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RESULTS OF POSTOPERATIVE IRRADIATION OF BREAST CANCER, REPORT OF 251 CASES

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In these six years from April 1, 1950 to March 31, 1956, 441 patients with cancer of the breast visited the out-patient clinic of our department. Among them 190 patients were inadequate for our present investigation, so that the total number available for our follow up examinations was 251. The excluded 190 patients were as follows: 13 cases irradiated by telecobalt unit, 50 cases treated for their recurrent or metastatic lesions which came out long after their first treatments with operation, irradiation or both, 8 inoperable cases which were dealt with irradiation only, 7 cases diagnosed as not cancer but mastopathy histologically, 19 cases which changed the hospital on the way of their treatments, 17 cases untreated for some reasons, and 76 cases found to be incompletely described.

Previously, Nakaizumi and Adachi¹⁾ reported the results of the treatment of breast cancer of our clinic from 1932 to 1939, and Nakaizumi and Sakka²⁾ reported the results from 1945 to 1950.

We have performed our investigation mainly from 3 aspects: first, the comparison with the reports mentioned above; second, the survival difference between the patients whose diagnosis were determined as cancer histologically and the patients who were diagnosed only clinically, and third, the cause of death of the deceased, and the physical conditions of the survived.

The data were collected from the files of the Department of both Radiology and Surgery of our hospital, and from the data of other hospitals for the period from 1950 to 1956. After the records had been screened and transferred on the tables case by case, and follow up study was performed to ascertain the state of health of each patient on December 31, 1958.

The patients were followed up by four steps.

1) A return-card was mailed repeatedly to each patient asking for the visit to our hospital for medical examination.

2) If he could not come, including the case of death, he or his family was asked to give us an answer by the return-card about his state of condition, his complaints, address of his family doctor, or date and cause of his death.

3) Many data were obtained by means of telephone correspondence with census registrars of the district of residence of the patient.

4) In case of death, the family doctor of the patient often gave us very useful information regarding date and cause of his death.

This article was stated at the 115th Radiology Society of Kanto District, on Jan. 30, 1960.

Among 251 cases we have followed up 188 cases (74.9%) up to the present, in which 134 cases are still alive (53.4%) and 54 cases died (21.5%).

In following tables, left side number in () shows previous results and the underlined number in the right is our present series. The minimum level of statistical significance was 0.05 through out this paper as same as former reports.

Results:

1) Pathologic Anatomy: (Table 1 (A) and Table 1 (B)).

Table 1: Histologic Classification of Cancer of the Breast (A)

Item No.	Our Classification	No. of Cases	Percentage
1.	Simple Cancer	93	53.8%
2.	Adenocarcinoma	70	40.5
3.	Gelatinous Cancer	5	2.9
4.	Squamous Epithelial Cancer	2	1.2
5.	Paget's Disease	2	1.2
6.	Sarcoma	1	0.6
	TOTAL:	173	100.0
*	* * *	*	*
7.	Exam. Histolog. but not revised	23	
8.	Not Exam. Histolog.	55	
	TOTAL:	78	

Table 1: Histologic Classification of Cancer of the Breast (B)

Item No.	Classification	Total Cases	Diagnosis of Pathologist	No. of Cases
1.	Simple Ca.	93	Skirrhous	6
			Ca. Simplex	77
			Ca. Solidum	10
2.	Adenocarcinoma	70	Adenoca.	40
			Cylinderepithel Ca.	11
			Intraductal Ca.	5
			Mastpathie-Entartung	3
			Cystoadenom Papillifer-Entartung	3
			Papillaryadenoca.	2
			Adenomatoese Entartung	1
			Klein Lobulaere Adenoca.	1
			Inflammatory Adenoca.	1
			Comedo Ca.	1
			Lobulaeres Ca.	1
			Cystoadenomatoese Ca.	1
3.	Gelatinous Ca.	5	Gallertkrebs	5
4.	Paget's Disease	2	Paget's Disease	2
5.	Squamous Epithelial Ca.	2	Basalzellen Krebs	1
			Plattenepithelkrebs	1
6.	Sarcoma	1	Fibromyxom-Entartung	1

Among 251 cases of our series, the diagnosis of cancer was confirmed by histological examination of the primary tumor in 173 cases (Table 1 (A)). Table 1 (A) shows the distribution of the various tumor types.

As to the remaining 78 cases, the diagnosis of cancer was histologically verified earlier in 23 cases, but the specimen were not available for reconfirmation; and 55 cases were not histologically examined, because they were operated by private family doctors; but the clinical diagnosis of cancer is undoubted.

As to the classification of the types of tumors, the opinions of many pathologists failed to find meeting-points. Therefore, Table 1 (B) shows the relationship between our classification and pathologist's diagnosis. In the following tables, the diagnosis of 173 cases (from 1 to 6 in Table 1 (A)) will be called "pathological diagnosis", and that of 78 cases (7 and 8 in Table 1 (A)) "clinical diagnosis".

2) Sex: (Table 2).

