

Malignant Tumors Among Koreans-Relative Frequency Study on 19,140 Cases During 1978 to 1986

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A statistical analysis was made on 19,140 primary malignant tumors histopathologically diagnosed at Seoul National University Hospital during 9 year period from 1978 to 1986. The study was performed to understand the recent trend of the relative frequency of the primary malignant tumors among Koreans and to compare it with the previous studies using same hospital materials, twice presented in 1968 and 1978, respectively. Sex distribution of the cases was 10,025 (52.38%) males and 9,115 (47.62%) females. Among males the frequency rank was stomach (33.88%), lung and bronchus (8.73%), leukemia (7.02%), liver (4.79%) and oral cavity (4.70%). And among females it was uterine cervix (24.48%), stomach (20.45%), thyroid (7.87%), breast (6.48%) and leukemia (4.78%). The relative frequency of malignant tumors in this study was generally similar to the previous data published in 1978 at this department, except for the fact that stomach and lung cancers were more commonly seen in both sexes during this study period than the previous periods of years.

Key Words: *Cancer, relative frequency, malignant neoplasm, epidemiology*

INTRODUCTION

The most basic and important problem on cancer in a country is the statistical survey on the incidence of cancer. It is an axiom that the prerequisite of any statistical investigation is accuracy of the primary data. The primary data in tumor statistics principally

should be based on the morphological background, that is histopathological diagnosis of the cases studied.

In Korea we do not have the nationwide statistics on age-adjusted incidence of malignant tumors yet. There is however active on-going study for the establishment of national cancer registry system in Korea (Kim et al., 1984).

In 1968 the Korean Society of Pathologists (Lee et al., 1968) presented the first nationwide data on cancer prevalence among Koreans, based on 22,208 biopsy and autopsy cases during a 10 year period of 1958 to 1967. Since that time there has been a multitude of factors that might have influenced on

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the cancer prevalence among Koreans. In 1977 although it was not nationwide the second statistical analysis was made on 7,363 consecutive cases of primary malignant tumors, all diagnosed microscopically during next 10 year period from January 1968 to December 1977, at the Department of Pathology, College of Medicine, Seoul National University (Lee *et al.*, 1979).

The present study is the third series of statistical surveys of malignant tumors based on the materials obtained at the same institute during 9 years, from 1978 to 1986.

MATERIALS AND METHODS

All the materials used in this survey were cases examined and diagnosed histologically at the Departments of Pathology, Clinical Pathology and Oral Pathology of Seoul National University Hospital. Those cases sent from outside surgical clinics for the histological diagnosis were not included in this study.

The biopsy site was taken as the primary site when the histological findings and clinical features were compatible with. The metastatic tumor was excluded. The age was taken at the time of diagnosis.

The specimens were processed routinely from fixation to slide preparations. At least two pathologists were involved for the histological confirmation of the diagnosis. The diagnosis and other items of each case are computerized so that the repeat biopsy could be detected and excluded. When a patient had more than one malignant tumor they were registered separately. To compare the data of previous two surveys we have adopted the same classification method, *i.e.*, WHO tumor classification (WHO Morbidity Statistics, 1961).

RESULTS

1. Total cases of malignant tumors

During a period of 9 years, from January 1, 1978 to December 31, 1986, there were 19,140 primary cancers diagnosed. Average 2500 cases of primary malignant tumor were diagnosed each year during this period. When these data were compared with the total number of accessions of surgical pathology, primary malignant tumors accounted for approximately 16%.

Of 19,140 cases 10,025 (52.38%) were males and 9,115 (47.62%) were females. The male female ratio

was 1.1:1.

2. Annual trend of malignant tumors (Table 1)

The number of new cases diagnosed each year during the survey period was shown in Table 1. There was a steady increase in the number of new cases and this tendency was same in male and female.

3. Relative frequency of malignant tumors by primary site

Twenty common cancers in male, female and both sexes combined were shown in table 3.

Stomach cancer was 33.38% of all malignancy in male and that was the commonest. The 6th decade was the most prevalent age group affected, although it showed a bell-shaped curve with the peak in the 6th decade. There were 2 cases of stomach cancer occurred below the age of 9 years. Male female ratio of stomach cancer was 1.8:1. The lung and bronchus cancer was the second most common malignancy (8.73%) of male. The cancer was prevalent in the 6th and 7th decades. Male female ratio was 3.8 to 1. Leukemia was the third most common cancer (7.02%) of male. It was most common in the 2nd decade, followed by the 3rd decade and the first decade. Male female ratio was 1.6 to 1. Cancer of liver including intrahepatic biliary system was the 4th most common malignancy and accounted for 4.7% of the entire malignancy in male. The great majority of these cancers were hepatocellular carcinoma. Male to female ratio was 3.6 to 1. Most of them occurred in the 5th and the 6th decades. Most of 22 hepatic malignancies below the age of 9 were of hepatoblastoma. Cancers of oral cavity other than those of tongue was the 5th common (4.70%) in male. Male to female ratio was 1.6 to 1. The 6th decade was the most prevalent decade of age incidence, followed by the 5th decade and the 7th decade.

