

가 1

2

: 가

: 47

. 47 36 가 , 11 23 68 46

38 , 37 . 46

: 46 가 29 (63%),

가 가 13 (28%) , 가 8 (17%) ,

2 (4%), 1 (2%), 가 9 (20%) .

38 가 25 (66%), 가 9 (24%) ,

가 8 (21%) , 2 (5%), 3 (8%) ,

가 7 (18%) . 37

가 25 (68%), 가 20 (54%) , 2 (5%),

3 (8%), 1 (3%) ,

가 1 (3%) . 20%, 18%

, 3% .

가

: 가

가

가 40 10

가 Silverberg E. (1) (2).

1990 가

15 , 4 4

. 40

가 70

가 가 . 가 가

1 가

2 가

2001 10 10 2002 7 2 ,

(false negative rate)

가

1993 2000
 47
 36 가 (ductal carcinoma in situ) 11
 (invasive ductal carcinoma)
 23 68 46 , 47
 47 46 , 38 11 36 1 cm
 37
 Lorad (New York, U.S.A.) (Table 1).
 (mediolateral oblique view: MLO view) 가 36
 (craniocaudal view: CC view) 23 (64%) 가 ,
 (spot compression and magnification 가 18 (50%), 가 2 (6%),
 view) 가 Acuson 가 3 (8%),
 128XP/10 (Mountain - view, California, U.S.A.) 7 MHz 가 1 (3%) 가
 가 가 1 (3%) ,
 가 가 11 10 (91%) 가

Table 1. Mammographic and Ultrasonographic Findings of Ductal Carcinoma In Situ(DCIS) and Invasive Ductal Carcinoma(IDC) of the Early Breast Cancer

Mammographic Findings	US Findings	DCIS	IDC
Mass	Mass	4(4)	1(1)
Microcalcification	Mass	0(0)	0(0)
	Microcalcification	1(0)	0(0)
	Mass with microcalcification	6(6)	1(1)
	Duct dilatation	1(0)	0(0)
	Negative	5(5)	0(0)
Mass with microcalcification	-	6(0)	1(0)
	Mass	2(2)	2(2)
	Mass with microcalcification	0(0)	1(1)
	Negative	1(1)	0(0)
Multiple nodules	-	1(1)	1(1)
	Multiple nodules	2(2)	0(0)
	Architectural distortion	1(1)	0(0)
Negative	Mass	2(2)	4(3)
	Duct dilatation	2(2)	0(0)
	Negative	1(1)	0(0)
-	Mass	1(1)	0(0)
Total number of cases		36(28)	11(9)

- : Case in which no mammography or ultrasonography was performed.
 () : Total number of cases having symptom such as palpable mass, breast pain and nipple discharge.

가 6 (55%)
 가 29 (63%) 가 (Fig. 1),
 가 13 (28%) 가 8 (17%)
 가 2 (4%), 가 1 (2%)
 ()가 9 20%
 가 25 (66%) 가 (Fig. 2),
 가 9 (24%) 가 8 (21%)
 가 2 (5%), 가 3 (8%)
 ()가 7
 가 63%
 24%
 ($p < 0.05$).
 28%
 66%
 가
 ($p < 0.05$).

37
 가 25 (68%),
 가 20 (54%) (Fig. 3),
 가 2 (5%) (Fig. 4), 가 3
 (8%), 가 1 (3%)

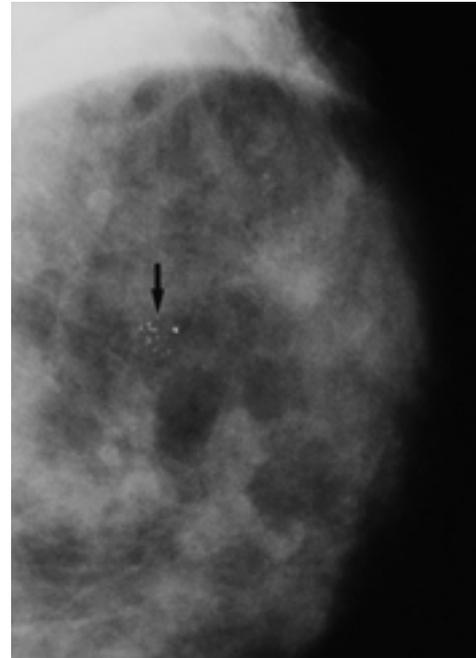


Fig. 1. Ductal carcinoma in situ in 46-year-old female. Compression and magnification view of mammogram shows clustered microcalcifications with amorphous and linear patterns (arrows). But ultrasonogram shows no abnormal findings (not shown).