Table 2: Sex of Cancer of the Breast

	1932—1939 (Adachi)	1945—1950 (Sakka)	1950—1956		
			(Our Series)	(Histologic. Diag.)	(Clinic. Diag.)
Female	(238)	(404)	250	173	77
Male	(2)	(1)	1	0	1
TOTAL:	(240)	(405)	251	173	78

Proportion of female patients to male patients with cancer of the breast in this series is about 1000 to 4. This is middle grade of the former reports. It is to be noted that only one male patient was diagnosed not histologically but clinically in our series.

3) Age distribution: (Table 3, Fig. 1).

It was very difficult to know exactly the time of initiation of cancer. Therefore, we regarded the onset, like former reports, at the time of first visit of our clinic.

Table 3: Age Distribution of Cancer of the Breast

Age	1932—1939 (Adachi)	1945—1950 (Sakka)	1950—1956		
			(Our Series)	(Histolog. Diag.)	(Clinic. Diag.)
1—20	(0)	(3)	1	1	0
21—30	(10)	(15)	15	9	6
31—40	(51)	(79)	47	37	10
41—50	(89)	(141)	107	71	36
51—60	(62)	(102)	51	35	16
61—70	(21)	(35)	27	18	9
71—	(7)	(5)	3	2	1
TOTAL:	(240)	(380)	251	173	78
MEAN:	47.0	46.0	47.1	46.9	47.5
STANDARD DEVIATION:	10.2	10.5	6.9	8.3	8.3

Fig. 1. Age Distribution of Breast Cancer

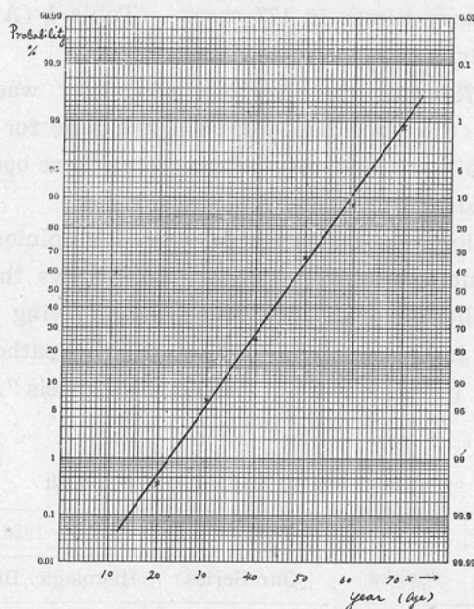


Table 3 shows the age distribution of the onset of cancer of the breast. If the accumulated numbers were plotted on a probability section paper, they were almost on a straight line. Hence, thus determined age distribution shows statistically normal (Table 3, Fig. 1). The mean age of patients is 47.1 years; the youngest is 20 and the oldest 78. The data of present series are tabled together with those previous reports made by Nakaizumi-Adachi and Nakaizumi-Sakka. We can not find significant difference among them. And there was no difference between patients pathologically diagnosed and clinically diagnosed.

4) Localization of lesions: (Table 4 (1), (2) and (3)).

As to sites of cancer of the breast, 248 patients were available for our observation. The results are shown on Table 4 (1). The left side is more frequently invaded than the right, but the difference is not significant. Proportion of the left side to the right is lower than the previous reports, but with regard to three reports there is no difference among them. Table 4 (2) shows the localization in detail. If the localization

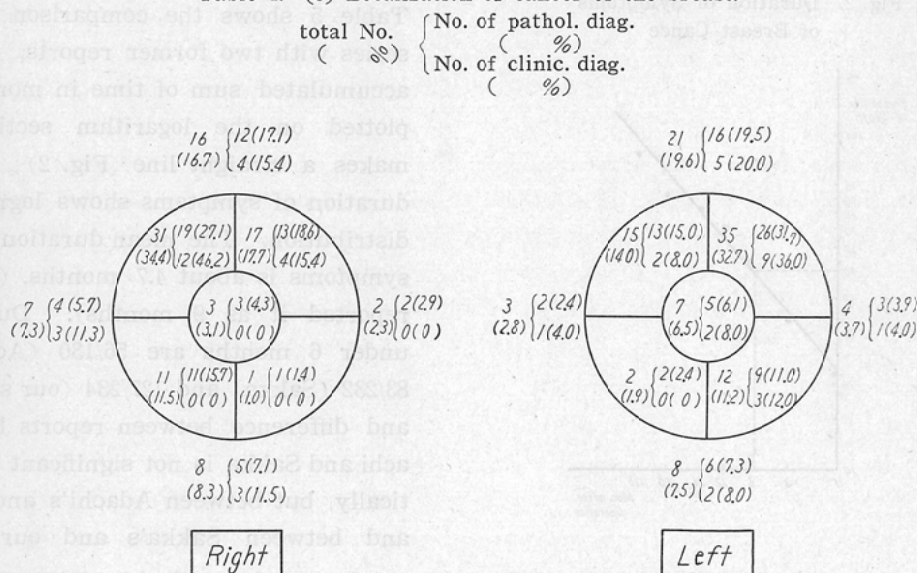
Table 4: Localization of Primary Tumor (1)