Other common male cancers were malignant lymphoma (4.04%), urinary bladder (4.04%), larynx (3.62%), rectum (3.37%) and esophagus (2.96%).

Uterine cervix cancer was encountered in 2,231 cases. It corresponded to 24.48% of the female malignancy, thus ranking the first in relative frequency. 707 cases occurred in the 5th decade, 686 cases in the 6th decade and 393 cases in the 4th decade. There were 73 cases that were diagnosed before the age of 30 years. In the same period there were 218 cases of uterine body cancer which was the 10th most common tumor in female.

Table 1. Number of new cases of malignant tumors diagnosed at Seoul National University Hospital (SNUH) during the year period of 1978-1986 by primary site, sex, and calendar year.

Primary site	Sex	'78	'79	'80	'81	'82	'83	'84	'85	'86	Total	Percent
Lip	M	1	0	1	3	3	2	4	0	1	15	0.15%
	F	1	0	0	0	1	0	2	0	0	4	0.04%
	T	2	0	1	3	4	2	6	0	1	19	0.10%
Tongue	M	2	9	18	15	14	15	12	11	11	107	1.07%
	F	2	5	8	4	3	11	5	6	6	50	0.55%
	T	4	14	26	19	17	26	17	17	17	157	0.82%
Salivary gland	M	1	1	4	3	6	4	8	4	2	33	0.33%
	F	5	3	9	5	6	3	5	4	7	47	0.52%
	T	6	4	13	8	12	7	13	8	9	80	0.42%
Ear	M	0	0	2	2	0	1	2	1	0	8	0.08%
	F	0	1	0	1	0	0	1	0	1	4	0.04%
	T	0	1	2	3	0	1	3	1	1	12	0.06%
Oral cavity (excl. tongue)	M	39	70	67	69	40	34	41	43	68	471	4.70%
	F	20	36	40	36	38	38	28	35	32	303	3.32%
	T	59	2	17	18	19	6	6	7	7	774	4.04%
Pharynx	M	5	7	6	14	9	3	2	8	5	59	0.59%
	F	1	2	3	0	4	3	1	4	1	19	0.21%
	T	6	9	9	14	13	6	3	12	6	78	0.41%
Esophagus	M	8	29	27	26	33	36	33	48	57	297	2.96%
	F	0	5	6	4	4	9	12	5	7	52	0.57%
	T	8	34	33	30	37	45	45	53	64	349	1.82%
Stomach	M	100	171	293	391	388	443	508	492	610	3396	33.88%
	F	48	79	161	218	217	284	299	287	271	1864	20.45%
	T	148	250	454	609	605	727	807	779	881	5260	27.48%
Small intestine	M	2	4	0	4	10	10	5	12	1	48	0.48%
	F	2	2	2	3	7	10	9	5	1	41	0.45%
	T	4	6	2	7	17	20	14	17	2	89	0.46%
Large intestine	M	13	21	27	28	24	27	42	43	46	271	2.70%
	F	7	12	25	25	17	29	35	32	29	211	2.31%
	T	20	33	52	53	41	56	77	75	75	482	2.52%
Rectum	M	17	22	36	23	35	49	35	52	69	338	3.37%
	F	19	26	25	32	31	55	39	35	52	314	3.44%
	T	36	48	61	55	66	104	74	87	121	652	3.41%
Liver	M	27	51	44	35	39	63	82	70	69	480	4.79%
	F	9	14	12	9	9	20	26	15	18	132	1.45%
	T	36	65	56	44	48	83	108	85	87	612	3.20%
Gall bladder	M	2	5	6	5	3	2	1	6	8	38	0.38%
	F	3	4	8	9	6	3	6	6	4	49	0.54%
	T	5	9	14	14	9	5	7	12	12	87	0.45%
Bile duct extrahepatic	M	3	8	9	10	7	7	8	7	12	71	0.71%
	F	1	2	6	10	3	3	1	4	9	39	0.43%
	T	4	10	15	20	10	10	9	11	21	110	0.57%