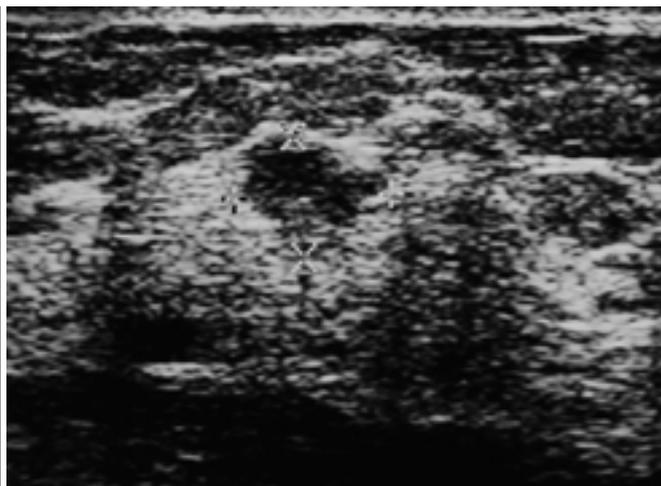


Fig. 2. Invasive ductal carcinoma in 46-year-old female presenting with palpable mass.
A. Mediolateral oblique view of mammogram shows dense fibroglandular tissue with no definite abnormal mass and microcalcification.
B. Ultrasonogram shows ill-defined hypoechoic mass which is measured about 0.9 × 0.7 cm in size at upper outer quadrant of the right breast (cursors).

A

가 (16.2%) (14.7%) (1999) 가 (20%, 18%, 3%) 가 1 (3%) 가 9 가 5 가 3 (dense breast) 가 1 가 6 가 2 가 가 1 가 2 가 1 가 1 가 5 가 6 가 1 가 (Table 1).

(Table 2).

가 9

가 3

가 1

가 6 가 2 가

가 1

가 2

가 1

가 1

가 5 가

가 6

가 1 가 (Table 1).

Breast Cancer Detection Demonstration Project(BCDDP) (lobular carcinoma in situ), (ductal carcinoma in situ) 1 cm 가 (3-5). (5),

Table 2. Diagnostic Rate of the Early Breast Cancer on Mammography, Ultrasonography, and Combined Study of Mammography and Ultrasonography

	Mammography (n=46)	US (n=38)	Mammography and US (n=37)
DR	37 (80%)	31 (82%)	36 (97%)
FNR	9 (20%)	7 (18%)	1 (3%)*

DR: Diagnostic rate of the early breast cancer
 FNR: False negative rate of the early breast cancer
 *: $p < 0.05$

