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SPECIAL ARTICLE

Comprehensive Registry of Esophageal Cancer in Japan, 2003

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Preface

We are very pleased to publish the Comprehensive Registry of Esophageal Cancer in Japan, 2003, and thank all the members of the Japan Esophageal Society who made great contributions in preparing this material.

We would like to review the history of the registry of esophageal cancer cases in Japan. The Registration Committee for Esophageal Cancer, the Japan Esophageal Society, has annually registered cases of esophageal cancer since 1976 and published the first issue of the Comprehensive Registry of Esophageal Cancer in Japan in 1979. The Act for the Protection of Personal Information was promulgated in 2003, and began to be enforced in 2005. The purpose of this Act is to protect the rights and interests of individuals while taking into consideration the usefulness of personal information, keeping in mind the remarkable increase in the use of personal information arising from the development of today's advanced information and communications society. The registry of esophageal cancer cases has required some adjustments to comply with the Acts. The new registration system has been discussed for several years and was finally completed in 2008. The most important point was

These data were first issued on 1 March, 2011, as the Comprehensive Registry of Esophageal Cancer in Japan, 2003. Not all pages are reprinted here; however, the original table and figure numbers have been kept.
The authors were at the time members of the Registration Committee for Esophageal Cancer, the Japan Esophageal Society, and made great contributions in preparing this material.

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"anonymity in an unlinkable fashion" using encryption with a hash function. Finally, the registry resumed registering cases of esophageal cancer that had been treated in 2001.

In the Comprehensive Registry in 2003, we newly inserted Figure 3: Survival of patients treated by EMR/ESD in relation to the pathological depth of tumor invasion (pT); Figure 4: Survival of patients treated by EMR/ESD in relation to the lymphatic or blood vessel invasion, in order to present the treatment outcome depending on the pathological status.

We briefly summarized the Comprehensive Registry of Esophageal Cancer in Japan, 2003. A total of 4659 cases were registered from 199 institutions in Japan. Comparing the Comprehensive Registry in 2003 to the Comprehensive Registry in 2002, the number of registered cases and surgical cases increased by 378 and 509, respectively, although the number of registered institutions decreased by 23. As for the histologic type of cancer according to biopsy specimens, squamous cell carcinoma and adenocarcinoma accounted for 92.2% and 3.0%, respectively. Regarding clinical results, the 5-year survival rates of patients treated using endoscopic mucosal resection, concurrent chemoradiotherapy, radiotherapy alone, chemotherapy alone, or esophagectomy were 80.0%, 21.9%, 30.3%, 3.0%, and 46.6%, respectively. Concerning the approach used to perform an esophagectomy, 15.5% of the cases were performed endoscopically, that is, thoracoscopically, laparoscopically, or mediastinoscopically. Regarding the reconstruction route, the posterior mediastinal, the retrosternal, and the intrathoracic route were used in 37.3%, 33.3% and 15.7% of cases, respectively. The operative mortality was 1.0% (25 out of 2510 cases).

We hope that this Comprehensive Registry of Esophageal Cancer in Japan for 2003 helps to improve all aspects of the diagnosis and treatment of esophageal cancer.

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I. Clinical factors of esophageal cancer patients treated in 2003

Institution-registered cases in 2003

Institution
Aichi Cancer Center
Aizawa Hospital
Akita University Hospital
Asahikawa Kosei general Hospital
Asahikawa Medical College Hospital
Chiba Cancer Center
Chiba Prefecture Sawara Hospital
Chiba University Hospital
Dokkyo Medical University Hospital
Foundation for Detection of Early Gastric Carcinoma
Fuchu Hospital
Fujioka General Hospital
Fujita Health University
Fujita Health University Banbuntane Hotokukai Hospital
Gunma Central General Hospital
Gunma University Hospital
Hachinohe City Hospital
Hachioji Digestive Disease Hospital
Hakodate Goryokaku Hospital
Hamamatsu University School of Medicine, University Hospital
Health Insurance Naruto Hospital
Hiratsuka City Hospital
Hiratsuka Kyosai Hospital
Hiroshima City Asa Hospital
Hiroshima University Research Institute for Radiation Biology Medicine
Hofu Institute of Gastroenterology
Hokkaido University Hospital
Hyogo Cancer Center
Hyogo College Of Medicine
Ida Municipal Hospital
Inazawa City Hospital
International University of Health and Welfare Mita Hospital
Ishikawa Kenritsu Chuo Hospital
Ishinomaki Red Cross Hospital
Iwakuni Clinical Center
Iwakuni Medical Center
Iwate Medical University Hospital
JFE Kenpo Kawatetsu Chiba Hospital
Jichi Medical University Hospital
Juntendo University Hospital
Juntendo University Shizuoka Hospital
Kagawa Prefectual Central Hospital
Kagawa University Hospital
Kagoshima Kenritsu Satsunan Hospital
Kagoshima University Hospital
Kanagawa Cancer Center
Kanazawa University Hospital
Kansai Rosai Hospital
Kashima Rosai Hospital
Kashiwa Kousei General Hospital
Kawasaki Medical School Hospital
Keio University Hospital