Primary site	Sex	'78	'79	'80	'81	'82	'83	'84	'85	'86	Total	Percent
Pancreas	M	0	7	9	9	4	5	9	8	14	65	0.65%
	F	2	0	2	5	3	7	4	3	6	32	0.35%
	T	2	7	11	14	7	12	13	11	20	97	0.51%
Peritoneum	M	3	2	2	0	3	9	3	13	2	37	0.37%
	F	2	5	3	0	2	7	1	10	3	33	0.36%
	T	5	7	54	0	5	16	4	23	5	70	0.37%
Retropери- toneal tissue	M	0	3	0	4	2	3	2	3	2	19	19.0%
	F	1	2	0	2	2	7	3	6	4	27	0.30%
	T	1	6	0	6	4	10	5	9	6	46	0.24%
Nose & nasal cavity	M	8	7	24	13	20	24	19	9	10	134	1.34%
	F	5	5	8	16	15	11	4	8	5	77	0.84%
	T	13	12	32	29	35	35	23	17	15	211	1.10%
Paranasal sinus	M	1	6	15	21	6	8	10	5	2	74	0.74%
	F	3	5	8	7	9	0	3	2	4	41	0.45%
	T	4	11	23	28	15	8	13	7	6	115	0.60%
Larynx & trachea	M	27	44	32	45	37	72	45	27	34	363	3.62%
	F	3	8	10	4	6	9	12	2	4	58	0.64%
	T	30	52	42	49	43	81	59	29	38	421	2.20%
Lung & bronchus	M	33	65	101	116	122	133	111	94	100	875	8.73%
	F	8	16	19	40	29	46	32	15	23	228	2.50%
	T	41	81	120	156	151	179	143	109	123	1103	5.76%
Pleura	M	3	1	3	7	2	2	1	1	1	21	0.21%
	F	1	6	2	1	0	2	0	3	1	16	0.18%
	T	4	7	5	8	2	4	1	4	2	37	0.19%
Media- stinum	M	1	1	1	1	1	3	1	6	0	15	0.15%
	F	0	2	1	1	0	0	0	7	0	11	0.12%
	T	1	3	2	2	1	3	1	13	0	26	0.14%
Eye	M	3	2	5	11	14	6	6	2	3	52	0.52%
	F	3	4	5	2	10	8	4	4	3	43	0.47%
	T	6	6	10	13	24	14	10	6	6	95	0.50%
Bone & joint	M	11	12	20	19	14	14	19	13	21	143	1.43%
	F	7	4	11	13	6	10	12	9	12	84	0.92%
	T	18	16	31	32	20	24	31	22	33	227	1.19%
Muscle	M	0	3	0	0	1	0	3	2	0	9	0.09%
	F	0	0	0	0	0	0	1	0	2	3	0.03%
	T	0	3	0	0	1	0	4	2	2	12	0.06%
Soft tissue	M	4	8	9	5	9	13	8	15	5	76	0.76%
	F	4	8	8	8	4	12	6	8	4	62	0.68%
	T	8	16	17	13	13	25	14	23	9	138	0.72%
Breast	M	0	1	0	2	0	1	0	1	0	5	0.05%
	F	22	36	54	81	73	77	73	83	92	591	6.48%
	T	22	37	54	83	73	78	73	84	92	596	3.11%

Primary site	Sex	'78	'79	'80	'81	'82	'83	'84	'85	'86	Total	Percent
Kidney	M	5	8	9	12	7	16	14	18	18	107	1.07%
	F	4	9	4	10	6	3	6	6	8	56	0.61%
	T	9	17	13	22	13	19	20	24	26	163	0.85%
Urinary bladder & ureter	M	25	31	32	38	38	55	63	63	60	405	4.04%
	F	2	11	6	14	13	9	12	15	10	92	1.01%
	T	27	42	38	52	51	64	75	78	70	497	2.60%
Prostate	M	2	5	11	13	8	12	15	10	11	87	0.87%
	F	—	—	—	—	—	—	—	—	—	0	0.00%
	T	2	5	11	13	8	12	15	10	11	87	0.45%
Testis & epididymis	M	2	3	2	8	5	5	5	3	4	37	0.37%
	F	—	—	—	—	—	—	—	—	—	0	0.00%
	T	2	3	2	8	5	5	5	3	4	37	0.19%
Penis	M	7	3	3	3	3	3	2	3	2	29	0.29%
	F	—	—	—	—	—	—	—	—	—	0	0.00%
	T	7	3	3	3	3	3	2	3	2	29	0.15%
Uterine cervix	M	—	—	—	—	—	—	—	—	—	0	0.00%
	F	133	143	200	332	293	266	336	279	249	2231	24.48%
	T	13	143	200	332	293	266	336	279	249	2231	11.66%
Uterine corpus	M	—	—	—	—	—	—	—	—	—	0	0.00%
	F	6	6	33	30	17	39	39	25	23	218	2.39%
	T	6	6	33	30	17	39	39	25	23	218	1.14%
Ovary	M	—	—	—	—	—	—	—	—	—	0	0.00%
	F	3	10	21	19	26	15	21	20	15	150	1.65%
	T	3	10	21	19	26	15	21	20	15	150	0.78%
Fallopian tube	M	—	—	—	—	—	—	—	—	—	0	0.00%
	F	0	0	0	0	0	0	1	0	1	2	0.02%
	T	0	0	0	0	0	0	1	0	1	2	0.01%
Vagina	M	—	—	—	—	—	—	—	—	—	0	0.00%
	F	1	2	4	2	5	15	1	9	3	42	0.46%
	T	1	2	4	2	5	15	1	9	3	42	0.22%
Vulva	M	—	—	—	—	—	—	—	—	—	0	0.00%
	F	2	4	2	2	5	5	2	2	1	25	0.27%
	T	2	4	2	2	5	5	2	2	1	25	0.13%
Skin & skin appendage	M	10	10	18	19	10	25	23	20	30	165	1.65%
	F	9	6	10	12	12	18	13	9	22	111	1.22%
	T	19	16	28	31	22	43	36	29	52	276	1.44%
Adrenal gland	M	0	0	4	2	5	1	6	0	6	24	0.24%
	F	2	2	5	2	15	3	6	2	8	45	0.49%
	T	2	2	9	4	20	4	12	2	14	69	0.36%
Thyroid	M	13	12	17	17	13	10	10	19	20	131	1.31%
	F	70	73	78	89	92	56	92	91	76	717	7.87%
	T	83	85	95	106	105	66	102	110	96	848	4.43%

