

Clinical Characteristics of Korean Breast Cancer Patients in 1998

The Korean Breast Cancer Society collected and formulated data for breast cancer in Korea through the nation-wide survey in 1998. The purposes of the present study were to determine the characteristics of breast cancer patients and compare these data with those from other countries. The data were collected from 36 university hospitals and 41 training hospitals. The total number of patients was 4,695. The estimated incidence of breast cancer in 1998 was 20.3 patients per 100,000 women. The median age was 47.0 years. The operation method was mastectomy (74.3%), breast conserving surgery (23.8%) and others (1.9%). The most prevalent stage was II (53.3%) followed by I (24.9%), III (13.7%), 0 (6.4%) and IV (1.7%). Other clinical and pathological findings were also evaluated. Several characteristics of breast cancer among Koreans tend to follow the patterns of western countries, and we need to understand the characteristics of Korean breast cancer through continuous investigations as the present study attempts.

Key Words: Breast Neoplasms; Incidence; Operation; Stage; Korea

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INTRODUCTION

Breast cancer is reported to be the most frequently occurring cancer in women in U.S.A. and several western countries. According to the surveillance, epidemiology and end results (SEER) cancer statistics review from US National Cancer Institute in 1998, approximately 180,000 women are diagnosed with breast cancer annually in the United States. And breast cancer accounts for approximately 30% of all incident cancers among women. The life-time risk through age 85 years of being diagnosed with breast cancer for an American woman is approximately 1 in 8, or 12.5%. Breast cancer is the second most frequent cancer in Japanese women next to stomach cancer.

In Korea, according to the cancer registration report of the Ministry of Health and Welfare in 1997, breast cancer ranks the third most frequent cancer in women. About 13.3% of cancers occurring in women is breast cancer, after cervical cancer and stomach cancer. Although this rate is low compared to those of European countries and U.S.A., the rate is gradually increasing (1). According to statistics of the Ministry of Health and Welfare, the number of breast cancer patients was reported to be 2,779 in 1992, 3,247 in 1993, and 3,203 in 1994; the number is expected to grow due to westernizing life style, decreasing rates of birth and lactation, and increasing interest in regular check-up for breast

cancer. The Korean Breast Cancer Society constructed baseline data of Korean breast cancer in 1996, and through the same procedure, we have tried to understand changing patterns of breast cancer and establish appropriate plans for treatment and early diagnosis annually.

The purposes of the present study were to determine changing patterns in the number of breast cancer patients, age distribution, cancer stages, and treatment methods compared to 1996 data and to determine data differences between other countries by comparing these from those countries.

MATERIALS AND METHODS

The subjects of this study were patients who were diagnosed as having breast cancer and underwent surgery from January through December 1998 in Korea, and whose records could be obtained. Forty-one medical schools, chosen according to the Current Situation of Medical School Education Reports (1997-1998), and 61 surgical resident training hospital, referred by the list of Korean Surgical Society, were initially selected for possible participation in this study. Out of the 41 medical schools, excluding 5 that had no university hospital, 36 university hospitals were selected for participation. Excluding hospitals where data collection was difficult, 41 training hospitals were finally selected. We were able to

Table 1. Number of Korean breast cancer patients collected in 1998 and analyzed by age (years)