continued

Institution
Keiyukai Sapporo Hospital
Kikuna Memorial Hospital
Kin-ikyo Chuo Hospital
Kinki Central Hospital
Kinki University Hospital
Kinki University Nara Hospital
Kinki University Sakai Hospital
Kiryu Kosei General Hospital
Kitakyushu Municipal Medical Center
Kitano Hospital
Kitasato University Hospital
Kitasato University Kitasato Institute Medical Center Hospital
Kobe City Medical Center General Hospital
Kobe University Hospital
Kumamoto University Hospital
Kurashiki Central Hospital
Kurume University Hospital
Kuwana City Hospital
Kyorin University Hospital
Kyoto University Hospital
Kyushu University Hospital
Matsuda Hospital
Matsudo City Hospital
Matsushita Memorial Hospital
Matsuyama Red Cross Hospital
Mie University Hospital
Minoh City Hospital
Mito Red Cross Hoapital
Murakami General Hospital
Nagano Red Cross Hospital
Nagaoka Chuo General Hospital
Nagayoshi General Hospital
Nagoya City University Hospital
Nagoya Daiichi Red Cross Hospital
Nagoya University Hospital
Nanpuh Hospital
Nara Medical University Hospital
National Cancer Center Hospital
National Cancer Center Hospital East
National Defense Medical College Hospital
National Hospital Organization Chiba Medical Center
National Hospital Organization Kure Medical Center
National Hospital Organization Kyushu Cancer Center
National Hospital Organization Matsumoto National Hospital
National Hospital Organization Nagano Medical Center
National Hospital Organization Nagasaki Medical Denter
National Hospital Organization Osaka National Hospital
National Hospital Organization Tokyo Medical Center

continued

Institution
Nihon University Itabashi Hospital
Nihonkai General Hospital
Niigata City General Hospital
Niigata Prefectural Shibata Hospital
Niigata University Medical and Dental Hospital
Nikko Memorial Hospital
Nippon Medical School Hospital
Nippon Medical School Musashi Kosugi Hospital
Nippon Medical School Tama Nagayama Hospital
Nishi-Kobe Medical Center
NTT East Japan Kanto Hospital
NTT West Osaka Hospital
Numazu City Hospital
Ohta General Hospital Foundation Ohta Nishinouchi Hospital
Oita Red Cross Hospital
Okayama Saiseikai General Hospital
Okayama University Hospital
Onomichi Municipal Hospital
Osaka City University Hospital
Osaka Koseinenkin Hospital
Osaka Medical Center for Cancer and Cardiovascular Diseases
Osaka Medical College Hospital
Osaka Prefectural Hospital Organization Osaka General Medical Center
Osaka University Hospital
Otsu Red Cross Hospital
Red Cross Society Onoda Hospital
Saga University Hospital
Saiseikai Narashino Hospital
Saitama City Hospital
Saitama Medical Center Jichi Medical University
Saitama Medical University Hospital
Saitama Medical University International Medical Center
Saitama Red Cross Hospital
Saitama Social Insurance Hospital
Saku Central Hospital
Sano Kousei General Hospital
Seirojika National Hospital University Hospital
Sendai City Hospital
Sendai Medical Center
Shiga Medical Center for Adults
Shiga University of Medical Science Hospital
Shikoku Cancer Center
Shimane University Hospital
Shimizu Welfare Hospital
Shinshu University Hospital
Shizuoka City Shimizu Hospital
Shizuoka City Shizuoka Hospital

continued

Institution
Showa Inan General Hospital
Showa University Fujigaoka Hospital
Showa University Hospital
Social Insurance Omuta Tenryo Hospitak
Social Insurance Tagawa Hospital
Social Insurance Yokohama Central Hospital
Sonoda Daiichi Hospital
Southern Region Hospital
Sugita Genpaku Memorial Obama Municipal Hospital
Suita Municipal Hospital
Syowa University Toyosu Hospital
Tachikawa Hospital
Takaoka Hospital
Takasago Municipal Hospital
Teikyo University School of Medicine Hospital, Mizonokuchi
Toho University Omori Medical Center
Tohoku Kosai Hospital
Tokai University Hospital
Tokushima Red Cross Hospital
Tokushima University Hospital
Tokyo Dental College Ichikawa General Hospital
Tokyo Jikeikai Medical
Tokyo Medical and Dental University Hospital
Tokyo Medical University Kasumigaura Hospital
Tokyo Metropolitan Cancer and Infectious Center Komagome Hospital
Tokyo Women's Medical University Hospital

continued

Institution
Tokyo Women's Medical University Medical Center East
Toranomon Hospital
Tottori Prefectural Central Hospital
Tottori University Hospital
Toyama Prefectual Central Hospital
Toyama University Hospital
Tsuchiura Kyodo Hospital
Tsukuba University Hospital
Tsuruoka Municipal Shonai Hospital
University of Fukui Hospital
University of Miyazaki Hospital
University of Occupational and Environmental Health
University of the Ryukyu Hospital
Wakayama Kenritsu University Hospital
Yamagata Prefectural Central Hospital
Yamagata Prefectural Shinjo Hospital
Yamagata University Hospital
Yamagata University Hospital
Yamanashi Prefectural Central Hospital
Yamanashi University Hospital
Yao Municipal Hospital
Yokohama City University Hospital
Yokohama City University Medical Center
Yokohama Rosai Hospital
Yuri General Hospital