Primary site	Sex	'78	'79	'80	'81	'82	'83	'84	'85	'86	Total	Percent
Parathyroid	M	0	0	1	0	0	0	1	0	0	2	0.02%
	F	0	0	0	0	1	0	2	0	0	3	0.03%
	T	0	0	1	0	1	0	3	0	0	5	0.03%
Malignant lymphoma	M	21	48	50	61	45	28	45	48	59	405	4.04%
	F	8	14	22	20	26	19	26	25	22	182	2.00%
	T	29	62	72	81	71	47	71	73	81	587	3.07%
Leukemia	M	63	83	76	81	91	74	72	76	88	704	7.02%
	F	39	46	47	51	49	45	45	58	56	436	4.78%
	T	102	129	123	132	140	119	117	134	144	1140	5.96%
Thymus	M	0	2	0	3	2	2	0	0	3	12	0.12%
	F	0	0	0	2	1	1	3	0	7	14	0.15%
	T	0	2	0	5	3	3	3	0	10	26	0.14%
Spinal cord	M	4	0	1	0	2	1	2	3	4	17	0.17%
	F	1	0	1	2	1	0	2	4	6	17	0.19%
	T	5	0	2	2	3	1	4	7	10	34	0.18%
Brain	M	19	15	28	40	34	31	37	36	49	289	2.88%
	F	18	14	14	19	37	28	40	38	58	266	2.92%
	T	37	29	42	59	71	59	77	74	107	555	2.90%
Malignant histiocytosis	M	5	3	3	4	7	1	4	3	12	42	0.42%
	F	0	2	1	3	0	1	7	0	11	25	0.27%
	T	5	5	4	7	7	2	11	3	23	67	0.35%
Melanoma	M	4	6	7	5	4	5	3	4	7	45	0.45%
	F	3	3	3	5	9	5	5	6	3	42	0.46%
	T	7	9	10	10	13	10	8	10	10	87	0.45%
Heart & pericardium	M	0	0	1	0	1	0	0	1	1	4	0.04%
	F	0	0	0	1	0	0	0	4	1	6	0.07%
	T	0	0	1	1	1	0	0	5	2	10	0.05%
GRAND TOTAL	M	494	789	1024	1187	1121	1258	1322	1303	1527	10025	100.00%
	F	480	637	887	1151	1113	1192	1283	1191	1181	9115	100.00%
	T	97	1426	1911	2338	2234	2450	2605	2494	2708	19140	100.00%

Table 2. Age distribution of malignant tumors diagnosed at SNUH during the year period of 1978-1986 by primary site and sex.

Primary site	Sex	-1	-4	-9	-19	-29	-39	-49	-59	-69	-79	-89	90-	?	Mean
Lip	M	0	0	0	0	1	0	2	3	4	4	0	0	1	52.3
	F	0	0	0	0	0	1	0	1	1	1	0	0	0	59.2
Tongue	M	0	0	0	0	2	3	25	35	29	11	1	0	1	56.5
	F	0	1	0	0	0	2	7	12	20	3	0	0	5	57.4
Salivary gland	M	0	0	0	4	3	5	8	7	3	2	0	0	1	44.6
	F	0	0	0	3	4	12	10	7	6	4	0	0	1	43.2