Hospital	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-	Unknown	Total
Ajou University	0	4	16	23	12	10	3	0	0	68
Catholic University of Korea (Kangnam St. Mary's Hospital)	0	3	17	33	21	20	3	1	0	98
Catholic University (Yuido St. Mary's Hospital)	0	2	6	13	11	5	3	0	0	40
Chonbuk National University	0	1	10	19	10	5	0(1)	0	0	46
Chonnam National University	0	3	18	47	35	6	4	0	0	113
Chosun University	0	0	4	8	8	4	0	0	0	24
Chung-Ang University (Pildong Hospital)	0	1	4	8	5	1	1	0	0	20
Chung-Ang University (Yongsan Hospital)	0	2	4	2	2	0	2	0	0	12
Chungbuk National University	0	0	6	9	3	3	0	0	0	21
Chungnam National University	0	0	18	37	16	6	3	1	0	81
Dankook University Medical Center	0	0	10	12	8	3	0	0	0	33
Dong-A University	0	0	7	18	12	6	1	0	0	44
Dongguk University (Kyongju Hospital)	0	0	1	2	1	1	1	1	0	7
Eulji University (Daejun Eulji Hospital)	0	1	3	3	6	2	1	0	0	16
Eulji University (Eulji Hospital)	0	1	1	3	0	0	0	0	0	5
Ewha Women's University (Dongdaemoon Hospital)	0	1	3	4	4	2	0	0	0	14
Ewha Women's University (Mokdong Hospital)	0	0	0	0	0	0	0	0	17	17
Gachon Medical School (Gil Medical Center)	0	1	22	29	24	6	2	0	0	84
Gyeong-Sang National University	0	1	4	8	5	5	0	1	0	24
Hallym University (Chuncheon Sacred Heart Hospital)	0	0	1	7	1	5	0	0	0	14
Hallym University (Hangang Sacred Heart Hospital)	0	0	1	12	6	3	2	0	0	24
Hallym University (Kang Dong Sacred Heart Hospital)	0	1	3	9	3	1	0	1	0	18
Hallym University (Kangnam Sacred Heart Hospital)	0	1	1	7	7	3	0	1	0	20
Hanyang University (Seoul Hospital)	0	5	11(1)	19	14	7	1	0	0	58
Hanyang University (Kuri Hospital)	0	1	3	5	3	3	0	0	0	15
Inha University (Inchon Hospital)	0	0	5	22	13	5	2	0	0	47
Inha University (Sunghnam Hospital)	1	3	2	5	0	2	0	1	0	14
Inje University (Pusan Paik Hospital)	0	0	0	0	0	0	0	0	75	75
Inje University (Sanggye Paik Hospital)	1	1	10	5	5	0	0	0	0	22
Inje University (Seoul Paik Hospital)	0	2	3	7	4	1	0	1	0	18
Keimyung University (Dongsan Medical Center)	0	8	21	35	27	16	5	1	0	113
KonKuk University Medical Center	0	0	0	1	0	1	1	0	0	3
Korea University (Anam Hospital)	0	5	26	46	23	10	2(1)	3	0	116
Korea University (Guro Hospital)	0	3	10	23	9	7	1(1)	3	0	57
Kosin University Gaspel Hospital	0	6	42	78	53	23	2	1	0	205
Kyung Hee University	0	0	2	9	11	6	2	0	0	30
Kyungpook National University	1	4	30	51	44	15(1)	2	1	0	149
Pochon CHA University (Pundang CHA General Hospital)	0	1	6	8	5	1	1	0	0	22
Pusan National University	0	5	25	33	21	5	1	1	0	91
Seoul National University	0	15	76	128	93	36	6	0	1	355
Soonchunhyang University	0	1	11	15	6	5	1	0	0	39
Sungkyunkwan University (Kangbuk Samsung Hospital)	1	5	12	20	12	9	1	0	0	60
Sungkyunkwan University (Samsung Medical Center)	0	8	52	105	76	30	5	0	0	276
Sungkyunkwan University (Samsung Cheil Hospital)	0	4	29	67	58	18	2	1	0	179

(Table 1 continued next)

Table 1. Number of Korean breast cancer patients collected in 1998 and analyzed by age (years) (continued)

Hospital	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-	Unknown	Total
University of Ulsan (Asan Medical Center)	0	7	70	156	83	39	12(1)	1	0	369
University of Ulsan (Ulsan Hospital)	0	0	4	7	3	3	1	0	0	18
Wonju Union Christian Hospital Yonsei University Wonju College of Medicine	0	3	7	17	11(1)	6	1	1	0	47
Wonkwang University	0	1	5	14	12(1)	4	0	4	0	41
Yeungnam University Medical Center	0	4	25	45	22(1)	13(1)	5	0	0	116
Yonsei University (Severance Hospital)	0	5	66	98	91	32	6	2	0	300
Yonsei University (Yongdong Severance Hospital)	0	9	37	60	35	15	6	0	0	162
Andong General Hospital	0	0	1	4	1	0	1	0	0	7
Boramae City Hospital	0	0	7	12	6	2	1	0	0	28
Catholic University of Korea (Uijongbu St. Mary's Hospital)	0	1	5	9	7	3	4(1)	0	0	30
Catholic University of Korea (Holy Family Hospital)	0	1	11	16	11	3	2	0	0	44
Catholic University of Korea (Our Lady of Mercy Hospital)	0	1	5	7	3	2	2	0	0	20
Catholic University of Korea (St.Vincent's Hospital)	0	0	11	18	3	4	0	0	0	36
Cheong Ju St. Mary's Hospital	0	0	1	4	1	1	1	0	0	8
Chonnam Hospital	0	0	1	1	2	0	0	0	0	4
Choon Hae Hospital	0	0	1	2	1	0	0	0	0	4
Daerim St. Mary's Hospital	0	0	1	3	0	0	0	0	0	4
Dong Eui Medical Center	0	0	1	3	0	0	0	0	0	4
Dong Rae Bongsae Hospital	0	0	0	0	2	0	0(1)	0	0	3
Fatima Hospital	0	1	2	10	11	7	1	0	0	32
Hanil Hospital	0	0	4	3	2	0	0	0	0	9
Inchon Christian Hospital	0	0	1	3	4	2	0	0	0	10
Inchon Medical Center	0	0	0	1	1	3	0	0	0	5
Jechon Seoul Hospital	0	0	0	1	0	0	0	0	0	1
Kangnam General Hospital Public Corporation	0	0	2	5	1	1	0	0	0	9
Korea Cancer Center Hospital	0	10	70	157	61	22	3	0	0	323
Kwang Hye Hospital	0	0	0	1	1	0	0	0	0	2
Kwang-Myung Sung-Ae Hospital	0	0	1	2	1	0	1	1	0	6
National Medical Center	0	0	2	5	10	4	4	1	0	26
Presbyterian Medical Center	0	0	6	9	6	8	1	3	0	33
Pundang Jesaeng Hospital	0	0	2	5	2	1	0	0	0	10
Pusan Maryknoll Hospital	0	0	4	13	8	5	0	0	0	30
Pusan Medical Center	0	0	1	1	1	0	1	0	0	4
Pusan Sei-Gang General Hospital	0	0	1	1	1	0	0	0	0	3
Pusan St. Benedict's Hospital	0	1	0	10	4	1	0	0	0	16
Samsun Hospital	0	0	0	0	1	0	0	0	0	1
Sejong General Hospital	0	0	3	5	3	2	1	0	0	14
Seoul Adventist Hospital	0	0	2	4	3	0	0	0	0	9
Seoul Red Cross Hospital	0	1	2	1	1	0(2)	1	1	0	9
Soonchunhyang University (Kumi Hospital)	0	0	0	0	2	1	0	0	0	3
St. Columban's Hospital	0	1	1	2	0	2	1	0	0	7
Sun General Hospital	0	0	2	0	1	2	0	0	0	5
SungAe Hospital	0	0	4	3	2	1	1	0	0	11
Sungkyunkwan University (Masan Samsung Hospital)	0	0	2	7	5	3	1	0	0	18
Catholic University of Taegu-Hyosung	0	0	0	0	0	0	0	0	14	14
Ulsan Dong Kang Hospital	0	1	4	1	0	1	0	0	0	7
Kangnung Hospital	0	1	2	5	11	4	2	1	0	26
Wallace Memorial Baptist Hospital	0	2	3	6	6	2	0	1	0	20
Total	4	150	917(1)	1,732	1,123(3)	500(4)	127(6)	35	107	4,695