Patient Background

Table 1 Age and gender

*** Excluding 39 missing cases of gender**

Age	Male	Female	Unknown	Cases (%)
~29	3	1	0	4 (0.1%)
30~39	10	5	0	15 (0.3%)
40~49	138	26	2	166 (3.7%)
50~59	841	145	0	986 (21.8%)
60~69	1511	187	0	1698 (37.5%)
70~79	1227	193	0	1420 (31.4%)
80~89	151	46	0	197 (4.4%)
90~	31	9	0	40 (0.9%)
Total	3912	612	2	4526
Missing	78	16	0	94

Table 12 Tumor location

*** Excluding 185 treatment unknown, missing cases of treatment types**

Location of tumor	Endoscopic treatment (%)		Chemotherapy and/or radiotherapy (%)		Surgery				Total (%)	
					Palliative operation (%)		Esophagectomy (%)			
Cervical	14	(2.7%)	98	(7.5%)	3	(2.6%)	74	(3.0%)	189	(4.3%)
Upper thoracic	55	(10.7%)	200	(15.3%)	16	(13.9%)	268	(10.8%)	539	(12.2%)
Middle thoracic	289	(56.1%)	650	(49.8%)	59	(51.3%)	1146	(46.2%)	2144	(48.6%)
Lower thoracic	118	(22.9%)	266	(20.4%)	26	(22.6%)	792	(31.9%)	1202	(27.2%)
Abdominal	15	(2.9%)	31	(2.4%)	9	(7.8%)	152	(6.1%)	207	(4.7%)
EG	3	(0.6%)	3	(0.2%)	0		18	(0.7%)	24	(0.5%)
EG-Junction(E=G)	1	(0.2%)	0		1	(0.9%)	19	(0.8%)	21	(0.5%)
Cardia (G)	1	(0.2%)	0		0		3	(0.1%)	4	(0.1%)
Others	0		0		0		0		0	
Unknown	19	(3.7%)	57	(4.4%)	1	(0.9%)	8	(0.3%)	85	(1.9%)
Total	515		1305		115		2480		4415	
Missing	13		7		0		23		43	

EG: esophago-gastric

Table 15 Histologic types of cancer according to biopsy specimens

*** Excluding 185 treatment unknown, missing cases of treatment types**

Histologic types	Endoscopic treatment (%)		Chemotherapy and/or radiotherapy (%)		Surgery				Total (%)	
					Palliative operation (%)		Esophagectomy (%)			
Not examined	5	(1.0%)	8	(0.6%)	1	(0.9%)	5	(0.2%)	19	(0.4%)
SCC	480	(92.5%)	1218	(93.4%)	106	(92.2%)	2225	(91.5%)	4029	(92.2%)
SCC	379	(73.0%)	833	(63.9%)	72	(62.6%)	1355	(55.7%)	2639	(60.4%)
Well diff.	22	(4.2%)	72	(5.5%)	5	(5.0%)	203	(8.3%)	302	(6.9%)
Moderately diff.	66	(12.7%)	208	(16.0%)	21	(18.3%)	494	(20.3%)	789	(18.1%)
Poorly diff.	13	(2.5%)	105	(8.1%)	8	(7.0%)	173	(7.1%)	299	(6.8%)
Adenocarcinoma	16	(3.1%)	7	(0.5%)	3	(2.6%)	103	(4.2%)	129	(3.0%)
Undifferentiated	1	(0.2%)	14	(1.1%)	1	(0.9%)	10	(0.4%)	26	(0.6%)
Carcinosarcoma	0		2	(0.2%)	0		8	(0.3%)	10	(0.2%)
Malignant melanoma	2	(0.4%)	0		0		8	(0.3%)	10	(0.2%)
Other tumors	2	(0.4%)	16	(1.2%)	1	(0.9%)	21	(0.9%)	40	(0.9%)
Dysplasia	0		0		0		0		0	
Unknown	13	(2.5%)	39	(3.0%)	3	(2.6%)	53	(2.2%)	108	(2.5%)
Total	519		1304		115		2433		4371	
Missing	12		13		1		77		103	

SCC: squamous cell carcinoma

Table 19 Organs with metastasis in cM1 case (JSED-cTNM 9th)