Primary site	Sex	-1	-4	-9	-19	-29	-39	-49	-59	-69	-79	-89	90-	?	Mean
Ear	M	0	0	1	0	0	1	2	3	1	0	0	0	0	45.6
	F	0	0	0	0	0	0	3	1	0	0	0	0	0	48.0
Oral cavity (excl. tongue)	M	0	0	7	32	48	51	89	110	88	37	2	0	7	54.5
	F	0	0	0	28	48	48	51	54	42	21	2	0	9	48.6
Pharynx	M	0	0	0	2	1	1	11	24	13	6	0	0	1	55.3
	F	0	0	0	0	2	1	4	6	2	1	0	0	3	48.7
Esophagus	M	0	0	0	0	1	8	36	100	110	33	2	0	7	58.5
	F	0	0	0	0	4	2	7	9	11	2	0	0	17	52.8
Stomach	M	0	0	2	4	71	326	807	1046	825	245	12	4	54	53.8
	F	0	0	0	5	93	251	392	467	365	90	6	1	194	51.3
Small intestine	M	0	0	0	2	4	6	8	13	11	4	0	0	0	50.0
	F	0	0	1	0	1	1	5	11	14	4	1	0	4	56.4
Large intestine	M	0	0	0	0	7	37	62	81	53	25	4	0	2	52.8
	F	0	0	0	3	7	26	36	44	54	19	5	0	17	53.8
Rectum	M	1	0	0	1	10	33	68	93	95	25	8	0	4	53.9
	F	0	0	0	1	14	35	78	77	63	19	4	0	23	51.9
Liver	M	4	7	5	3	13	46	141	178	70	8	2	0	3	49.0
	F	0	4	2	4	0	15	32	34	21	3	1	0	16	47.8
Gall bladder	M	0	0	0	0	1	1	7	9	14	4	0	0	2	53.3
	F	0	0	0	0	3	1	3	21	14	5	0	0	2	54.5
Bile duct extrahepatic	M	0	0	0	0	1	4	22	25	15	3	0	0	1	52.8
	F	0	0	0	0	0	2	7	13	12	4	0	0	1	54.4
Pancreas	M	0	0	0	0	1	1	17	19	25	2	0	0	0	56.2
	F	0	1	0	1	4	0	3	10	10	1	0	0	2	52.3
Peritoneum	M	2	0	3	1	2	2	10	11	3	3	0	0	0	44.3
	F	1	3	1	1	5	6	6	7	1	1	0	0	1	38.8
Retroperitoneal tissue	M	0	4	1	2	1	0	3	7	1	0	0	0	0	37.8
	F	1	4	0	3	2	4	5	7	1	0	0	0	0	37.8
Nose & nasal cavity	M	0	1	6	4	23	42	34	17	6	0	0	0	1	48.6
	F	0	1	0	4	6	11	17	23	7	4	1	0	3	47.9
Paranasal sinus	M	0	0	0	2	4	7	18	27	11	3	0	0	2	50.1
	F	0	0	0	0	3	9	5	9	10	4	0	0	1	51.0
Larynx & trachea	M	1	0	2	2	1	14	66	118	117	37	2	0	3	56.4
	F	0	3	2	1	3	3	7	14	14	2	1	0	8	49.5
Lung & bronchus	M	0	0	0	3	9	30	139	298	301	87	2	0	6	57.2
	F	0	0	0	2	2	18	44	60	57	7	1	0	37	53.6
Pleura	M	0	0	1	1	2	3	4	5	4	1	0	0	0	45.5
	F	0	0	0	1	3	1	1	6	2	2	0	0	0	48.3