() for Male Breast Cancer

Table 2. Summary of age and sex in Korean patients of breast cancer collected in 1998

Sex	Age (year)									Total
	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-	Unknown	
Female	4	150	916	1,732	1,120	496	121	35	107	4,681 (99.7%)
Male	0	0	1	0	3	4	6	0	0	14 (0.3%)
Total	4	150	917	1,732	1,123	500	127	35	107	4,695 (100%)
%	0.1	3.3	20.0	37.9	24.5	10.9	2.7	0.8	--	100

collect data of the breast cancer patients with the information provided by the participating hospitals. Then we analyzed the data. The collection of data was divided largely into essential and optional items. All the hospitals provided essential items including sex, age, surgery method, and classification after surgery according to disease stage from patients registered in 1998. Optional items were obtained from those hospitals that had their own data. These items included clinical symptoms, physical findings, laboratory findings, operative findings, pathologic findings, biologic markers and past history of risk factors. For essential items, data from a total of 4,695 patients were analyzed. For optional items, data of 1,815 patients from 31 hospitals were analyzed. There was a difference in the total number of patients according to each item.

RESULTS

Sex and age distribution

Of the total 4,695 patients (Table 1), there were 4,681 females (99.7%) and 14 males (0.3%). Age distribution was: 1,732 (37.9%) in their 40s, 1,123 (24.5%) in their 50s, 917 (20.0%) in their 30s, 500 (10.9%) in their 60s, 150 (3.3%) in their 20s, 127 (2.7%) in their 70s, 35 (0.8%) in their 80s, and 4 cases (0.1%) in their teens. The median age of the patients was 47.0 years with the oldest at 89 years of age and the youngest at 16 (Table 2).

Operation methods

A total of 4,577 patients underwent operation. Modified radical mastectomy was the most popular method undertaken in 3,209 cases (70.1%): breast conserving surgery was performed in 1,090 cases (23.8%), simple

Table 3. Operation undertaken for breast cancer patients

Method	No. of patients	%
Radical mastectomy	65	1.4
Modified radical mastectomy	3,209	70.1
Simple mastectomy	127	2.8
Breast conserving surgery	967	21.1
Excision, Segmentectomy	123	2.7
Biopsy	59	1.3
Others	27	0.6
Total	4,577	100

mastectomy in 127 cases (2.8%) and radical mastectomy in 65 cases (1.4%). Of 1,090 cases treated with breast conserving surgery, lumpectomy or quadrantectomy with axillary dissection was performed in 967 cases (21.1%), and tumor resection only or segmentectomy without axillary dissection was performed in 123 cases (2.7%). Tissue biopsy was performed in 59 cases (1.3%) and other methods were used in 27 cases (0.6%) (Table 3).