*** Excluding 185 treatment unknown, missing cases of treatment types**

Metastatic organs	Endoscopic treatment (%)		Chemotherapy and/or radiotherapy (%)		Surgery				Total (%)	
					Palliative operation (%)		Esophagectomy (%)			
PUL	5	(19.2%)	83	(19.1%)	0		17	(8.6%)	105	(15.7%)
OSS	1	(3.8%)	29	(6.7%)	0		3	(1.5%)	33	(4.9%)
HEP	5	(19.2%)	83	(19.1%)	1	(9.1%)	18	(9.1%)	107	(16.0%)
BRA	0		9	(2.1%)	0		1	(0.5%)	10	(1.5%)
LYM	12	(46.2%)	182	(41.9%)	7	(63.6%)	148	(75.1%)	349	(52.2%)
MAR	0		1	(0.2%)	0		0		1	(0.1%)
PLE	0		2	(0.5%)	0		0		2	(0.3%)
PER	0		3	(0.7%)	0		1	(0.5%)	4	(0.6%)
SKI	1	(3.8%)	4	(0.9%)	0		1	(0.5%)	6	(0.9%)
OTH	1	(3.8%)	18	(4.1%)	0		4	(2.0%)	23	(3.4%)
Unknown	1	(3.8%)	20	(4.6%)	3	(27.3%)	4	(2.0%)	28	(4.2%)
Lesions	26		434		11		197		668	
Missing	2		18		0		8		28	
One organ	16	(76.2%)	296	(80.2%)	8	(72.7%)	178	(94.2%)	498	(84.4%)
Two organs	3	(14.3%)	46	(12.5%)	0		6	(3.2%)	55	(9.3%)
Three organs	1	(4.8%)	5	(1.4%)	0		1	(0.5%)	7	(1.2%)
Four organs~	0		3	(0.8%)	0		0		3	(0.5%)
Unknown	1	(4.8%)	19	(5.1%)	3	(27.3%)	4	(2.1%)	27	(4.6%)
Total cases	21		369		11		189		590	
Missing	2		18		0		8		28	

PUL: pulmones, OSS: ossis, HEP: hepar, BRA: brain, LYM: lymph node, MAR: marrow, PLE: pleural membrane, PER:peritoneal membrane, SKI: skin, OTH: others

Table 20 Clinical stage (JSED-cTNM 9th)

*** Excluding 185 treatment unknown, missing cases of treatment types**

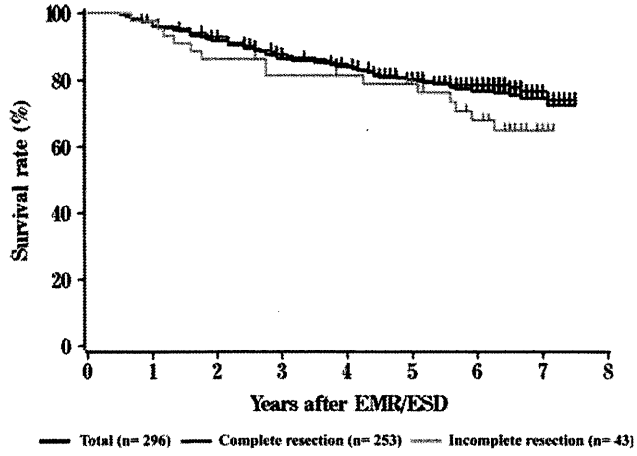
cStage	Endoscopic treatment (%)		Chemotherapy and/or radiotherapy (%)		Surgery				Total (%)	
					Palliative operation(%)		Esophagectomy (%)			
0	77	(15.1%)	4	(0.3%)	1	(0.9%)	19	(0.8%)	101	(2.4%)
I	342	(66.9%)	175	(13.7%)	18	(15.5%)	521	(22.0%)	1056	(24.7%)
IIA	6	(1.2%)	122	(9.5%)	23	(19.8%)	455	(19.3%)	606	(14.2%)
IIB	10	(2.0%)	75	(5.9%)	6	(5.2%)	295	(12.5%)	386	(9.0%)
III	24	(4.7%)	463	(36.2%)	52	(44.8%)	816	(34.5%)	1355	(31.7%)
IV	3	(0.6%)	107	(8.4%)	1	(0.9%)	33	(1.4%)	144	(3.4%)
IVA	4	(0.8%)	65	(5.1%)	6	(5.2%)	75	(3.2%)	150	(3.5%)
IVB	11	(2.2%)	198	(15.5%)	5	(4.3%)	92	(3.9%)	306	(7.2%)
Unknown	34	(6.7%)	71	(5.5%)	4	(3.4%)	57	(2.4%)	166	(3.9%)
Total	511		1280		116		2363		4270	
Missing	20		37		0		147		204	

II. Clinical results of patient treated with endoscopy in 2003

Table 21 Treatment modalities in patients receiving endoscopy

Treatment modarities	Cases (%)	
Endoscopic treatment only	440	(82.9%)
Endoscopic treatment + Radiotherapy	23	(4.3%)
Endoscopic treatment + Chemotherapy	15	(2.8%)
Endoscopic treatment + Chemoradiotherapy	52	(9.8%)
Endoscopic treatment + Chemoradiotherapy + Others	0	
Endoscopic treatment + Others	1	(0.2%)
Total	531	
Missing	0	

Fig. 1 Survival of patients treated by EMR/ESD



	Years after EMR/ESD							
	1	2	3	4	5	6	7	8
Total	97.1%	91.7%	86.5%	83.8%	80.0%	76.8%	74.6%	72.5%
Complete resection	97.1%	92.7%	87.4%	84.2%	80.2%	78.5%	76.6%	74.2%
Incomplete resection	97.7%	86.0%	81.3%	81.3%	78.8%	67.9%	64.8%	64.8%