Primary site	Sex	-1	-4	-9	-19	-29	-39	-49	-59	-69	-79	-89	90-	?	Mean
Mediastinum	M	0	0	0	2	0	4	1	7	1	0	0	0	0	44.5
	F	0	2	0	2	1	3	1	2	0	0	0	0	0	29.5
Eye	M	5	21	7	6	5	0	2	4	1	1	0	0	0	14.8
	F	1	11	6	2	2	1	2	6	4	6	0	0	2	32.4
Bone & joint	M	1	1	3	40	37	17	19	11	9	3	0	1	1	32.4
	F	1	0	7	20	18	12	12	9	2	1	0	0	2	30.9
Muscle	M	1	0	1	1	1	2	1	2	0	0	0	0	0	29.9
	F	0	0	0	1	0	0	1	1	0	0	0	0	0	38.3
Soft tissue	M	2	4	3	8	11	3	15	15	10	4	0	0	1	39.9
	F	3	3	3	5	10	6	11	5	12	1	1	1	1	43.6
Breast	M	0	0	0	0	2	1	0	0	0	2	0	0	0	46.8
	F	0	0	0	0	27	118	244	122	49	13	1	2	15	47.4
Kidney	M	2	12	3	2	0	2	25	35	22	3	1	0	0	47.4
	F	2	8	5	1	3	2	7	9	13	2	1	0	3	41.8
Urinary bladder & ureter	M	0	1	0	2	4	28	70	130	117	46	6	1	0	57.5
	F	0	1	3	0	4	2	10	27	22	14	1	0	8	55.6
Prostate	M	1	0	0	0	0	0	4	8	33	33	7	1	0	67.8
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	—
Testis & epididymis	M	7	10	1	2	6	2	2	4	1	1	0	0	1	21.6
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	—
Penis	M	0	0	0	0	0	3	9	11	4	2	0	0	0	51.8
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	—
Uterine cervix	M	0	0	0	0	0	0	0	0	0	0	0	0	0	—
	F	0	1	0	2	70	393	707	685	257	57	4	0	55	48.3
Uterine corpus	M	0	0	0	0	0	0	0	0	0	0	0	0	0	—
	F	0	0	1	2	47	49	57	32	15	6	0	0	9	45.5
Ovary	M	0	0	0	0	0	0	0	0	0	0	0	0	0	—
	F	0	1	2	5	27	31	30	27	14	10	0	0	3	43.0
Fallopian tube	M	0	0	0	0	0	0	0	0	0	0	0	0	0	—
	F	0	0	0	0	0	2	0	0	0	0	0	0	0	30.5
Vagina	M	0	0	0	0	0	0	0	0	0	0	0	0	0	—
	F	0	0	0	1	0	7	6	16	9	1	0	0	2	48.0
Vulva	M	0	0	0	0	0	0	0	0	0	0	0	0	0	—
	F	0	0	0	0	2	1	7	8	6	1	0	0	0	50.8
Skin & skin appendage	M	1	1	0	5	5	16	32	37	31	25	4	4	4	63.1
	F	1	0	2	1	4	10	15	24	25	16	4	0	9	54.8
Adrenal gland	M	2	0	1	1	3	7	3	6	1	0	0	0	0	36.6
	F	1	4	1	4	12	7	7	5	2	0	0	0	2	32.6

Primary site	Sex	-1	-4	-9	-19	-29	-39	-49	-59	-69	-79	-89	90-	?	Mean
Thyroid	M	0	0	0	7	21	18	35	22	21	7	0	0	0	45.0
	F	0	0	3	19	131	186	154	130	64	11	0	0	19	40.9
Parathyroid	M	0	0	0	0	1	0	1	0	0	0	0	0	0	32.5
	F	0	0	0	0	1	1	1	0	0	0	0	0	0	37.0
Malignant lymphoma	M	6	9	25	43	39	55	82	56	70	17	1	0	2	41.1
	F	4	3	7	12	20	16	37	42	21	9	10	0	1	38.8
Leukemia	M	0	2	85	170	117	99	63	36	20	6	0	0	16	24.0
	F	0	1	108	76	104	47	53	22	22	2	0	0	12	25.6
Thymus	M	0	0	0	0	2	1	1	4	3	1	0	0	0	51.3
	F	0	0	1	1	0	2	2	5	1	0	0	1	1	56.5
Spinal cord	M	0	0	1	2	5	1	6	1	1	0	0	0	0	35.2
	F	0	01	3	3	3	1	4	2	0	0	0	0	0	37.1
Brain	M	3	13	22	30	40	58	68	40	14	1	0	0	0	33.5
	F	2	8	16	32	54	44	55	40	14	1	0	0	0	36.0
Malignant histiocytosis	M	1	5	5	4	4	9	9	4	1	0	0	0	0	32.3
	F	0	5	2	7	5	3	2	0	1	0	0	0	0	23.2
Melanoma	M	0	1	0	1	1	9	10	11	7	3	1	1	0	48.8
	F	0	0	0	0	4	7	8	13	8	1	0	0	1	46.0
Heart & pericardium	M	0	0	0	0	1	1	1	0	1	0	0	0	0	40.5
	F	0	0	0	0	0	2	2	2	0	0	0	0	0	43.2
GRAND TOTAL	M	40	92	179	391	492	938	2046	2690	2178	701	55	12	121	50.1
	F	17	65	174	253	753	1404	2155	2129	1290	49	44	5	489	46.5

Therefore the ratio of cancer of cervix versus corpus cancer was approximately 10 to 1. Stomach cancer was the second most common female cancer (20.45%). Thyroid cancer was the third most common cancer (7.87%) of female. Thyroid cancers were more frequently seen in female, showing female to male ratio of 5.5 to 1. For female the breast cancer was the 4th common cancer, accounting for 6.48% of all female cancers. The tumors were most commonly encountered in the fifth decade although the 4th and the 6th decades shared the high incidence. Leukemia was the 5th most common cancer of female (4.78%). The other common primary sites of female cancers were rectum (3.44%), oral cavity (3.32%), brain (2.92%), lung (2.50%), and uterine corpus (2.39%).

