%) by both mammogram and CBE (Fig. 3A). In the context of age, the mammographic sensitivity for cancer detection was 100% for women aged over 60, 91% for 50s, 78.9% for 40s, and 75% for 30s, and was inversely correlated with the patient's age (Fig. 3B). These results imply that film mammography is not

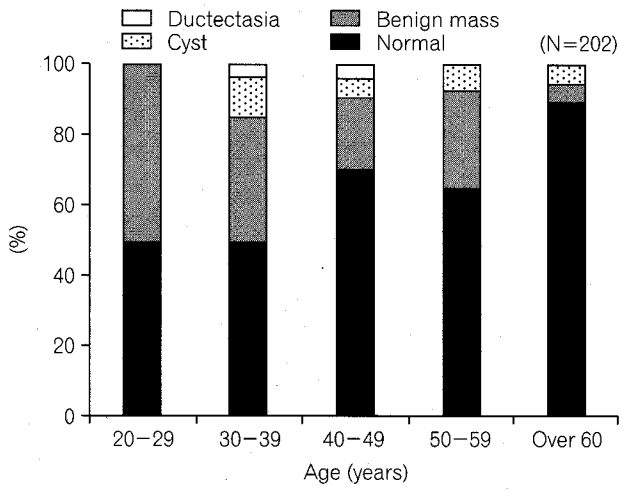

Fig. 1. Ultrasonographic findings for the women with both normal MMG and CBE. We carried out ultramammogram for 202 out 255 women who had not displayed abnormal findings on both MMG and CBE. 68 cases showed abnormal findings such as ductectasia, cyst, or benign mass, and the incidence of abnormal findings was mostly dependent on the patient's age. MMG, film mammography; CBE, clinical breast examination.

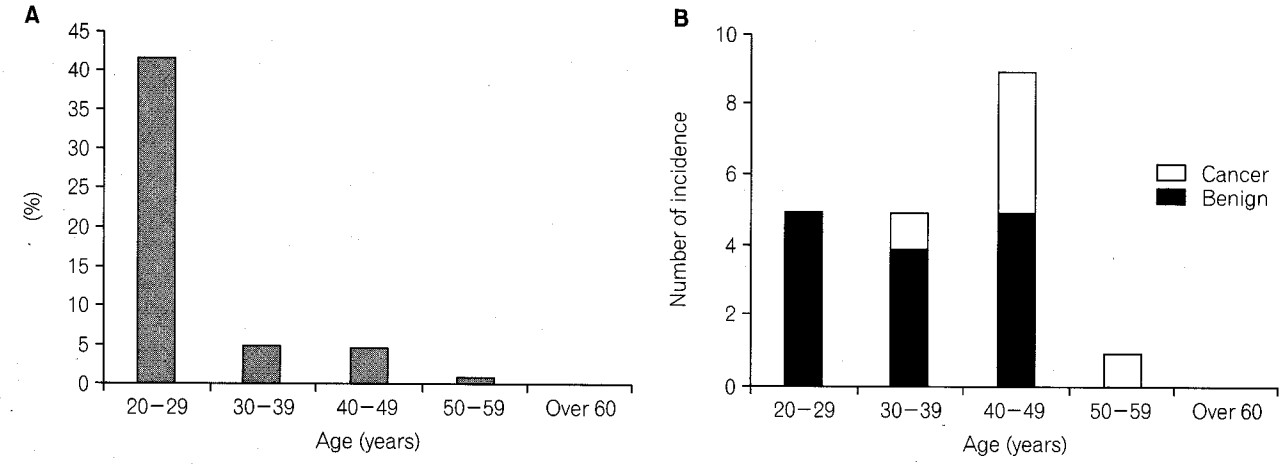

Fig. 2. Incidence and end-results of mammography-missed lesion, detected by CBE alone. We found 20 cases of mammography-missed lesions by CBE. The ratio of mammography-missed lesion was quite dependent on the patient's age, with the highest number of incidences in the 20s (41.7%), 4.8% in 30s, 4.5% in 40s, and 1% in 50s (A). Among the 20 mammography-missed lesions, six turned out to be malignant four in the 40s and the other two in the 30s and 50s. Although the study population was too small to draw an exact conclusion, this result suggests that there may be a need for different diagnostic tools depending on the patient's age and that a careful CBE is also required to reduce false negative imaging diagnoses, particularly in the younger cancer prevalent ages (B). CBE, clinical breast examination.