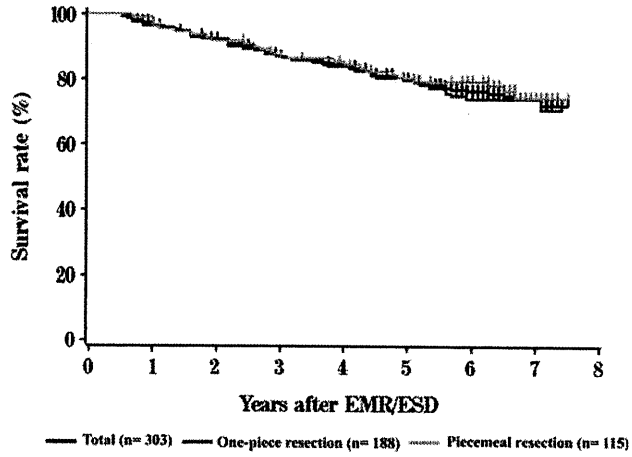


Fig. 2 Survival of patients in relation to type of EMR/ESD

	Years after EMR/ESD							
	1	2	3	4	5	6	7	8
Total	97.2%	92.2%	87.1%	84.1%	80.1%	76.4%	72.2%	72.2%
One piece resection	96.6%	92.5%	87.1%	84.0%	79.9%	74.1%	74.1%	70.9%
Piecemeal resection	98.2%	91.9%	87.3%	84.4%	80.4%	79.4%	74.3%	74.3%

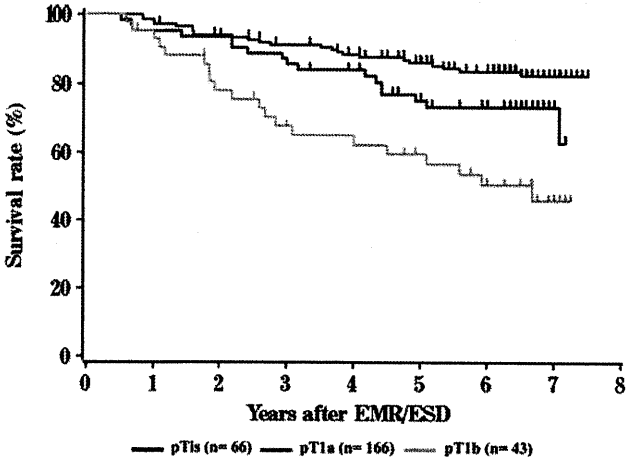


Fig. 3 Survival of patients treated by EMR/ESD in relation to the pathological depth of tumor invasion (pT)

	Years after EMR/ESD							
	1	2	3	4	5	6	7	8
pTis	95.2%	93.7%	87.2%	84.0%	75.1%	73.3%	73.3%	62.8%
pT1a	98.0%	94.0%	91.3%	88.4%	86.2%	83.6%	82.4%	82.4%
pT1b	95.2%	77.9%	67.6%	62.2%	59.5%	50.4%	45.8%	45.8%

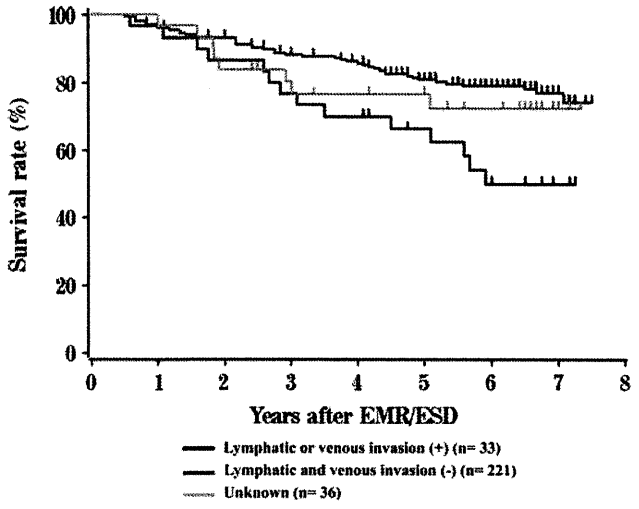


Fig. 4 Survival of patients treated by EMR/ESD in relation to the lymphatic or venous invasion

	Years after EMR/ESD							
	1	2	3	4	5	6	7	8
Lymphatic or venous invasion (+)	96.7%	86.7%	76.7%	70.0%	66.3%	49.9%	49.9%	49.9%
Lymphatic and venous invasion (-)	96.7%	93.3%	88.3%	85.8%	80.9%	79.0%	77.0%	74.2%
Unknown	100.0%	83.9%	80.2%	76.6%	76.6%	72.3%	72.3%	72.3%

III. Clinical results in patients treated with chemotherapy and/or radiotherapy in 2003

Table 34 Dose of irradiation with or without chemotherapy (non-surgically treated and curative cases)

Dose of irradiation (Gy)	Chemotherapy				Preope RT (%)		Postope RT (%)	
	with (%)		without (%)					
0	0		0		0		0	
-29	5	(1.3%)	6	(7.9%)	10	(4.0%)	7	(4.5%)
30-39	9	(2.3%)	1	(1.3%)	80	(32.1%)	7	(4.5%)
40-49	22	(5.7%)	0		128	(51.4%)	56	(36.4%)
50-59	25	(6.5%)	7	(9.2%)	5	(2.0%)	37	(24.0%)
60-69	303	(78.3%)	52	(68.4%)	22	(8.8%)	44	(28.6%)
70-	23	(5.9%)	10	(13.2%)	4	(1.6%)	3	(1.9%)
Total	387		76		249		154	
Median (min - max)	60 (18 - 146)		60 (2 - 120)		40 (2 - 81.4)		50 (2 - 81.4)	
Missing	16		4		29		40	