	1932—1939		1945—1950		1950—1956					
	(Adachi)		(Sakka)		(Our Series) (Histologic. Diag.) (Clinic. Diag.)					
Left	(138) cs	57.5%	(211) cs	53.6%	125 cs	50.4%	88 cs	51.5%	37 cs	48.1%
Right	(99)	41.2	(172)	43.7	117	47.2	78	45.6	39	50.6
Both Sides	(3)	1.2	(11)	2.8	6	2.4	5	2.9	1	1.4
(Unknown)	—	—	—	—	(3)	—	(2)	—	(1)	—
TOTAL:	240 cs	100.0%	394 cs	100.0%	248 cs	100.0%	171 cs	100.0%	77 cs	100.0%

Table 4: Localization of Primary Tumor (2)

	1945—1950		1950—1956					
	(Sakka)		(Our Series)		(Histologic. Diag.)		(Clinic. Diag.)	
Uprer Outer	(37) cs	18.2%	66 cs	32.5%	45 cs	29.4%	21 cs	42.0%
Upper Inner	(28)	13.7	33	16.3	27	17.6	6	12.0
Lower Outer	(14)	6.9	24	11.8	20	13.1	4	8.0
Lower Inner	(8)	3.9	3	1.5	3	2.0	0	0.0
Upper	(16)	7.8	37	18.2	28	18.3	9	18.0
Lower	—	—	14	6.9	10	6.5	4	8.0
Outer	(27)	13.2	11	5.4	7	4.6	4	8.0
Inner	(5)	2.5	5	2.5	4	2.6	1	2.0
Center	(9)	4.4	10	4.9	8	5.6	2	4.0
(Unknown)			(48)		(20)		(28)	
TOTAL:	(204)	100.0%	203 cs	100.0%	153 cs	100.0%	50 cs	100.0%

Table 4. (3) Localization of cancer of the breast.



were classified to left and right of the breast, they distributed as table 4 (3). The most frequent site of lesion is the upper outer quadrant of the breast.

5) Duration of symptoms: The time from the appearance of symptoms to the operation: (Table 5, Fig.2).

In recent years many agencies in Japan have conducted intensive campaign of public education for the early detection of cancers, and the percentage of early diagnosis has been increasing. But this statistics covers data about 10 years dating back from the present, and at that time, shortly after the termination of the second world war, cancer education and economic condition of Japan were very poor. If we make the same statistics of patients after 1956, the result must be much improved.

Table 5: Duration of Symptoms of the Breast Cancer

Duration	1932—1939		1945—1950		1950—1956					
	(Adachi)		(Sakka)		(Our Series)		(Histo. Diag.)		(Clinic. Diag.)	
< 1 Month	(19) cs	14.7%	(21) cs	9.1%	47 cs	20.1%	36 cs	21.6%	11 cs	16.4%
< 3 Months	(39)	30.0	(47)	20.3	78	33.3	58	34.7	20	29.9
< 6 Months	(56)	43.1	(83)	25.7	129	55.1	91	54.5	38	56.7
< 1 Year	(86)	66.2	(136)	58.6	173	73.8	122	73.1	51	76.1
< 2 Years	(107)	82.3	(170)	73.3	194	82.9	137	82.0	57	85.1
< 5 Years	(121)	93.1	(215)	92.7	217	92.7	154	92.2	63	94.0
< 10 Years	(126)	96.9	(229)	98.7	227	97.0	161	96.4	66	98.3
> 10 Years	(130)	100.0	(232)	100.0	234	100.0	167	100.0	67	100.0
TOTAL:	130 cs	100.0%	232 cs	100.0%	234 cs	100.0%	167 cs	100.0%	67 cs	100.0%
	*		*		*		*		*	
Unknown					(17)		(6)		(11)	

Fig. 2. Duration of Symptoms of Breast Cancer

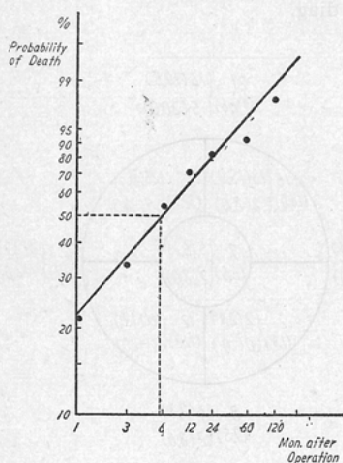


Table 5 shows the comparison of our series with two former reports. If the accumulated sum of time in months is plotted on the logarithm section, it makes a straight line (Fig. 2); hence, duration of symptoms shows lognormal distribution. The mean duration of the symptoms is about 4.7 months, (Sakka reported it as 9 months). Duration under 6 months are 56/130 (Adachi), 83/232 (Sakka) and 127/234 (our series); and difference between reports by Adachi and Sakka is not significant statistically, but between Adachi's and ours, and between Sakka's and ours, the

difference is significant. Duration under one month is 14.7% (Adachi), 9.1% (Sakka) and 20.1% (our series). The increase of this percentage in our series should be paid much attention. In all of these cases, radical mastectomy had been performed.

6) Interval between operation and irradiation (Table 6).