American Joint Committee on Cancer (AJCC) classification according to cancer stage

Excluding patients whose cancer stage was uncertain and other breast cancers such as malignant sarcoma and lymphoma, the classification of breast cancer stage in 4,295 patients was as follows: stage 0 was found in 274 cases (6.4%), stage I in 1,069 (24.9%), IIA in 1,362 (31.7%), IIB in 927 (21.6%), IIIA in 459 (10.7%), IIIB in 128 (3.0%), and IV in 76 cases (1.7%). The ratio of early cancer of stage 0 and I was 31.3%, and stage II cancer was most prevalent comprising 53.3% (Table 4).

Clinical symptoms and physical findings

Of 1,809 patients whose history was taken at the time of hospital visit, breast mass without pain was seen in 1,241 cases or 72.1% of the total number of patients,

Table 4. AJCC staging

Stage	0	I	IIA	IIB	IIIA	IIIB	IV	Total
Patients number	274	1,069	1,362	927	459	128	76	4,295
%	6.4	24.9	31.7	21.6	10.7	3.0	1.7	100

breast mass with pain was in 164 (9.5%), nipple discharge in 87 (5.1%), axillary mass in 69 (4.0%), change in breast skin and nipple retraction in 56 (3.3%), breast pain and discomfort in 29 cases (1.7%), and 150 (8.7%) cases were discovered by screening mammogram or ultrasonogram without any symptoms at the time of diagnosis.

Of 1,638 patients, the duration of symptoms was most frequent within 1 month in 675 cases (41.2%); among these patients, 149 cases (9.1%) were within 1 week, 526 (32.1%) were between 1 week and 1 months, 402 (24.5%) were between 1 to 3 months, 229 (14.0%) were between 3 to 6 months, 163 (10.0%) were between 6 months to 1 year, and 125 (7.6%) were between 1 to 3 years, 44 cases (2.7%) were longer than 3 years.

Of 1,569 patients, the location of mass was in the left side in 824 cases (52.5%), the right side in 740 cases (47.2%). Five cases (0.3%) had cancer mass present at both sides. As for the distribution of mass location, upper-outer quadrant was the site in most cases with 750 cases (50.0%) of 1,501 patients, followed by upper-inner quadrant with 273 (18.2%), lower-outer quadrant with 196 cases (13.0%), central with 152 cases (10.1%), and lower-inner quadrant with 94 cases (6.3%). Thirty-six cases (2.4%) had masses present all over the breast.

At physical examination, the mass in 1,329 cases (90.2%) was detected by palpation. The non-palpable lesion in 145 cases (9.8%) was discovered through mammography or sonography.

Laboratory findings

Of 1,387 cases where the cancer confirmation method were known before surgery, the most popular method was fine needle aspiration on breast mass with 579 cases (41.7%), followed by excisional biopsy with 321 cases (23.1%), needle biopsy with 111 cases (8.1%), incisional biopsy with 56 cases (4.0%), ultrasonography guided biopsy with 143 cases (10.3%), Hook-wire biopsy with 42 cases (3.1%), and stereotactic core biopsy with 13 cases (0.9%) and others with 122 cases (8.8%) (Table 5).

On mammographic findings before surgery, 659 cases

(53.1%) were malignant tumors and 406 cases (32.7%) were suspicious of cancer, showing that 85.8% of the cases had findings of cancer. However, there were 107 cases (8.6%) with the findings of benign mass, 31 cases (2.5%) of normal findings, and 34 cases (2.7%) where mammographic findings were unsatisfactory. There were 835 cases where ultrasonographic findings before surgery were available, and among these cases, 499 cases (59.8%) showed compatible findings of malignant mass, 124 cases (14.8%) showed findings of possible breast cancer, 53 cases (6.3%) of benign mass, 9 cases (1.1%) of normal ultrasonogram findings, and 18 cases (2.2%) showed inappropriate ultrasonogram findings (Table 6).

There were 358 cases where preoperative blood CEA level was examined. Of these cases, 337 cases (94.1%) showed normal levels and 21 cases (5.9%) showed increased levels. CaAg15-3 level was examined in 531 cases. Of these cases, 493 cases (92.8%) showed normal levels, and 38 cases (7.2%) showed increased levels. Alkaline phosphatase was examined in 1,113 cases; 1,080 cases (97.0%) showed normal levels and 33 cases (3.0%) showed an increased levels.