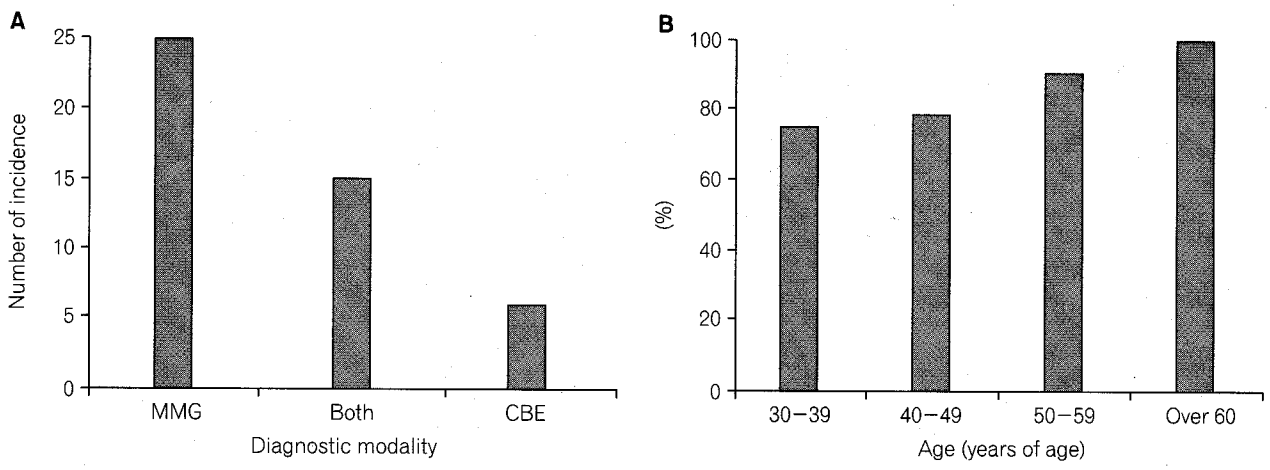

Fig. 3. Incidence of cancers by detection modalities and mammographic sensitivity for cancer detection according to age. The total number of cancer cases was 46 (9.4%) out of 489 women: twenty-five (54.35%) by mammogram alone, six (13.04%) by CBE, and the remaining 15 (32.61%) by both mammogram and CBE (A). In the context of age, the mammographic sensitivity for cancer detection was 100% for women over age 60, 91% for 50s, 78.9% for 40s, and 75% for 30s, and was observed to be inversely correlated with the patient's age (B). These results imply that film Mammography is not perfect for breast cancer detection, particularly for young women and that a careful CBE has a definite role in reducing false-negative mammographic screening. MMG, film mammography; CBE, clinical breast examination.