Almost all of our patients with breast cancer were irradiated within 3 months after operation. If we compare the number of cases with an interval less than one month, we can see significant difference among three series: 87/217, 39.7% (Adachi), 166/307, 54.0% (Sakka) and 183/245, 74.7% (our series). This means that the patients from 1945 to 1950 visited our clinic for their irradiation earlier than those from 1932 to 1939, and patients from 1950 to 1956 came earliest of the three groups.

The patients diagnosed pathologically were treated with irradiation earlier than

Table 6: Interval from Operation to Irradiation

Interval	1932—1939		1945—1950		1950—1956					
	(Adachi)		(Sakka)		(Our Series)		(Histo. Diag.)		(Clinic. Diag.)	
< 1 Month	(87)cs	39.7%	(166)cs	54.0%	183 cs	74.7%	143 cs	82.5%	40 cs	54.8%
< 3 Months	(115)	52.7	(222)	72.4	241	98.4	171	99.6	70	94.5
< 6 Months	(125)	57.2	(247)	80.7	244	99.6	172	100.0	72	98.6
< 1 Year	(155)	71.0	(273)	89.0	245	100.0	172	100.0	73	100.0
< 2 Years	(184)	84.0	(288)	94.0	245	100.0	"	"	"	"
< 5 Years	(211)	96.7	(305)	99.5	"	"	"	"	"	"
<10 Years	(215)	98.5	(307)	100.0	"	"	"	"	"	"
>10 Years	(219)	100.0	(307)	100.0	"	"	"	"	"	"
TOTAL:	(219)cs	100.0%	(307)cs	100.0%	245 cs	100.0%	172 cs	100.0%	73 cs	100.0

that of clinically diagnosed. Statistically significant difference was demonstrated between pathologically diagnosed cases (143/172) and clinically diagnosed cases (40/72) regarding the interval less than one month. (Table 6).

7) Method of irradiation (Table 7 and 8).

Table 7: Treatment of the Breast Cancer 1950—1956

Irradiation	Total Cases	Histolog. Diag.	Clinic. Diag.
Complete Irradiation	136	97 cases	39 cases
Incomplete Irradiation	115	76	39
TOTAL:	251	173	78

Table 8: Distribution of Malignancy Grade according to Steintal's Classification

Steintal's Stadium	Total Cases	Histolog. Diag.	Clinic. Diag.
St. I	60	48 cases	12 cases
St. II	98	73	25
St. III	37	26	11
St. IV	4	4	0
(Unknown)	52	22	30
TOTAL:	251	173	78

Our method of irradiation was almost the same as employed in the series from 1945 to 1956: 150 kV, 3 mA, filter 0.5 mm Cu., H.V.L. 0.5 mm Cu., F.S.D. 30 cm, dose rate 10 r/min., field size 8×10cm, 200r—300 r/day (air dose). One course of irradiation therapy means the complete irradiation of four portals (1) axilla front and (2) back, (3) supraclavicular region and (4) operated area of the breast; irradiation was continued in each part not until the appearance of wet desquamative dermatitis mixed with pigmentation and erythema at the skin of the irradiated area.

We divided all patients into two groups—the complete and the incomplete irradiation by whether (1) they were irradiated with all four portals and (2) at least in each of four portals total dose of irradiation were over 4000 r (air dose), or not.

Table 9-1: Crude Survival Rate of Cancer of the Breast (1950-1956) according to the Recommendation of WHO

Stadium Irradiation	1 Year	2 Year	3 Year	4 Year	5 Year
I Complete	25/26 4/6 (29/32)	24/26 4/6 (28/32)	20/25 4/6 (24/31)	12/19 3/5 (15/24)	8/16 3/5 (11/21)
I Incomplete	15/22 3/6 (18/28)	15/22 3/6 (18/28)	13/22 3/6 (16/28)	8/19 3/6 (11/25)	8/19 3/6 (11/25)
I Total	40/48 7/12 (47/60)	39/48 7/12 (46/60)	33/47 7/12 (40/59)	20/38 6/11 (26/49)	16/35 6/11 (22/46)
II Complete	32/43 10/14 (42/57)	30/43 10/14 (40/57)	28/43 9/13 (37/56)	21/37 9/13 (30/50)	16/33 7/12 (23/45)
II Incomplete	18/31 7/11 (25/42)	14/31 6/11 (20/42)	11/30 5/11 (16/41)	10/30 3/10 (13/40)	8/28 3/10 (11/38)
II Total	50/74 17/25 (67/99)	44/74 16/25 (60/99)	39/73 14/24 (53/97)	31/67 12/23 (43/90)	24/61 10/22 (34/83)
III Complete	10/14 4/8 (14/22)	9/14 3/8 (12/22)	7/14 3/8 (10/22)	6/14 2/7 (8/21)	4/12 2/7 (6/19)
III Incomplete	8/12 2/3 (10/15)	5/12 2/3 (7/15)	3/12 1/3 (4/15)	2/12 1/3 (3/15)	2/12 1/3 (3/15)
III Total	18/26 6/11 (24/37)	14/26 5/11 (19/37)	10/26 4/11 (14/37)	8/26 3/10 (11/36)	6/24 3/10 (9/34)
IV Complete	0/2 0/0 (0/2)				
IV Incomplete	0/2 0/0 (0/2)				
IV Total	0/4 0/0 (0/4)				