Operative findings

Of 1,635 cases where the surgical method was confirmed, radical mastectomy was used in 23 cases (1.4%), and according to stage, 13 cases (56.5%) were at stage III, 5 cases (21.7%) at stage II, and 1 case (4.3%) at stage IV. In 1,147 cases where modified radical mastectomy performed (70.2%), stage II was the most prevalent with 695 cases (60.6%), followed by stage I with 253 cases (22.1%), stage III with 149 cases (13.0%), stage 0 with 30 cases (2.6%), and stage IV with 13 cases (1.1%). Simple mastectomy was performed in 72 cases (4.4%); this method was used in 45 cases (62.5%) of stage 0 and 12 cases (16.7%) of stage I and II and 2 cases (2.8%) of stage IV. There were 28 cases of breast mass resection without axillary dissection or local resection. Breast conserving surgery was performed in 363 cases (22.2%) with 37 cases (10.2%) at stage 0, 147

Table 5. Preoperative diagnostic method

Method	No. of patients	%
Fine needle aspiration	579	41.7
Excisional biopsy	321	23.1
Needle biopsy	111	8.1
Incisional biopsy	56	4.0
USG guided biopsy, FNA	143	10.3
Hook-wire biopsy	42	3.1
Stereotactic biopsy	13	0.9
Others	122	8.8
Total	1,387	100

Table 6. Preoperative MMG/USG finding

Finding	MMG (No/%)	USG (No/%)
Malignant	659 (53.1)	499 (59.8)
Suspicious	406 (32.7)	124 (14.8)
Benign	107 (8.6)	53 (6.3)
Normal	31 (2.5)	9 (1.1)
Unsatisfactory	34 (2.7)	18 (2.2)
Others	5 (0.4)	132 (15.8)
Total	1,242 (100)	835 (100)

MMG, mammography; USG, ultrasonography

Table 7. Operation methods undertaken according to the stage of breast cancer

	0	I	II	III	IV	etc	Total	%
Radical mastectomy	0	2	5	13	1	2	23	1.4
Modified radical mastectomy	30	253	695	149	13	7	1,147	70.2
Simple	45	12	12	0	2	1	72	4.4
Breast conserving operation	24	143	152	16	0	0	335	20.5
Excision or segmentectomy	13	4	5	0	1	5	28	1.7
Biopsy	0	2	4	2	11	6	25	1.5
Others	1	1	2	1	0	0	5	0.3
Total	113	417	875	181	28	21	1,635	100
%	6.9	25.5	53.5	11.1	1.7	1.3	100	

cases (40.5%) of stage I, 157 cases (43.3%) at stage II, 16 cases (4.4%) at stage III, and 1 case (0.3%) at stage IV (Table 7).

Out of 952 cases, 58 cases (6.1%) were treated by immediate breast reconstruction after radical mastectomy, modified radical mastectomy, and simple mastectomy. The reconstruction methods were not available in this survey.

Of 1,040 cases where postoperative complications were determined, 259 cases (24.9%) developed complications. Seroma was the most frequent complication in 143 cases (13.8%), skin necrosis in 40 cases (3.8%), wound infection in 27 cases (2.6%), arm edema in 19 cases (1.8%), bleeding with transfusion in 18 cases (1.7%), limitation in arm movement in 6 cases (0.6%), and axillary contracture in 3 cases (0.3%); and there were no cases of nerve damage.

Pathologic findings

Of 1,577 cases where postoperative histopathologic classification were confirmed, invasive ductal carcinoma was most prevalent with 1,407 cases (89.2%), followed by ductal carcinoma in situ (DCIS) in 88 cases (5.6%). Invasive lobular carcinoma was present in 42 cases (2.7%), lobular carcinoma in situ (LCIS) in 1 case (0.1%), pure Paget's disease in 5 cases (0.3%), and others including lymphoma and malignant phylloides tumor in 34 cases (Table 8).

Of 1,355 cases of invasive ductal carcinoma where WHO classification was possible, invasive not otherwise specified (NOS) was most prevalent with 1,060 cases (78.2%), followed by invasive carcinoma with intraductal predominant type in 166 cases (12.2%), mucinous cancer in 36 cases (2.7%), medullary cancer in 23 cases (1.7%), tubular cancer in 23 cases (1.7%), papillary cancer in 19 cases (1.4%), and inflammatory cancer in 12 cases (0.9%). Others were metaplastic cancer in 11 cases, apocrine cancer in 3 cases, adenoid cystic cancer and secretory cancer in one case respectively.

Table 8. Histologic types of the breast cancer

Histologic diagnosis	No. of patients	%
Ductal carcinoma in situ	88	5.6
Invasive ductal carcinoma	1,407	89.2
Lobular carcinoma in situ	1	0.1
Invasive lobular carcinoma	42	2.7
Paget's disease (pure form)	5	0.3
Others	34	2.1
Total	1,577	100

Of 1,552 cases where T stage was confirmed, T0 was present in 3 cases (0.2%), Tis in 84 cases (5.4%), T1 in 554 cases (35.7%), T2 in 716 cases (46.1%), T3 in 103 cases (6.6%), and T4 in 48 cases (3.1%).