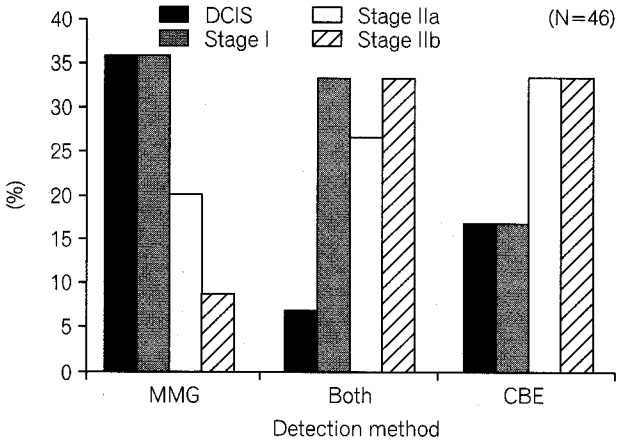

Fig. 4. Pathologic stage of cancers by detection modalities. Among the 25 cancers detected by mammogram alone, 18 (72%) belonged to DCIS or stage I. In contrast, four (66.7%) of six cancers detected by CBE alone and nine (60%) of 15 cancers by both CBE and mammogram were included in stage IIa or IIb. This result shows the role of the mammogram in cancer detection in the earlier stage. MMG, film mammography; CBE, clinical breast examination.

perfect for breast cancer detection, particulalry for young women, that a careful CBE has a definite role in reducing false-negative mammographic screening. Ultramammography may have a certain roles in breast cancer screening as well. Considering the pathologic stage by detection modalities, among the 25 cancers

Table 2. Comparison of Pathologic Stage between Screening Group and Symptomatic Group

	Stages 0 and I	Over stage IIa	Total
Screening Group*	26	20	46
Symptomatic Group*	162	357	519

* $p < 0.01$.

detected by mammogram alone, 18 (72%) belonged to DCIS or stage I; four (66.7%) of six cancers by CBE alone and nine (60%) of 15 cancers by both CBE and mammogram were included in stages IIa or IIb (Fig. 4). Overall, 26 cancers (56.5%) belonged to stages 0 or I, which showed a significantly higher rate of earlier detection in asymptomatic screening women in contrast to symptomatic patients ($p < 0.01$) (Table 2). These results support the roles of breast screening and film mammography in earlier detection, and the role of CBE in the reduction of false-negative results in breast screening.

DISCUSSION

According to a randomized breast screening study carried out from 1963 through 1975 by Health Insu-

rance Plan of Greater New York (HIP),[15] the incidence of breast cancer detected by film mammography alone was only 33%, while it was 44.7% by CBE alone. However, the sensitivity of film mammography to detect breast cancer has been improved and it has become the primary screening modality for breast cancer detection.

The Breast Cancer Detection Demonstration Project (BCDDP)[16] showed that the mammographic sensitivity for detecting cancer was 89.2% for the 40s and 94.8% for women over age 50. However, 10.8% of cancers of women in their 40s and 5.2% of cancers of women over age 50 were detected by CBE alone. The current study, as shown in figure 3B, also demonstrated very similar mammographic sensitivity and this data suggests that screening with mammography alone may result in approximately 10% false negative results, which may cause delayed diagnosis and treatment. However, this can be overcome by a careful CBE.

Although mammography is more sensitive than CBE for the detection of breast cancer, some parts of breast cancers can escape detection. The reasons include the facts that mammographic imaging does not always include the entire breasts, some malignant features of a non-calcified breast cancer may go undetected when the cancer is within an area of fibroglandular tissue, and could also be due to simple observer inconsistency.[17-19] As shown in Fig. 2A and 3B, mammographic sensitivity was inversely correlated with the patient's age, because younger women have radiographically dense breasts and breast cancers have an attenuation that is similar to that of the glandular and fibrous elements. Therefore, the denser and more complex the mammographic pattern, the less confident radiologists are in their diagnosis.[20]

Since false-negative mammography may lead to a delay in the diagnosis and treatment of breast cancer,[21-23] a careful CBE would be necessary for the reduction of false negative results and for the reduction of breast cancer mortality as well.

As demonstrated in Fig. 1, because newer ultrasonographic machines and probes are capable of higher contrast and spatial resolution and most cancers are relatively hypoechoic and well visualized against a background of hyperechoic fibroglandular tissue, more non-palpable mammographically occult cancers may be identified in women with dense breasts.[24] Although we did not experience any cancers detected by ultramammogrphy alone in the current study, we believe that ultramammography would have some role as second-line tool in the detection of breast cancers, particulalry for young women, and we will continue to collect ultramammographic data related to screening women.