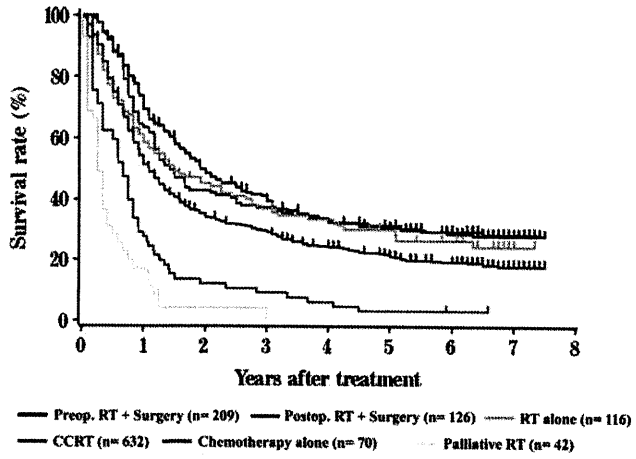


Fig. 5 Survival of patients treated by chemotherapy and/or radiotherapy

	Years after treatment							
	1	2	3	4	5	6	7	8
Preop. RT + Surgery	72.8%	49.9%	41.1%	32.4%	30.7%	28.7%	27.9%	27.9%
Postop. RT + Surgery	64.4%	42.9%	37.2%	33.0%	31.4%	29.6%	28.5%	28.5%
RT alone	60.2%	45.0%	36.7%	33.4%	30.0%	26.2%	24.4%	24.4%
CCRT	53.7%	35.2%	29.8%	24.4%	21.9%	19.4%	18.1%	18.1%
Chemotherapy alone	28.9%	12.2%	9.1%	6.1%	3.0%	3.0%	3.0%	-
Palliative RT	16.9%	4.2%	4.2%	-	-	-	-	-

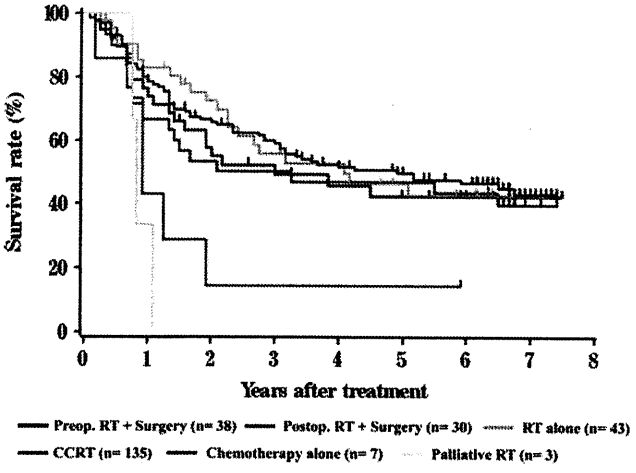


Fig. 6 Survival of patients treated by chemotherapy and/or radiotherapy (cStage I-IIA)

	Years after treatment							
	1	2	3	4	5	6	7	8
Preop. RT + Surgery	73.7%	57.6%	52.1%	45.7%	42.2%	42.2%	42.2%	42.2%
Postop. RT + Surgery	66.7%	53.3%	50.0%	46.7%	46.7%	43.3%	39.7%	39.7%
RT alone	82.8%	72.2%	55.6%	52.5%	46.3%	42.5%	42.5%	42.5%
CCRT	79.3%	66.5%	59.9%	51.4%	49.5%	46.5%	42.8%	42.8%
Chemotherapy alone	42.9%	14.3%	14.3%	14.3%	14.3%	14.3%	-	-
Palliative RT	33.3%	-	-	-	-	-	-	-

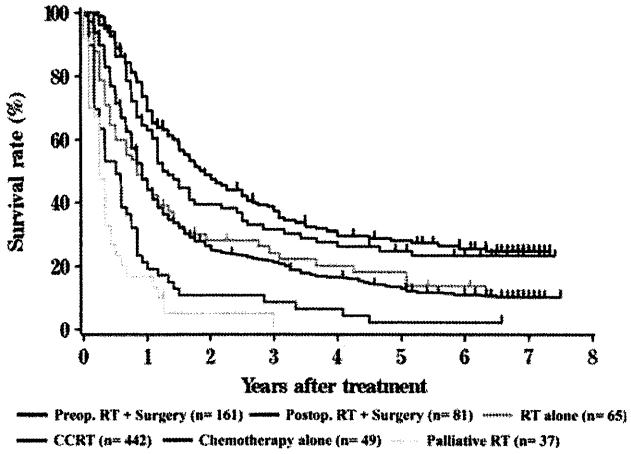


Fig. 7 Survival of patients treated by chemotherapy and/or radiotherapy (cStage IIB-IVB)

	Years after treatment							
	1	2	3	4	5	6	7	8
Preop. RT + Surgery	72.8%	48.7%	38.5%	29.5%	28.0%	25.6%	24.7%	24.7%
Postop. RT + Surgery	64.4%	39.4%	31.5%	26.3%	24.9%	23.3%	23.3%	23.3%
RT alone	45.5%	28.1%	24.1%	20.1%	18.1%	13.8%	10.3%	-
CCRT	46.9%	26.4%	21.7%	16.6%	13.6%	11.0%	10.3%	10.3%
Chemotherapy alone	21.3%	10.6%	8.5%	6.4%	2.1%	2.1%	2.1%	-
Palliative RT	16.8%	5.0%	5.0%	0.0%	-	-	-	-