As for tumor size among 1,449 patients, 22 cases (1.5%) had masses under 0.5 cm, 0.5-1.0 cm in 110 cases (7.6%), 1-2 cm in 423 cases (29.2%), 2-5 cm in 754 cases (52.0%), 5-10 cm in 119 cases (8.2%), and larger than 10 cm in 21 cases (1.5%).

The presence of axillary lymph node metastasis was documented in 1,712 cases; lymph node metastasis was not seen (NO) in 927 cases (54.1%), N1 in 599 cases (35.0%), N2 in 99 cases (5.8%), N3 in 7 cases (0.4%) and NX in 80 cases (4.7%). In 1,410 cases where the number of lymph node metastasis was confirmed, 804 cases (57.0%) showed no metastasis to lymph node, 1-3 in 301 cases (21.3%), 4-9 in 172 cases (12.2%), and more than 10 lymph nodes in 133 (9.5%). The average number of resected lymph nodes was 17.3.

Out of 1,205 patients in whom the presence of estrogen receptor (ER) was examined, ER-positive was in 641 cases (53.2%) and negative in 564 cases (44.8%). The presence of progesterone receptor (PR) was examined in 1,198 cases; PR-positive was in 537 cases (44.8%) and negative in 661 cases (55.2%). The presence of C-erbB2 was examined in 562 cases; positive results were seen in 275 cases (48.9%) and negative in 287 cases (51.1%). The presence of p-53 mutation was examined in 507

cases; positive results were seen in 222 cases (43.8%) and negative in 285 cases (56.2%).

Past history of risk factors

Of 849 patients, sixty-seven patients (7.7%) had their first menstruation before 13 years of age, 793 cases (91.6%) between 14-20 years, and 6 cases (0.7%) older than 21 years. Among 314 post-menopausal patients the number of patients whose menopause started before the age of 49 years was 151 (48.1%), 131 cases (41.7%) between 50-54 years, and 32 cases (10.2%) older than 55 years. We did not include the hysterectomy cases.

Of 696 patients, the patients age at first child birth was under 19 years in 29 cases (3.7%), between 20-24 years in 291 cases (37.2%), between 25-29 years in 382 cases (48.9%), and older than 30 years in 80 cases (10.2%). Of 871 patients the number of children was 2 in 406 cases (44.2%), 3 in 187 cases (20.4%), 1 in 106 cases (11.5%), more than 5 in 82 cases (8.9%), 4 in 73 cases (8.0%), and no children including unmarried patients was 64 cases (7.0%).

Of 940 breast cancer patients whose marital status was confirmed, the rate of unmarried status was 4.3% (39/940); according to age group, 44.4% (16/36) was under the 20s, 4.5% (8/178) in the 30s, 3.0% (11/364) in the 40s, 1.9% (4/206) in the 50s, and there were no unmarried patients of older than 60 years.

Out of 773 breast cancer patients whose lactation method was examined, 469 cases (60.7%) breast-fed their children and 138 cases (17.8%) used formula, and 163 cases (21.1%) fed both breast milk and formula.

Of 976 patients who were examined for a family history of breast cancer, 49 cases (5.0%) had breast cancer patients in family members. The most prevalent type of family relationship with the patient was of sister with 27 cases (51.9%), followed by mother with 9 cases, aunt, grandmother, cousin each with 4 cases and daughter in one case.

The degree of obesity of breast cancer patients was calculated using BMI (Body Mass Index=Weight (kg)/Height² (m²)). Obesity degree was examined in 720 patients; 96 patients (13.3%) were underweight (BMI less than 20), 390 (54.2%) were normal (BMI 20-25), 213 (29.6%) were overweight (BMI 26-30), and 21 (2.9%) were severely overweight (BMI more than 30), showing that 32.5% of the breast cancer patients were obese.

DISCUSSION

The incidence of breast cancer is continuously growing

throughout the world. In 1990, there were 790,000 cases and the number is expected to grow to about 1 million by 2000, an increase of 23.9% (more than 2% a year) in a mere decade (1). Breast cancer is the most frequently occurring cancer in women in U.S.A. and in many western countries. Actually, the proportion of breast cancer in U.S.A. makes up 19.1% of cancers occurring in women, and in 1993, 180,000 women were diagnosed as having breast cancer, with 1 out of 8 women expected to get breast cancer (2) in their life time. In Korea, according to the cancer registration report of 1993 by the Ministry of Health and Welfare, breast cancer is the third most frequent cancer in women next to cervical cancer and stomach cancer, making up about 12% out of all cancers. In 1997, the proportion was 13.3%. Although lower than in Europe and U.S.A., the incidence is expected to grow as Koreans take up a westernized life style, decrease in birth and lactation rates, and increased interest in regular breast check-up (3). Actually, according to an analysis of the national survey on breast cancer by the Korean Breast Cancer Society (4), 3,801 patients in 1996 rose to 4,168 in 1997 (5) and 4,695 in 1998. Ahn et al. (6) reported that the incidence of breast cancer per 100,000 women was 10.9 between June 1988 to July 1989; and the crude incidence determined in the present study, by dividing 4,681 female patients with the Korean female population of 23,033,380 in 1998 was 20.3 per 100,000 women. Age-specific incidence was also calculated (Fig. 1) and compared to that of U.S.A. According to the previous study, 16.7 patients per 100,000 women in 1996 (4) and 18.2 per 100,000 women in 1997 (5) was reported. Although this incidence is lower than the average incidence (29.8) in the world, a gradually increasing trend can be seen. The characteristics of breast cancer incidence in developed countries are high incidence (39.4-84.8 per