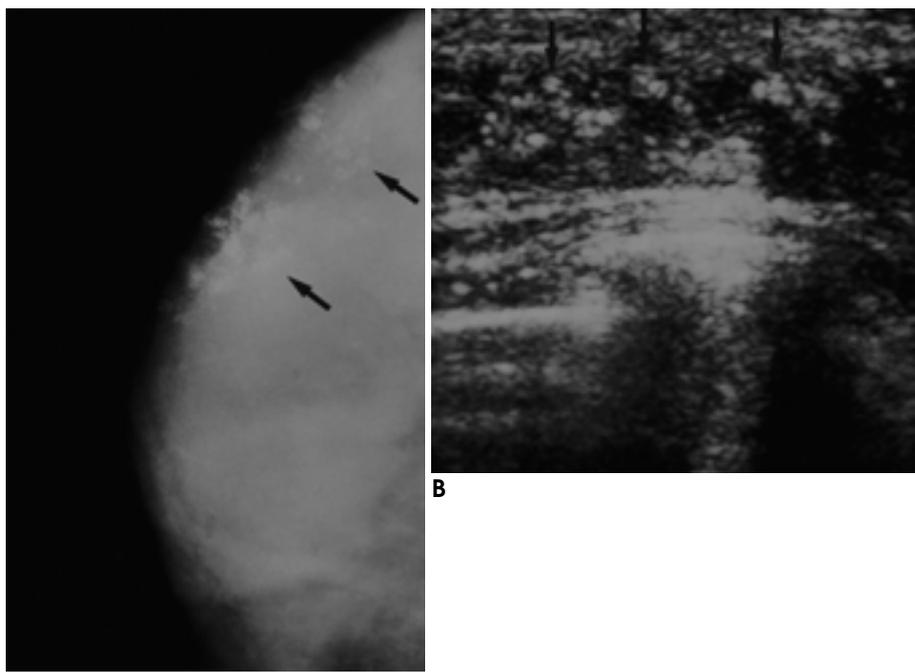


Fig. 3. Ductal carcinoma in situ in 23-year-old female.
A. Craniocaudal view of mammogram shows clustered microcalcifications at with segmental distribution at outer portion of the left breast (arrows).
B. Ultrasonogram shows multiple conglomerated echogenic spots from massive clustered microcalcifications (arrows).

3/4 가 1 cm

가

(suspicious malignancy)

가 가
가 가

(p < 0.05).

가 20%, 18%

가 3%

가 가
Strathfield Breast Centre Chew

20
, 1995
(24)

9%
(25, 26)

1977 Dodd 1988 Cregan
12% 11%
Chew (24)

49

가

7

가

20%
18%

Chew Dodd, Cregan

가

3%

가

54%

9 (20%)

5

(fatty
(scattered

breast),
fibroglandular parenchyma)

1. Silverberg E, Boring CC, Squires TS. Cancer statistics 1990. *CA Cancer J Clin* 1990;40:9-26
2. . 1996
1998;55:621-635
3. Page DL, Dupont WD, Rogers LW, Landenberger M. Intraductal carcinoma of the breast: follow-up after biopsy only. *Cancer* 1982; 49:751-758
4. Baker LH. Breast cancer detection demonstration project: five-year summary report. *CA Cancer J Clin* 1982;32:194-225
5. Seidman H, Gelb SK, Silverberg E, LaVerda N, Lubera JA. Survival experience in the Breast Cancer Detection Demonstration Project. *CA Cancer J Clin* 1987;37:258-290
6. Fletcher SW, Black W, Harris R, Rimer BK, Shapiro S. Report of the international workshop on screening for breast cancer. *J Nat Cancer Inst* 1993;85:1644-1656
7. Smart CR, Hendrick RE, Rutledge JH III, Smith RA. Benefit of mammography screening in women ages 40 to 49 years. *Cancer* 1995;75:1619-1626
8. Edeiken S. Mammography and palpable cancer of the breast. *Cancer* 1988;61:263-265
9. Burns PE, Grace MG, Lees AW, May C. False negative mammo-grams causing delay in breast cancer diagnosis. *J Can Assoc Radiol* 1979;30:74-76
10. Mann BD, Giuliano AE, Bassett LW, Barber MS, Hallauer W, Morton DL. Delayed diagnosis of breast cancer as a result of normal mammograms. *Arch Surg* 1983;118:23-24
11. Huang CS, Wu CY, Chu JS, Lin JH, Hsu SM, Chang KJ. Microcalcifications of non-palpable breast lesions detected by ul-trasonography: correlation with mammography and histopathology. *Ultrasound Obstet Gynecol* 1999;13:431-436
12. Sickles EA. Mammographic features of 300 consecutive nonpalpa-ble breast cancers. *AJR Am J Roentgenol* 1986;146:661-663
13. Sickles EA. Breast calcifications: mammographic evaluation. *Radiology* 1986;160:289-293