IV. Clinical results in patients treated with esophagectomy in 2003

Table 45 Tumor location

Locations	Cases (%)	
Cervical	74	(3.0%)
Upper thotacic	268	(10.8%)
Middle thoracic	1146	(46.3%)
Lower thoracic	792	(32.0%)
Abdominal	152	(6.1%)
EG	18	(0.7%)
EG-Junction (E=G)	19	(0.8%)
Unknown	8	(0.3%)
Total lesions	2477	
Total cases	2477	
Missing	23	

EG: esophago-gastric

Table 46 Approaches to tumor resection

Approaches	Cases (%)	
Cervical approach	80	(3.5%)
Right thoracotomy	1832	(81.2%)
Left thoracotomy	46	(2.0%)
Left thoracoabdominal approach	53	(2.4%)
Laparotomy	78	(3.5%)
Transhiatal (without blunt dissection)	33	(1.5%)
Transhiatal (with blunt dissection)	80	(3.5%)
Sternotomy	6	(0.3%)
Others	27	(1.2%)
Unknown	20	(0.9%)
Total	2255	
Missing	255	

Table 47 Endoscopic surgery

Endoscopic surgery	Cases (%)
None	1899 (84.4%)
Thoracoscopy-assisted	187 (8.3%)
Laparoscopy-assisted	73 (3.2%)
Thoracoscopy + Laparoscopy-assisted	64 (2.8%)
Mediastinoscopy-assisted	20 (0.9%)
Thoracoscopy + Mediastinoscopy-assisted	0
Laparoscopy + Mediastinoscopy-assisted	1 (0.0%)
Others	3 (0.1%)
Unknown	4 (0.2%)
Total	2251
Missing	259

Table 48 Fields of lymph node dissection according to the location of the tumor

*** Excluding pharynx and missing 38 cases of locations**

Locations	Cevical	Upper thoracic	Middle thoracic	Lower thoracic	Abdominal	EGJ	Total
Region of lymphadenectomy	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)
None	7 (10.3%)	7 (3.0%)	45 (4.3%)	17 (2.4%)	5 (3.6%)	0	81 (3.8%)
C	21 (30.9%)	2 (0.8%)	3 (0.3%)	1 (0.1%)	0	0	27 (1.3%)
C+UM	14 (20.6%)	2 (0.8%)	3 (0.3%)	0	0	0	19 (0.9%)
C+UM+MLM	2 (2.9%)	7 (3.0%)	13 (1.3%)	9 (1.3%)	0	0	31 (1.4%)
C+UM+MLM+A	15 (22.1%)	132 (55.9%)	467 (45.0%)	219 (30.9%)	8 (5.7%)	2 (5.9%)	843 (39.3%)
C+UM+A	3 (4.4%)	1 (0.4%)	1 (0.1%)	2 (0.3%)	0	0	7 (0.3%)
C+MLM	0	0	0	0	0	0	0
C+MLM+A	0	1 (0.4%)	3 (0.3%)	1 (0.1%)	0	0	5 (0.2%)
C+A	0	1 (0.4%)	2 (0.2%)	2 (0.3%)	1 (0.7%)	0	6 (0.3%)
UM	0	3 (1.3%)	1 (0.1%)	3 (0.4%)	0	0	7 (0.3%)
UM+MLM	0	6 (2.5%)	19 (1.8%)	8 (1.1%)	1 (0.7%)	0	34 (1.6%)
UM+MLM+A	3 (4.4%)	57 (24.2%)	404 (38.9%)	334 (47.1%)	28 (20.0%)	3 (8.8%)	829 (38.7%)
UM+A	0	1 (0.4%)	4 (0.4%)	3 (0.4%)	0	0	8 (0.4%)
MLM	0	2 (0.8%)	4 (0.4%)	6 (0.8%)	4 (2.9%)	2 (5.9%)	18 (0.8%)
MLM+A	1 (1.5%)	8 (3.4%)	43 (4.1%)	83 (11.7%)	56 (40.0%)	18 (52.9%)	209 (9.7%)
A	0	0	14 (1.3%)	18 (2.5%)	35 (25.0%)	9 (26.5%)	76 (3.5%)
Unknown	2 (2.9%)	6 (2.5%)	12 (1.2%)	3 (0.4%)	2 (1.4%)	0	25 (1.2%)
Total	68	236	1038	709	140	34	2144
Missing	6	32	108	83	15	3	247

C: bilateral cervical nodes

UM: upper mediastinal nodes

MLM: middle-lower mediastinal nodes

A: abdominal nodes

Table 49 Extent of lymph node dissection

Grade of dissection (D)	Cases (%)	
DX	47	(2.1%)
D0	121	(5.4%)
DI	292	(13.1%)
DII	1023	(45.8%)
DIII	751	(33.6%)
Total	2234	
Missing	276	