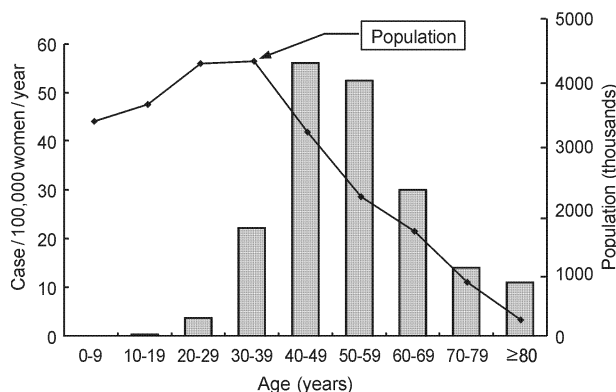


Fig. 1. Age-specific incidence of breast cancer in 1998. The age-specific annual incidence of female breast cancer is indicated by the bar graph. The population is shown in thousands on the right axis.

100,000 women), significantly high incidence in the elderly (more than 250 per 100,000 women older than 65), high percentage of elderly women in the population composition (10.2-15.0% who is older than 65 years), and high crude incidence rates of breast cancer (48.9-113.3 per 100,000 women). In Japan, where a high elderly population (10.3% older than 65 years) is seen, the characteristics are both low age-standardized incidence of breast cancer (23.5 per 100,000 women) and low crude incidence (29.2 per 100,000 women). As for many developing countries, the characteristics are low age-standardized incidence of breast cancer (less than 30 per 100,000 women), small number of the elderly (less than 6% those who are older than 65 years), and low crude incidence of breast cancer (less than 30 per 100,000 women) (1). In the present study, distribution of breast cancer according to age was highest in the 40s followed by the 50s and 30s; and this distribution shows same results of other studies in Korea. According to a 1998 survey, the distribution is showing a decreasing trend in women in their 70s and an increasing trend in their 20s (6-10). This distribution pattern differs from U.S.A. or western countries, and the peak age of breast cancer is 10-15 years younger in Korea. Considering that there are many women in their 20s and 30s who are influenced by Western culture, the incidence of breast cancer in the future is expected to rise gradually in Korea. The age specific incidence of breast cancer in Korea in the present study is the highest in their 40s (56.1), gradually decreasing after menopause; however, in U.S.A., the incidence of breast cancer rises continually even after menopause so that women in their 60s and 70s have incidences of about 230 and 300 breast cancer per 100,000, respectively. The number of breast cancer patients and the incidence per each age group is also higher than that of Korea, showing a different distribution pattern from Korea (11, 12).

As for the breast cancer in males, about 1% of the total breast cancer cases was male in the western countries. In the present study, there were only 14 cases (0.3%) of male breast cancer patients, showing a lower percentage of male breast cancer patients than that of western countries.

In the present study, breast conserving surgery including wide excision or segmentectomy was performed in 23.8% of patients, which is 4-11% higher than that of several previous studies (8, 9, 13). Therefore, it can be presumed that breast conserving surgery is on the rise also in Korea. Robert et al. (14) reported in the Edinburg study that 25-31% of patients were treated by breast conserving surgery. At the National Cancer Institute Consensus Conference in 1990, breast conserving surgery of breast cancer at stage I and II showed no difference