Stadium Irradiation	6 Year	7 Year	8 Year	9 Year	10 Year
I Complete	4/12 3/5 (7/17)	3/11 2/4 (5/15)	1/9 1/3 (2/12)	0/8 0/2 (0/10)	
I Incomplete	7/18 3/6 (10/24)	2/13 1/5 (3/18)	1/12 1/5 (2/17)	0/11 1/5 (1/16)	0/4
I Total	11/30 6/11 (17/41)	5/24 3/9 (8/33)	2/21 2/8 (4/29)	0/19 1/7 (1/26)	
II Complete	14/31 6/12 (20/43)	7/26 5/11 (12/37)	2/22 3/9 (5/31)	1/21 0/7 (1/28)	0/20 0/7 (0/27)
II Incomplete	7/27 2/10 (9/37)	2/22 2/10 (4/32)	0/20 1/9 (1/29)	0/20 0/8 (0/28)	
II Total	21/58 8/22 (29/80)	9/48 7/21 (16/69)	2/42 4/18 (6/60)	1/41 0/15 (1/56)	
III Complete	2/11 2/7 (4/18)	1/11 1/6 (2/17)	0/10 1/6 (1/16)	0/10 0/5 (0/15)	
III Incomplete	1/11 1/3 (2/14)	1/11 1/3 (2/14)	0/10 0/2 (0/12)	0/10 0/2 (0/12)	
III Total	3/22 3/10 (6/32)	2/22 2/9 (4/31)	0/20 1/8 (1/28)	0/20 0/7 (0/27)	

Table 9-2: Crude Survival Rate of Cancer of the Breast, (1945-1950) and 1950-1956 according to the Recommendation of WHO

Stadium	Irradiation	1 Year	2 Year	3 Year	4 Year	5 Year
I	Complete	(19/37) 29/32	(18/35) 28/32	(12/32) 24/31	(8/24) 15/24	(5/14) 11/21
	Incomplete	(22/44) 18/28	(31/41) 18/28	(19/39) 16/28	(12/31) 11/25	(5/17) 11/25
II	Complete	(27/48) 42/57	(22/43) 40/57	(15/35) 37/56	(10/24) 30/50	(5/17) 23/45
	Incomplete	(10/34) 25/42	(6/29) 20/42	(5/23) 16/41	(4/16) 13/40	(4/12) 11/38
III	Complete	(15/30) 14/22	(11/23) 12/22	(8/19) 10/22	(7/13) 8/21	(6/11) 6/19
	Incomplete	(7/44) 10/15	(1/41) 7/15	(1/28) 4/15	(0/22) 3/15	(0/19) 3/15
IV	Complete	(1/2) 0/2	(1/2) 0/2	(1/3) 0/2	(1/3) —	(0/2) —
	Incomplete	(1/7) 0/2	(1/3) 0/2	(1/3) —	(0/2) —	(0/1) —

Stadium	Irradiation	6 Year	7 Year	8 Year	9 Year
I	Complete	(2/20) 7/17	5/15	2/12	0/10
	Incomplete	(2/12) 10/25	3/18	2/17	1/16
II	Complete	(4/11) 20/43	12/37	5/31	1/28
	Incomplete	(1/8) 9/37	4/32	1/29	0/28
III	Complete	(0/4) 4/18	2/17	1/16	0/15
	Incomplete	(0/14) 2/14	2/14	0/12	0/12
IV	Complete	(0/1) —	—	—	—
	Incomplete	(0/1) —	—	—	—

The details of two groups are shown on Table 7. There are slightly more cases of complete irradiation than of incomplete irradiation and in both occasions pathologically diagnosed cases were more than the clinically diagnosed.

If we classify the grade of illness of all patients, at the time of first consultation according to Steintal's classification into four stadiums, we find cases in Stadium II are most frequent (Table 8). This result, together with that of Table 5, shows that all patients came too late for consultation, missing chances of healing.

8) Results of treatment: Survival rate (Table 9 (1), (2) and Table 11).

Crude survival rate was estimated according to the recommendation³⁾ of WHO in 1950. All patients were divided as follows:

A—Number known to be alive	AO—with no evidence of the disease
	AC—with cancer present
	AX—with presence of cancer uncertain
D—Number known to be dead	DO—with no evidence of the disease
	DC—with cancer present
	DX—with presence of cancer uncertain at death
L—Number of unexamined at the end of year.	

Crude Survival Rate ($SR_{cru} = A/A+D+L$) was calculated in every year after the time when the patients were operated (Table 9 (1), (2) and Table 11).

Table 9 (1) shows the crude survival rate of our series. The numbers in the first and second column from the left are that of pathologically diagnosed cases and that of clinically diagnosed cases and final numbers in () are the total.

