



5

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1

2

3

4

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가 가

: 5

1

13,889 (30-

85)

가

ACR BI-RADS final assessment 0

가

가

ACR BI-RADSTM final assess-

ment 1-5

Category 4, 5

: 5

13,889

15,308

(1.1) 1,992

(13%). ACR BI-RADS category 4, 5

92 17

(PPV2) 18.5%

1.2/1,000

30 0.24/1000 , 40

1.6/1,000

1

47% (8/17),

47% (8/17), 14

64% (9/14)

2

90%

17

4

:

1990 Sickles

(medical audit)

가

ACR BI-RADS™ (American College of Radiology Breast Imaging and Data System): (follow-up and outcome monitoring)

(1).

1980

8.7%

97

가

가

(2).

13.3% 가

1994 5

1998 12

5

13,889 (30-85)

가

가

가

50%

가

(ACR BI-RADS: Breast composition 3, 4)

가

ACR BI-RADS

(final assessment) category 0

가

1999 9 28

2000 2 29

1
2
3
4

(Table 1). 가
 (Category 4, 5) 가
 (Category 3) 6
 (Fig. 1).
 Lorad M-III mammographic unit (LORAD Medical systems, Danbury, U.S.A.)
 Diasonic Imaging (GE Medical systems, Wisconsin, U.S.A.)
 1998 8 1999 2
 1994 5 1998 2
 BI-RADS™ category 0-5 1998 3
 category 0-5 BI-RADS category 4,
 5
 ACR BI-RADS™ (fol-
 low-up and outcome monitoring)
 30-39 가 4,599 (30%) 가 , 40 가 4,179
 (27%), 50 가 4,583 (30%), 60 1,736 (11%), 70

211 (1%) (Table 2).
 1,992 가
 (category 4, 5) 92 52 17
 40 10 가
 (Table 3). (category 4, 5)
 (positive predictive value 2) 18.5%
 17 3 1 5 1
 47% (8/17) (1cm
) 47% (8/17)
 14 가
 9 (64%)
 (Category 1) 2 19 17
 (Sensitivity) 90% (17/19)
 (Table 4). 17
 4 1 8
 1 (Table
 5).
 Table 6
 165 3
 18.2/1,000 13,724 14
 1.0/1,000 가
 가 388 1

Table 1. ACR BI-RADS™ : Final Assessment Categories

Assessment	Incomplete
Category 0	Need additional imaging evaluation
Assessment is complete-final category	
Category 1	Negative
Category 2	Benign finding
Category 3	Probably benign finding Short interval follow-up suggested
Category 4	Suspicious abnormality- Biopsy should be considered
Category 5	Highly suggestive of malignancy- Appropriate action should be taken

ACR BI-RADS™ : American College of Radiology Breast Imaging-Reporting and Data System™

Table 2. Age Distribution of Women Screened by Year

Age\Year	Total	30-39	40-49	50-59	60-69	70-
1994	992	224	263	378	114	13
1995	3,232	1,113	888	912	286	33
1996	3,186	946	861	957	380	42
1997	4,926	1,630	1,366	1,352	520	60
1998	2,970	686	801	984	436	63
Total	15,308	4,599	4,179	4,583	1,736	211

Table 3. Mammography Audit: Collected Data

Data Item	Results
Total screening cases	13,889
Total screening cases, assessment BI-RADS™ Category 0,4,5	1,992
Total cases, final assessment BI-RADS™ Category 4,5	92
Total cases from final assessment BI-RADS™ Category 4,5 that underwent Biopsy or surgery	52
Number of these that were malignant	17
Number of these that were benign	35
Total cases from final assessment BI-RADS™ Category 5 that were	
lost to follow-up, refused biopsy, or surgeon elected to follow rather than biopsy	F/U 30 Lost 10
Total cancers found that were ductal carcinoma in situ	3
Total cancers found that were invasive ductal carcinoma or invasive lobular carcinoma	14
Total cancers found that were invasive ductal carcinoma or invasive lobular carcinoma for which axillary sampling was performed	14
Total number of invasive cancers that were < /= 1cm in size	5
Total number of invasive cancers that showed positive axillary lymph nodes at surgery	9
F/U cases who choose to follow up	
Lost cases who were lost to follow up	

Table 4. Result of Medical Audit Data and Comparison with Desirable Goal

Audit Data	Result	Goal
Positive predictive value (PPV) based on abnormal findings at screening examination (PPV1)	0.8%	5-10%
PPV when biopsy or surgical consultation recommended (PPV2)	18%	25-40%
Tumor found- stage 0 or 1	47% (8/17)	> 50%
Tumor found-minimal cancer	47% (8/17)	> 30%
Node positivity	64% (9/14)	> 25%
Cancers found / 1000 cases	1.2	2-10
Prevalent cancers found /1000 first-time examinations	1.5	6-10
Incident cancers found / 1000 follow-up examinations	0	2- 4
Recall rate	13%	< 10%
Sensitivity (if measurable)	89.5%	> 85%
Specificity (if measurable)	> 99%	> 90%

Goal: Desirable goal of screening mammography in U.S.A
 Minimal cancer: invasive cancer < /= 1 cm, or in situ ductal cancer

Table 5. Cancers detected by Surgeon in Mammographically Detected 17 Cancers

Stage	0	1	2	3	Total
Mammography (%)	3 (18)	5 (29)	6 (35)	3 (18)	17 (100)
P/E by surgeon (%)	0 (0)	1 (17)	2 (40)	1 (33)	4 (24)

P/E= physical examination
 () Percent

Table 6. Cancer Detection Rate according to Demographic Finding

Subgroup	No.	No. Cancer	Cancer Detection Rate (/1000)
Palpable			
Yes	165	3 (1)	18.2 (24.2)
No	13,724	14 (1)	1.0 (1.1)
Family history			
Yes	388	0	0
No	13,501	17 (2)	1.3 (1.4)
Menopause			
Yes	6,761	12 (2)	1.9 (2.1)
No	7,128	5	2.1
Prior mammogram			
Yes	2,874	0	0
No	11,015	17 (2)	1.5 (1.7)

() Number of total cancer detected including missed cancer
 Prior mammogram: women who have already been screened within 1 year

2,874
 (40-85) 1.6/1,000
 30-39 0.24/1,000 , 40
 (Table 7).
 , 30
 0/1,000, 40
 1.5/1,000 (Table 7).