Age distribution of malignant tumor in this survey period showed 567 (2.96%) in the first decade, 644 (3.36%) in the second decade, 1,245 (6.50%) in the

third decade, 2,342 (12.24%) in the 4th decade, 4,201 (21.95%) in the 5th decade, 4,819 (25.18%) in the 6th decade, 3,468 (18.12%) in the 7th decade, 1,050 (5.48%) in the 8th decade and 116 (0.6%) in patients over the age of 80 years. This tendency was same if males and females were separately analyzed. Therefore the 6th decade was the most prevalent period of cancer occurrence followed by the 5th decade, the 7th decade, and the 4th decade. There were 610 cases that the age was not known. They were 121 males and 489 females.

DISCUSSION

The annual increase of the total number of cancer in this study period is worthy of explanation. Seoul National University Hospital was expanded more than 2 folds in total bed capacity in 1980, and in 1985 a new Children's Hospital was added to it, to-

talling approximately 1,350 beds. Accordingly out-patients were also increased remarkably. This seems to be the major reason why we had so many new cases of cancer in the last 9 years.

The frequency rank of malignant tumor in this series was generally similar to the previous series as shown in tables 4 and 5. However, it was interesting to note that the lung cancer became the 4th most common tumor in the both sexes combined, accounting for 5.76% of the entire malignancy. The lung cancer was the 11th common tumor (2.85%) in the previous period. It is very important to notice

that now the lung cancer is the second most common tumor in male. The oral cavity cancer became the 6th most common tumor (4.04%) in both sexes combined in this survey. However, it was the 15th most common tumor (1.58%) in previous period. This is probably due to the fact that there is greater propensity to refer in oral surgery than other part in medicine. Breast cancer was the 5th most common tumor (5.53%) in the years 1968 to 1977 and became the 9th most common tumor (3.11%) in this survey, suggesting that actual number is decreasing. For female it used to be 10.89% of en-

Table 3. Frequency rank of malignant tumors during the year period 1978-1986 by primary site and sex.

Frequency rank	Male		Female		Both Sexes	
	Organ or type of tumors	No. (%)	Organ or type of tumors	No. (%)	Organ or type of tumors	No. (%)
1	Stomach	3396 (33.88)	Uterine cervix	2231 (24.48)	Stomach	5260 (27.48)
2	Lung & bronchus	875 (8.73)	Stomach	1864 (20.45)	Uterine cervix	2231 (11.66)
3	Leukemia	704 (7.02)	Thyroid	717 (7.87)	Leukemia	1140 (5.96)
4	Liver	480 (4.79)	Breast	591 (6.48)	Lung & bronchus	1103 (5.76)
5	Oral cavity (excl. tongue)	471 (4.70)	Leukemia	436 (4.78)	Thyroid	848 (4.43)
6	Malignant lymphoma	405 (4.04)	Rectum	314 (3.44)	Oral cavity (excl. tongue)	774 (4.04)
7	Urinary bladder & ureter	405 (4.04)	Oral cavity (excl. tongue)	303 (3.32)	Rectum	652 (3.41)
8	Larynx & trachea	363 (3.62)	Brain	266 (2.92)	Liver	612 (3.20)
9	Rectum	338 (3.37)	Lung & bronchus	228 (2.50)	Breast	596 (3.11)
10	Esophagus	297 (2.96)	Uterine corpus	218 (2.39)	Malignant lymphoma	578 (3.07)
11	Brain	289 (2.88)	Large intestine	211 (2.31)	Brain	555 (2.90)
12	Large intestine	271 (2.70)	Malignant lymphoma	182 (2.00)	Urinary bladder & ureter	497 (2.60)
13	Skin & skin appendage	165 (1.65)	Ovary	150 (1.65)	Large intestine	482 (2.52)
14	Bone & joint	143 (1.43)	Liver	132 (1.45)	Larynx & trachea	421 (2.20)
15	Nose & nasal cavity	134 (1.34)	Bone	84 (0.92)	Esophagus	349 (1.82)
16	Thyroid	131 (1.31)	Nose & nasal cavity	77 (0.84)	Skin & skin appendage	276 (1.44)
17	Tongue	107 (1.07)	Soft tissue	62 (0.68)	Bone & joint	227 (1.19)
18	Kidney	74 (0.74)	Kidney	56 (0.61)	Nose & nasal cavity	211 (1.10)
19	Soft tissue	76 (0.76)	Gallbladder	49 (0.54)	Uterine corpus	218 (1.14)
20	Pancreas	74 (0.74)	Salivary gland	47 (0.52)	Tongue	157 (0.82)

Table 4. Trend of frequency distribution of 10 common malignant tumors in 4 segments of years by sex.