(1) Regarding the difference between complete and incomplete irradiation, one-year, 3-year and 5-year survival rate were calculated. The result is as follows:

Steintal's Stadium	1-year			3-year			5-year		
	Path.	Clin.	Total	Path.	Clin.	Total	Path.	Clin.	Total
St. I	Not significant	Not sig.	Not sig.	Not sig.	Not sig.	Not sig.	Not sig.	Not sig.	Not sig.
St. II	Not significant	Not sig.	Significant	Not sig.	Not sig.	Significant	Not sig.	Not sig.	Not sig.
St. III	Not significant	Not sig.	Not sig.	Not sig.	Not sig.	Not sig.	Not sig.	Not sig.	Not sig.
St. IV	—	—	—	—	—	—	—	—	—

The significant difference of the two lies only in the total survival rates of one-year and 3-year regarding Steintal's stadium II.

(2) On the cases of complete irradiation in each stadium, we examined the difference of survival rate between the pathologically diagnosed and the clinically diagnosed. Results are as follows:

	3-year	5-year
Stadium I	Not significant	Not significant
Stadium II	Not significant	Not significant
Stadium III	Not significant	Not significant

It was recognized that there is not significant difference in the survival-rate between them, which may be the proof of absence of benign tumor in the group of patients diagnosed as cancer clinically.

(3) Compared with Sakka's report, as shown in Table 9 (2), percentage of survival rate in our series apparently much improved in each line of Table 9 (2), but if we examine statistically one, 3 and 5 year survival rate of Sakka's report and there is ours, no definite difference between them shown as follows:

		1-year	3-year	5-year
Stad. I	Compl. irradi.	(+)	(-)	(-)
	Incompl. irradi.	(-)	(-)	(-)
Stad. II	Compl. irradi.	(-)	(+)	(-)
	Incompl. irradi.	(+)	(-)	(-)
Stad. III	Compl. irradi.	(-)	(-)	(-)
	Incompl. irradi.	(-)	(+)	(-)

(4) All of the patients with pathological diagnosis were classified according to Steinthal's stadium of illness (Table 10). Table 11 shows crude survival rate of the cases with simple ca. and with adenomatous ca.. But the number of cases are not sufficient enough to make out the difference between them.

Table 10: Distribution of the Breast Cancer according to Histologic Diagnosis (1950—1956)

Stadium	Irradiation	Simple Cancer	Adeno Cancer	Gelatinous Cancer	Squamous Epithelial Cancer	Paget's Disease	Sarcoma	Total
I	Complete	10	15	1				26
	Incomplete	14	8	0				22
		(24)	(23)	(1)				(48)
II	Complete	19	21	1	0	2	0	43
	Incomplete	17	9	2	1	0	1	30
		(36)	(30)	(3)	(1)	(2)	(1)	(73)
III	Complete	6	7		1			14
	Incomplete	10	2		0			12
		(16)	(9)		(1)			(26)
IV	Complete	2	0					2
	Incomplete	1	1					2
		(3)	(1)					(4)
?	Complete	8	4	1				13
	Incomplete	6	3	0				9
		(14)	(7)	(1)				(22)
	TOTAL:	(93)	(70)	(5)	(2)	(2)	(1)	(173)

Table 11: Comparison of Survival Rate between Simple Cancer and Adenomatous Cancer (1950-1956)

Stadium Irradiation	1 Year	2 Year	3 Year	4 Year	5 Year
I Complete	(9/10) 15/15	(9/10) 14/15	(7/10) 12/14	(6/10) 5/8	(4/8) 4/7
I Incomplete	(12/14) 3/8	(12/14) 3/8	(10/14) 3/8	(7/13) 1/6	(7/13) 1/6
II Complete	(13/19) 18/21	(11/19) 18/21	(9/19) 18/21	(8/18) 13/17	(4/15) 11/15
II Incomplete	(10/17) 5/9	(7/17) 4/9	(6/17) 2/8	(5/17) 2/8	(5/17) 1/7
III Complete	(4/6) 5/7	(3/6) 5/7	(2/6) 5/7	(2/6) 4/7	(2/6) 1/5
III Incomplete	(8/10) 0/2	(5/10)	(3/10)	(2/10)	(2/10)
IV Complete	(0/2)				
IV Incomplete	(0/1) 0/1				

Stadium Irradiation	6 Year	7 Year	8 Year	9 Year	10 Year
I Complete	(1/6) 2/5	(1/6) 2/5	(0/5) 1/4	0/3	
I Incomplete	(6/12) 1/6	(2/8) 0/5	(1/7)	(0/6)	
II Complete	(4/15) 9/13	(3/15) 4/9	(1/14) 1/6	(1/14) 0/5	(0/13)
II Incomplete	(5/17) 0/6	(2/14)	(0/12)		
III Complete	(1/5) (1/5)	(0/5) 1/5	0/4		
III Incomplete	(1/9)	(0/9)			

NOTE: () Research for Simple cancer

9) Metastasis and recurrence after our treatment (Table 12).

(1) Recurrence; Table 12 shows incidence of metastasis and recurrence, viewed from time and localization. Recurrence means here the reappearance of cancerous tumor on the operated breast. Total frequency of recurrence in these three series are: $67/240=27.9\%$ (Adachi), $66/388=17.0\%$ (Sakka) and $17/261=6.7\%$ (our series) and the difference among them is significant.