in the few and disease-free survival rate, provided the appropriate local treatment, had few complications from the surgery, and had a better cosmetic result, concluding that breast conserving surgery is the better treatment method (15). In the present study, mastectomy was performed most frequently with 74.3% of the total cases, compared to 79.7% in 1996. On the other hand, breast conserving surgery shows an increasing trend at 18.7% in 1996, 19.9% in 1997, and 23.8% in 1998. This increase is expected continue as the number of patients who detect breast cancer at early stages grow, as interest in breast cancer among the public is raised, and as the mammographic screening is increased. Among mastectomy methods, radical mastectomy, which was performed frequently in the past, was done in 1.7% in 1996 and 1.4% in 1998, showing a downward trend. According to the studies by Noh et al. (16) and Jung et al. (17) on the changes in breast surgery methods in Korea, radical mastectomy was performed in 67% of the cases, making up most of the surgeries performed, but in the late 1980s, the modified radical mastectomy was used in 82%-83.7% of cases while radical mastectomy was used in 3%-10.5%. Modified radical mastectomy was clearly the surgery method of choice. Also, from the late 1970s, breast conserving surgery was started making up 5% of breast surgeries in late 1980s. The present study shows that the use of breast conserving surgery increased drastically at 23.8%. However, in other countries (11), the use of breast conserving surgery was 25-31%, and in stage I, II breast cancer discovered at screening, the rate rose to 77% (14), highlighting the still low rate of breast conserving surgery in Korea. The use of breast reconstruction after mastectomy was 6.1% in the present study, but Ahn et al. (18) reported up to 17.8% in case of breast cancer detected at stage 0, I, II screened by mammography, showing that the use of breast reconstruction after mastectomy is also on the rise.

In several studies in Korea including the present study (7-10), cancer of Korean patients was most frequently discovered at stage II (31.8-59.9%), whereas the detection of early breast cancer (stages 0 and I) was 9.3-22.9%. According to our data, the early detection of breast cancer is gradually increasing; 23.8% in 1996, 26.5% in 1997 and 31.3% in 1998. However, it is considerably lower of compared to western countries. Thus, we believe that efforts for early detection of breast cancer are necessary through screening mammography.

As for the symptoms of breast cancer at the time of hospital visit, the palpable breast mass was present in most of the cases (90.2%) in the present study. Thus, we suggest that regular self-examination, physical examination and mammography are necessary for early detection of breast cancer. Also, cases where breast cancer was

detected without any symptoms at regular check-up were only 8.7%, but in the U.S.A., about 30-40% is being discovered with screening. Therefore diagnosis of early breast cancer is expected to increase with the continued interest in breast cancer and mammography. But false negative findings of mammography in breast cancer patients were 13.8% such as benign, normal or inappropriate findings. And the cases that showed false negative findings were 9.6% in breast ultrasonography. Accordingly, even if benign or normal findings were shown on mammography and ultrasonography, tissue biopsy is recommended in masses that clinically suspicious of cancer. This is especially important in Korea where the majority of patients are premenopausal women, whose breasts are dense and of fibrocystic pattern.

According to several studies including the present study on the pathological classification of breast cancer in Korea (7-9, 13), invasive ductal carcinoma is the most prevalent at 89.2%. Also, with the increased detection of early breast cancer and screening mammography, the rate of DCIS gradually increased from 4.2% in 1996 to 5.6% in 1998.

No metastasis to lymph node was found in 804 cases (57.0%), 1-3 in 301 (21.3%), 4-9 in 172 (12.2%), and more than 10 lymph nodes were found in 133 cases (9.5%). With the increase in the early detection of breast cancer, the case of lymph node metastasis was gradually decreased from 47.2% to 43.0%, when compared with the 1996 data.

Those patients with family history of breast cancer were 5.0% which was slightly higher when compared to 3.2% in 1996. The degree of obesity of breast cancer patients was overweight (BMI 26-30) in 213 (29.6%), severely overweight (BMI more than 30) in 21 cases (2.9%), showing that 32.5% of breast cancer patients were obese. This obesity rate was slightly increased when compared to 31.7% in 1996 data. In Korea, the rate of breast cancer development is expected to rise with increase in high-caloric diet due to gradual westernization in diet, low number of birth, and older age of birth. Studies on risk factors for breast cancer development in Korea were already reported in the studies by Ahn et al. (19) and Kim et al. (20) through case-control studies. However, the American Cancer Society reported that breast cancer can be explained with the current known risk factors in only one fourth of breast cancer patients and that more continuous research on risk factors of breast cancer development is necessary (21).

Compared to 1996 data, the present data showed an increase in the number of breast cancer patients (3,801→4,695), relative increase in those women in their 20s (3.0%→3.3%), decrease in mastectomy and increase in breast conserving surgery (18.7%→23.8%), increase in

the rate of early stages, 0 and 1 (23.8%→31.3%). There was an increase in the rate of discovering breast cancer through regular mammography check-up (6.4%→8.7%), increase in DCIS (4.2%→5.6%), decrease in those patients with lymph node metastasis (47.2%→43.0%), and increase in overweight patients (31.7%→32.5%) and those with family history (3.2%→5.0%).

We concluded that breast cancer is on the rise throughout the world, including Korea. Several characteristics of Korean breast cancer tend to be similar with the patterns of western countries. And interests in early diagnoses and treatments of breast cancer are on the rise in Korea. The present study indirectly determined the rate of breast cancer development and characteristics of breast cancer throughout Korea. The results of the present study may be helpful in treating patients and researching on breast cancer, and the data can be compared with those from other countries.

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