Table 7. Cancer Detection Rate of Screened (nonpalpable) Women According to Women's Age

Subgroup Age	No. Women	No. Cancer	Cancer Detection Rate (/1,000)
30-39	4,140 (4,082)	1 (0)	0.24 (0)
40-49	3,649 (3,606)	4 (4)	1.1 (1.1)
50-59	4,247 (4,210)	7 (5)	1.65 (1.2)
60-69	1,652 (1,626)	6 (6)	3.6 (3.7)
70-	201 (200)	0 (0)	0 (0)
Total	13,889 (13,724)	17 (14)	1.2 (1.0)

() results of women without palpable lesions

가
 가
 (3). 1 , 2
 , ' ,
 75%
 lead time bias, length-time bias,
 overdiagnosis bias, selection bias
 7
 40-74
 5 22% (4), 1997
 7
 40-49 24% (5).
 (National cancer institute) 1997 3 40
 1-2 (6)
 (American Cancer Society)
 (American College of Radiology)

(7). 40 (demographic information), (recom-
 mendation) 가 ACR
 (lexicon)
 2 (minimal breast cancer)
 1cm 가 . 1cm 가
 (minimal breast cancer) 10 가
 95%, 가
 10 65-80% 가 10
 25-48% BCDDP(Breast Cancer (recall rate)
 Detection Demonstration Project) 1cm (PPV)
 14.3% 1cm 가
 29.2% 53%
 , 8.4% 36.4% 가 (13),
 (8). 1980 가
 9.3% (28.3%), (18%)
 3 1997 13.3% 가
 (9). (average
 age-specific breast cancer incidence) 가
 75-79 (480 /100,000)
 34%가 , 1992-1995 (14).
 100,000) 가 (9, 10). (screening patient) (diagnostic patient)
 (quality assurance)
 35 FDA 1993
 (11). (MQSA: Interim Rule) 1997 MQSA:Final
 Rule 1999 4 28 (15).
 (Nati-onal academy of sciences committee) (BEIR-V)
 5-10 Table 3, 4
 15 가 Table 4.
 20 가 .
 40 가 FDA(Food and drug administra- (12, 14).
 tion) 40 가 (12). (47%), 0
 가 (Breast composition 3, (47%)
 4) 가 (Breast composition 1, 2) 18% 25% (64%)
 가 (8). (recall
 rate)
 가 30 , 40
 가 (breast composition)
 가 가 1000 2-10 1.2 ,
 1990 Sickles 6-10 1.5
 가 가
 (1). 3,889 2 missed cancer

(specificity)

1

Tumor registry가

가

(16, 17).

40

가

가

가

가

가

가

가

1

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Screening Mammography in a Health Promotion Center for 5 Years: Results of Medical Audits¹

Mi Hye Kim, M.D., Mi Ja Lee, M.D.², Ki Keun Oh, M.D.³, Kyong Sik Lee, M.D.⁴

¹Department of Diagnostic Radiology, Miz Medi hospital

²Severance hospital Health promoting center

³Department of diagnostic radiology, Research Institute of Radiological Science, Yonsei University, College of Medicine

⁴Department of general surgery, Yonsei University, College of Medicine

Purpose: The purpose of this study was to perform a medical audit of the screening of mammographic results according to ACR BI-RADS Follow-Up and Outcome Monitoring and to evaluate the efficacy of screening mammography in the early detection of breast cancer.

Materials and Methods: We reviewed the results of 15,300 mammographic examinations of 13,889 women aged 30-75 years who underwent mammography at least once at the Severance Health Promotion Center between 1994 and 1998. Women with abnormal mammographic findings were recalled for additional study and those with dense breast composition (3, 4) underwent additional ultrasound. All results were categorized on the basis of the ACR BI-RADS final assessment scale, 1-5. We reviewed the pathologic or follow-up results of all women in categories 4 and 5, and/or those in any category who took the films out of the health center.

Results: The recall rate was 13%. Biopsy or surgical consultation was recommended for 92 women and biopsy was performed in 52. Pathology revealed 17 cancers and 35 benign lesions. Positive predictive value 2 was found in 18.5% of cases, and positive predictive value 3 in 33%. The cancer detection rate was 1.2/1,000, and sensitivity was 89.5%. Invasive cancers smaller than 1cm or in situ ductal cancers were found in eight of 17 cases (47%), while node-positive invasive cancers were found in nine of 14 cases (64%). Four of 17 mammographically detected cancers were palpated by a surgeon.

Conclusion: In asymptomatic women, screening mammography is an effective method for the detection of early breast cancer.

Index words : Breast neoplasms, diagnosis
Breast radiography, quality assurance
Cancer screening

Address reprint requests to : Mi Hye Kim, M.D., Department of Diagnostic Radiology, Miz Medi Hospital
701-4, Naebalsan-dong, Kangseo-ku, Seoul 157-280, Korea.
Tel. 82-2-2007-1430 Fax. 82-2-2007-1285
E-mail: Mkim221@unitel.co.kr