(2) Metastasis; Total numbers of metastasis in axilla are: $68/240=28.3\%$ (Adachi), $86/288=22.1\%$ (Sakka) and $11/251=4.3\%$ (our series); and there is a significant difference.

While number of metastasis in the supra-and, infra-clavicular region are: $59/240=24.5\%$ (Adachi), $113/388=29.1\%$ (Sakka) and $16/251=6.3\%$ (our series); and there is also a significant difference.

Regarding whole incidence of distant metastasis, however, the ratio of patients with distant metastasis to all patients is: $32/240=13.3\%$ (Adachi), $76/388=19.5\%$ (Sakka) and $34/251=13.5\%$ (ours); and the difference is not significant. This means that the improved surgical technik and earlier irradiation prevented the recurrence of the operated breast region and regional lymphnode metastasis remarkably, but not that of distant metastasis. Some of them must have had already malignant tumor cells in the distant organs when they came to our clinic.

The distant metastasis were localized in lung (12 cases), liver (5), bone (8), brain (4), and other regions (5). They were confirmed by autopsy, radiograph or clinical signs and examinations.

Table 12: Recurrence and Metastasis of Cancer of the Breast; (1932—1939)
by Adachi, (1945—1950) by Sakka & 1950—1956 Our Series

AFTER OPERATION

Interval	Recurrence	Axilla	Supraclavicular	Opposite Side	Skin	Distant	Total
< 6 months	(17)(30) 5	(35)(41) 5	(21)(50) 1	(5)(12) 0	(4)(29) 0	(5)(19) 6	(87)(131)17
< 1 year	(37)(38) 9	(49)(54) 5	(40)(73) 5	(7)(17) 3	(13)(40) 0	(19)(34)11	(165)(236)33
< 2 years	(48)(43)14	(56)(59) 6	(49)(82) 7	(12)(20) 3	(21)(44) 1	(26)(46)17	(212)(274)48
< 3 years	(56)(56)16	(58)(68) 7	(54)(92)10	(14)(23) 3	(21)(51) 2	(28)(56)21	(231)(319)59
< 5 years	(63)(59)17	(67)(69) 9	(57)(98)10	(15)(23) 3	(21)(51) 2	(31)(58)31	(254)(338)78
<10 years	(66)(60)17	(68)(70)11	(59)(102)16	(15)(23) 3	(22)(51) 2	(32)(59)34	(262)(345)83
TOTAL:	(67)(66)17	(68)(86)11	(59)(113)16	(15)(31) 3	(22)(62) 2	(32)(76)34	(263)(434)83

10) Death after the treatment (Table 13 and Table 14).

Fifty-four cases died after the treatment, whom we divided into two groups; group with complete irradiation and group with incomplete one (Table 13). There is no significant relation between death and Steintal's stadium. They distributed almost lognormally (Fig. 3). In Fig. 3 probability of 50% death is 24 months after the incomplete irradiation, and 48 months after the complete irradiation. Comparison with Sakka's data is shown as follows:

Table 13: Relation between Death and Irradiation (1950—1956)

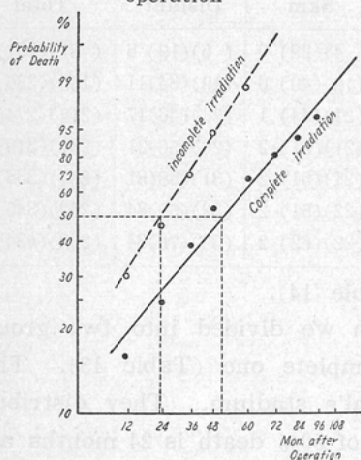
Irradiation	Steinthal's Stadium	No. of Death	Histolog. Diag.	Clinic. Diag.
Complete Irrad.	St. I	5/32	5/26	0/6
	St. II	10/56	7/42	3/14
	St. III	6/22	4/14	2/8
	St. IV	0/2	0/2	0/0
	?	4/24	3/13	1/11
Incomplete Irrad.	St. I	3/28	2/22	1/6
	St. II	12/42	8/31	4/11
	St. III	6/15	5/12	1/3
	St. IV	0/2	0/2	0/0
	?	8/28	3/9	5/19
TOTAL:		54/251	37/173	17/78
DEATH RATE:		21.1%	21.8%	21.8%

Table 14: Number of Death and Survival Time (1945-1950), 1950-1956

Steinthal's Stadium

Survival Time	I	II	III	IV	rec.	Total
< 3 months	(1) 0	(0) 0	(2) 1	(1) 0	(3) 1	(7) 2
< 6 months	(0) 0	(2) 1	(6) 1	(1) 0	(6) 0	(15) 2
< 1 year	(4) 0	(7) 4	(9) 0	(3) 0	(7) 2	(30) 6
< 2 years	(0) 0	(8) 3	(9) 4	(0) 0	(5) 3	(22) 10
< 4 years	(4) 4	(7) 7	(3) 4	(1) 0	(3) 5	(18) 20
> 4 years	(1) 4	(1) 7	(0) 2	(0) 0	(0) 1	(2) 14
TOTAL:	(10) 8	(25) 22	(29) 12	(6) 0	(24) 12	(94) 54