14. Ciatto S, Cataliotti L, Distanti V. Nonpalpable lesions detected with mammography: review of 512 consecutive cases. *Radiology* 1987;165:99-102
15. Lafontan B, Daures JP, Salicru B, et al. Isolated clustered microcalcifications: diagnostic value of mammography - series of 400 cases with surgical verification. *Radiology* 1994;190:479-483
16. Rosenberg AL, Schwartz GF, Feig SA, Patchefsky AS. Clinically occult breast lesions: localization and significance. *Radiology* 1987;162:167-170
17. Meyer JE, Kopans DB, Stomper PC, Lindfors KK. Occult breast abnormalities: percutaneous preoperative needle localization. *Radiology* 1984;150:335-337
18. Ciatto S, Bravetti P, Bonardi R, Rosselli de Turco M. The role of mammography in women under 30. *Radiol Med* 1990;80:676-678
19. Harris VJ, Jackson VP. Indications for breast imaging in women under age 35 years. *Radiology* 1989;172:445-448
20. Evans WP. Breast masses: appropriate evaluation. *Radiol Clin North Am* 1995;33:1085-1108
21. Mettler FA, Upton AC, Kelsey CA, Ashby RN, Rosenberg RD, Linver MN. Benefits versus risks from mammography: a critical reassessment. *Cancer* 1996;77:903-909
22. Moon WK, Im JG, Koh YH, Noh DY, Park IA. US of mammographically detected clustered microcalcifications. *Radiology* 2000;217:849-854
23. Kolb TM, Lichy J, Newhouse JH. Occult cancer in women with dense breasts: detection with screening US-diagnostic yield and tumor characteristics. *Radiology* 1998;207:191-199
24. Chew SB, Hughes M, Kennedy C, Gillett D, Carmalt H. Mammographically negative breast cancer at the Strathfield Breast Centre. *Aust N Z J Surg* 1996;66:134-137
25. Dodd GD. Present status of thermography, ultrasound and mammography in breast cancer detection. *Cancer* 1977;39(6 suppl):2796-2805
26. Cregan PC, Parer JG, Power AR. Accuracy of mammography in an Australian community setting. *Med J Aust* 1988;149:408-409

Diagnostic Accuracy of Mammography and Ultrasonography in Detection of Early Breast Cancer¹

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Purpose: To determine the value of mammography and ultrasonography in the detection of early breast cancer, and the usefulness of combining the two modalities for the diagnostic study of this condition.

Materials and Methods: The mammographic and ultrasonographic features of 47 female patients aged 23 - 68 (average, 46) years with pathologically proven early breast cancer were analyzed retrospectively. Mammography was performed in 46 patients and ultrasonography in 38, and 37 underwent both mammography and ultrasonography. Analysis of the mammographic and/or ultrasonographic features focused on mass, microcalcification, mass with microcalcification, multiple nodules, duct dilatation, and architectural distortion.

Results: Mammography revealed microcalcification in 29 (63%) patients, mass in 13 (28%) patients, mass with microcalcification in 8 (17%) patients, multiple nodules in 2 (4%) patients, architectural distortions in 1 (2%) patient, and negative finding in 9 (20%) patients. Ultrasonography revealed mass in 25 (66%) patients, microcalcification in 9 (24%) patients, mass with microcalcification in 8 (21%) patients, multiple nodules in 2 (5%) patients, duct dilatation in 3 (8%) patients, and negative finding in 7 (18%) patients. On combined study of mammography and ultrasonography of the 37 patients, mammography or ultrasonography revealed mass in 25 (68%) patients, microcalcification in 20 (54%) patients, multiple nodules in 2 (5%) patients, duct dilatation in 3 (8%) patients, and architectural distortion in 1 (3%) patient. In one (3%) patient among them, both mammography and ultrasonography revealed negative findings. The false negative rate of mammography, ultrasonography or both was 20%, 18%, and 3%, respectively, which was statistically significant difference ($p < 0.05$).

Conclusion: Combined study of mammography and ultrasonography is the most useful as a diagnostic study for early breast cancer. So, ultrasonography seems to be the important additional method for detection of early breast cancer.

Index words : Breast neoplasms
Breast neoplasms, radiography
Breast neoplasms, US

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