Screening reduces breast cancer mortality in women aged 50 to 74 by approximately 26%.[4] The efficacy of breast cancer screening for women ages of 50−64 is widely accepted, but there is much controversy concerning the screening of women ages 40−49 years old in western countries. Kerlikowske et al, and Smart et al, reported that a benefit of screening women ages 40−49 years old, with at least 10−12 years of follow-up, is a 17−21% mortality reduction.[4,25] The prognosis of mammographically detected breast cancer is at least as favorable in women ages 40−49 as in women ages 50−64.[6] In 1997, however, a National Institute of Health Consensus Development Conference concluded that the data currently available do not warrant a universal recommendation for mammograms for all women in their forties.[26] The characteristics of Korean breast cancer are the highest incidence rate in their 40s and more than 20% of cancers occurring in women aged under 40.[27] Therefore, Moon and The Korean Council of Breast Imaging recommended to begin breast screening as early as age 35 for Korean women.[28] As shown in figure 2B, five of six mammography-missed cancers were found in women in their ages of 30s and 40s, which suggested that a careful CBE must be included for breast cancer screening in Korea.

As shown in Fig. 4, seventy two per cent of cancers detected with mammography alone were included in stage 0 (DCIS) or stage I, in comparison with 33.4% by CBE alone. This result suggests the superiority of film mammography for the detection of earlier lesions in breast cancer screening. In addition, the incidence of early cancer is significantly higher in the screening group than that seen in the symptomatic group (Table 2). Moreover, the rate (56.5%) of early cancer (stages 0 and I) was comparable to the result of Yoon et al,[11] who performed breast screening with both CBE and film mammography. Although the ability of mammography to detect many non-infiltrating and small, non-palpable tumors before they are apparent on CBE has been indisputably established, this does not ensure that breast cancer mortality will be reduced.[5] Moreover, CBE was the main reason for the

breast cancer mortality reduction in the Health Insurance Plan study, which compared mammography plus CBE with no screening.[29,30] The National Breast Screening Study (NBSS) of Canada also showed that mammography adds little to mortality reduction if CBE is also incorporated in a screening program.[31] Therefore, if CBE combined with the teaching and reinforcement of BSE, could provide much of the benefits from mammography alone, this may be a cost-effective and acceptable approach in many populations.[32]

We found six cancers (13%) out of 46 cases with CBE alone, which was slightly higher but comparable to other reports of 5.2% to 10.8%.[11,16] A false negative mammography can also be a hazard if a woman delays seeking care when she subsequently notices a breast mass.[33] That is one of the reasons why we emphasize the importance of CBE in breast screening.

Collectively, mammography would detect many more in-situ cancers than would CBE.[34] However, the ratio of benign to malignant biopsy samples is likely to be lower for CBE-detected than for mammographically detected lesions.[28] Although screening with CBE alone may delay the diagnosis, screening by CBE may be as effective as screening mammography in reducing mortality from breast cancer with psychological and economic advantages.[13] We do not insist on breast screening with CBE alone, since we know the benefits of film mammography for the detection of small non-palpable lesions in their early stage.

In Korea, the incidence of breast cancer is highest among women aged 40 to 49 and more than 20% of cancers occur in women under age 40.[27] Moon and The Korean Council of Breast Imaging recommended to begin breast screening as early as age 35 in Korean women.[28] Therefore, a careful CBE must be included in breast screening in order to reduce false negative results. Addtionally, ultramammography may be helpful for the verification of certain lesions detected by CBE or film mammography. In terms of cost-effectiveness, mortality reduction, and psychosocial effects resulting from the false positive or false negative results of mammography, we insist on the importance of CBE in combination with film mammography for breast cancer screening in asymptomatic women, particulary for the younger women.

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