Fig. 3. Life expectancy of 54 died patients after operation



(Sakka) (Our Series)

	\bar{X}	\bar{X}
	Months	Months

Complete irradiation	21.40	42.3
Incomplete irradiation	13.73	27.7

Regarding the interval from operation to difference between complete and incomplete irradiation is significant in both Sakka's and our series. And the period of survival significantly increased in our series compared with Sakka's data, both in completely irradiated and in incompletely irradiated groups. (In Sakka's data, 41 cases were irradiated completely and 53 cases incompletely). But if we examine the rate of death according to Steinthal's Stadium

by the time of irradiation (Table 13), no significant difference was found, both in completely irradiated and in incompletely irradiated groups.

11) Cause of death (Table 15).

Causes of death are shown on Table 15. Of 54 died patients, the most frequent cause of death are metastasis and recidivation. Relation between cancer and other causes of death was not confirmed, because all of them were not autopsied.

12) Chief complaints of the survived: (Table 16).

Table 16 shows the chief complaints of 134 survivors. Seventy percent of them are without any complaint, so that patients with complaints are 30%. Postoperative edema of the upper arm appeared in 6% (Sakka reported 15%). Roentgen pneumonia (Roentgen fibrosis) was found in 2 cases (1%) among 31 who were under gone radio-

Table 15: Causes of Death in 54 cases (1950-1956)

Cause of Death	No. of Cases
Recidivation & Metastasis	46 cases
Heart Disease	2
Unknown	2
Apoplexia	1
Scorbute	1
Uremia	1
Pneumonia	1
TOTAL:	54 cases

Table 16: Chief Complaints of 136 Survivors

No. of Cases			
A. Without Complaints	96 (70,5%)		
B. With Complaints	40 (29,5%)	a. Under Treatment	10
		With Cancer	2
		Apoplexia	3
		Roentgen Pneumonia	1
		Hypertension	1
		Tuberculosis	1
		Neurosis	1
		Roentgen Ulcus	1
		b. Not under treatment	30
		and ever had some	
		treatment after	
		irradiation.	
		(Containing	
		patients with a	
		few complainments	
		at the same time)	
		Postmastectomy Lymphedema	8
		Hindrance of Motibility	7
		of Arm	
		Neuralgia of Scar	6
		Tuberculosis	2
		Appendicitis	2
		Nephritis	2
		Pneumonia	2
		Felling Stiff in	2
		Shoulder	
		Ektopie	1
		Ovaial Tumor	1
		Goiter	1

grams after the treatment occasionally. Since 200 k Volt apparatus has been employed in 1956, lung fibrosis after irradiation has been increasing. On the lung fibrosis after irradiation, a report shall be published by us.

SUMMARY

251 patients with cancer of the breast who visited our hospital during 1950 to 1956 were examined and compared with the previous reports of Nakaizumi-Adachi and Nakaizumi-Sakka. We found that there was no significant difference regarding the age of onset, localization of primary tumor, survival rate, but remarkable difference was found in the duration of symptoms, interval from operation to irradiation, incidence of recurrence and metastasis, between our data and previous reports by Nakaizumi, Adachi and Sakka. No significant difference was found between pathologically diagnosed cases and clinically diagnosed cases on the distribution.

Causes of death and complaints of the survived were investigated.

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乳癌手術後照射 251 例の治療成績.

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(昭和 35 年 11 月 10 日 受付)

1950年から1956年迄に東大放射線科を訪れた 441名の乳癌患者の中から術後照射の意味のあるもの251名の治療成績を1958年末現在で集計し, これを1932年から1939年迄の中泉・足立の報告と, 1945年から1950年迄の中泉・栗冠の報告と比較した. 追求率は74.9%で生存53.4%, 死亡21.5%, 追求不能25.1%である. 之を173名の病理診断を有する群と臨床診断のみの群とに分け, これを比較した. 男性乳癌は1名(0.4%), 平均年齢47.1才, 最年少者20才, 最高年者78才. 患側は左側が僅かに多い. 症状発現から手術迄の期間は次第に短縮の傾向あり, 6カ月以内の手術例は54.2%である. 照射法は中泉・栗冠と同じで, 完全照射例が僅かに多く, 悪性度でみると第Ⅱ度, 第Ⅲ度が大部分であることから一層の早期治療の啓蒙が必要である. 中泉・栗冠の報告と比較した粗生存率は何れも多少の改善をみたが, 有意の差を見ない. 合計の5年粗生存率は38.9%である. 再発転移は何れも前2回の報告より減少したが遠隔転移では差がない. 死因は再発転移によるものが大部分で, 死亡率は完全照射と不完全照射とは差がなく21%である. 死亡者の平均生存月数は完全照射で42.3カ月, 不完全照射で27.7カ月である. 生存者の70%は別に自覚症状の訴えなく, 訴えのある30%のうち, 最多は手術側上腕の浮腫6%で肺線維症(放射線肺炎様症)は2例約1%である.