Primary sites of male cancers	1970		1975		1980		1985	
	No.	%	No.	%	No.	%	No.	%
Stomach	69	21.56	96	22.97	293	28.61	492	37.76
Lung & bronchus	12	3.75	31	7.42	101	9.86	94	7.21
Leukemia	27	8.43	40	9.57	76	7.42	76	5.83
Liver	24	7.50	38	9.09	44	4.30	70	5.37
Oral cavity (excl. tongue)	12	3.75	4	0.96	67	6.54	43	3.30
Malignant lymphoma	18	5.63	13	3.11	50	4.88	48	3.68
Urinary bladder & ureter	11	3.44	11	2.63	32	3.13	63	4.83
Larynx & trachea	27	8.44	21	5.02	32	3.13	27	2.07
Rectum	6	1.88	19	4.55	36	3.52	52	3.99
Esophagus	1	0.31	7	1.67	27	2.64	48	3.68
Others	113	35.31	138	33.01	267	29.10	390	22.28
Total	320	100.00	418	100.00	1024	100.00	1303	100.00

Primary sites of female cancers	1970		1975		1980		1985	
	No.	%	No.	%	No.	%	No.	%
Uterine cervix	108	31.03	115	28.19	200	22.55	279	23.43
Stomach	33	9.48	54	13.24	161	18.15	287	24.10
Thyroid	13	3.73	22	5.39	78	8.79	91	7.64
Breast	30	8.62	44	10.78	54	6.09	83	6.97
Leukemia	12	3.45	18	4.41	47	5.30	58	4.87
Rectum	15	4.31	12	2.94	25	2.82	35	2.94
Oral cavity (excl. tongue)	0	0.00	3	0.73	40	4.51	35	2.94
Brain	2	0.57	4	0.98	14	1.58	38	3.19
Lung & bronchus	4	1.15	5	1.23	19	2.14	15	1.26
Uterine corpus	16	4.60	12	2.94	33	3.72	25	2.10
Others	115	33.06	119	29.35	216	24.35	245	20.56
Total	348	100.00	408	100.00	887	100.00	1191	100.00

Table 5. Comparison of the frequency rank of malignant tumors in two survey periods by sex.

Frequency rank of male cancer	1968-1977		1978-1986	
	Organ	Percent	Organ	Percent
1	Stomach	22.23	Stomach	33.88
2	Liver	8.98	Lung & bronchus	8.73
3	Leukemia	8.36	Leukemia	7.02
4	Larynx & trachea	6.19	Liver	4.79
5	Skin & skin appendage	5.76	Oral cavity (excl. tongue)	4.70
6	Malignant lymphoma	5.19	Urinary bladder & ureter	4.04
7	Lung & bronchus	4.59	Malignant lymphoma	4.04
8	Rectum	4.40	Larynx & trachea	3.62
9	Urinary bladder & ureter	4.37	Rectum	3.37
10	Bone & joint	3.25	Esophagus	2.96

Frequency rank of female cancer	1968-1977		1978-1986	
	Organ	Percent	Organ	Percent
1	Uterine cervix	30.30	Uterine cervix	24.30
2	Stomach	11.00	Stomach	20.45
3	Breast	10.89	Thyroid	7.87
4	Thyroid	6.67	Breast	6.48
5	Leukemia	4.72	Leukemia	4.78
6	Rectum	3.41	Rectum	3.44
7	Malignant lymphoma	2.89	Oral cavity (excl. tongue)	3.32
8	Skin & skin appendage	2.92	Brain	2.92
9	Ovary	2.76	Lung & bronchus	2.50
10	Uterine corpus	2.46	Uterine corpus	2.39

tire female malignancy in previous period. It now decreased 6.48% in this series.

Among male cancer the most striking fact was the lung cancer which now became the second most common male cancer (8.73%). It was the 7th most common cancer (4.59%) in the years 1968 to 1977. Instead the liver cancer decreased from 8.98% in previous period to 4.79% in present series. The stomach cancer increased from 22.23% to 33.88%. We do not have any good explanation for this. Seoul National University Hospital possesses the surgical service that has very active gastrointestinal surgery. Therefore many new cases came to this hospital for the operation. Another report of cancer registry in cancer of Korea showed relative frequency of stomach cancer as 29.2% of male based on 15,580 male cancers (Park *et al.*, 1987).

Malignant tumors of female also showed some changing pattern in the present survey. The number of stomach cancer increased almost two folds from 11.00% to 20.45% comparing to that of previous survey (1968-1977). Breast cancers decreased from 10.89% to 6.48% of the entire female malignancy. The lung cancer that was the 16th most common tumor (1.15%) in previous series became the 9th most common tumor (2.50%) in present series. The brain tumor that was 0.6% female malignancy in 1968 to 1977 became

the 8th most common tumor in present series accounting for 2.92%. Uterine cervix cancer was still ranking the first in the present series. However, its proportion decreased from 30.30% in previous series to 24.30% in this series. There were no particular change in relative incidence in cancer of thyroid, leukemia, rectal cancer and uterine corpus cancer.

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