Table 50 Reconstruction route

Reconstruction route	Cases (%)	
None	30	(1.4%)
Antethoracic	212	(9.6%)
Retrosternal	736	(33.3%)
Intrathoracic	348	(15.7%)
Posterior mediastinal	826	(37.3%)
Others	38	(1.7%)
Unknown	23	(1.0%)
Total	2213	
Missing	278	

Table 51 Organs used for reconstruction

Organs used for reconstruction	Cases (%)	
None	36	(1.5%)
Whole stomach	227	(9.7%)
Gastric tube	1758	(74.9%)
Jejunum	107	(4.6%)
Free jejunum	34	(1.4%)
Colon	101	(4.3%)
Free colon	9	(0.4%)
Skin graft	1	(0.0%)
Others	67	(2.9%)
Unknown	8	(0.3%)
Total lesions	2348	
Total cases	2248	
Missing	262	

Table 58 Histological classification

Histological classification	Cases (%)	
Not examined	6	(0.3%)
SCC	1985	(88.9%)
SCC	226	(10.1%)
Well diff.	450	(20.2%)
Moderately diff.	944	(42.3%)
Poorly diff.	365	(16.3%)
Adenocarcinoma	73	(3.3%)
Barrett's adenocarcinoma	37	(1.7%)
Adenosquamous cell carcinoma	10	(0.4%)
(Co-existing)	1	(0.0%)
(Mucoepidermoid carcinoma)	1	(0.0%)
Adenoid cystic carcinoma	2	(0.1%)
Basaloid carcinoma	24	(1.1%)
Undiff. carcinoma (small cell)	9	(0.4%)
Undiff. carcinoma	6	(0.3%)
Other carcinoma	1	(0.0%)
Sarcoma	17	(0.8%)
Carcinosarcoma	4	(0.2%)
Malignant melanoma	6	(0.3%)
Dysplasia	5	(0.2%)
Other	22	(1.0%)
Unkown	24	(1.1%)
Total	2233	
Missing	277	

SCC: Squamous cell carcinoma

Table 59 Depth of tumor invasion

pT-category	Cases (%)	
pTX	7	(0.3%)
pT0	35	(1.6%)
pTis	33	(1.5%)
pT1a	175	(7.8%)
pT1b	517	(23.2%)
pT2	314	(14.1%)
pT3	959	(42.9%)
pT4	154	(6.9%)
Other	0	
Unknown	39	(1.7%)
Total	2233	
Missing	277	

Table 60 Subclassification of superficial carcinoma

Subclassification	Cases (%)	
Not superficial carcinoma	1487	(66.9%)
m1 (ep)	35	(1.6%)
m2 (lpm)	64	(2.9%)
m3 (mm)	101	(4.5%)
sm1	70	(3.1%)
sm2	113	(5.1%)
sm3	232	(10.4%)
Unknown	122	(5.5%)
Total	2224	
Missing	286	

ep: epithelium

lpm: lamina propria muosa mm: muscularis mucosa

Table 61 Pathological grading of lymph node metastasis

Lymph node metastasis	Cases (%)	
n (-)	910	(41.7%)
n1 (+)	329	(15.1%)
n2 (+)	539	(24.7%)
n3 (+)	181	(8.3%)
n4 (+)	177	(8.1%)
Unknown	44	(2.0%)
Total	2180	
Missing	330	

Table 62 Numbers of the metastatic nodes

Numbers of lymph node metastasis	Cases (%)	
0	1176	(46.9%)
1-3	737	(29.4%)
4-7	288	(11.5%)
8-	223	(8.9%)
Unknown	85	(3.4%)
Total	2509	
Missing	1	

Table 63 Pathological findings of distant organ metastasis

Distant metastasias (M)	Cases (%)	
MX	29	(1.3%)
M0	2171	(96.6%)
M1	48	(2.1%)
Total	2248	
Missing	262	

Table 64 Residual tumor

Residual tumor (R)	Cases (%)	
RX	117	(5.3%)
R0	1797	(82.0%)
R1	141	(6.4%)
R2	124	(5.7%)
Unknown	12	(0.5%)
Total	2191	
Missing	319	

Table 75 Causes of death

Cause of death	Cases (%)	
Death due to recurrence	780	(70.0%)
Death due to other cancer	52	(4.7%)
Death due to other disease (rec+)	41	(3.7%)
Death due to other disease (rec-)	122	(11.0%)
Death due to other disease (rec?)	23	(2.1%)
Death within 30 days after operation	25	(2.2%)
Death 31 days or more after operation	52	(4.7%)
Unknown	19	(1.7%)
Total of death cases	1114	
Missing	14	

rec: recurrence

Operative death means death within 30 days after operation in or out of hospital.

Operative mortality : 1.0%

Follow-up period (years)	
Median (min - max)	2.75 (0.00 - 7.41)

Table 76 Initial recurrent lesion

Initial recurrence lesion of fatal cases	Cases (%)	
Lymph node	509	(41.4%)
Lung	200	(16.3%)
Liver	176	(14.3%)
Bone	106	(8.6%)
Brain	29	(2.4%)
Primary lesion	95	(7.7%)
Dissemination	56	(4.6%)
Anastomotic region	2	(0.2%)
Others	48	(3.9%)
Unknown	8	(0.7%)
Total of recurrence lesion	1229	
Total	1081	
Missing	347	

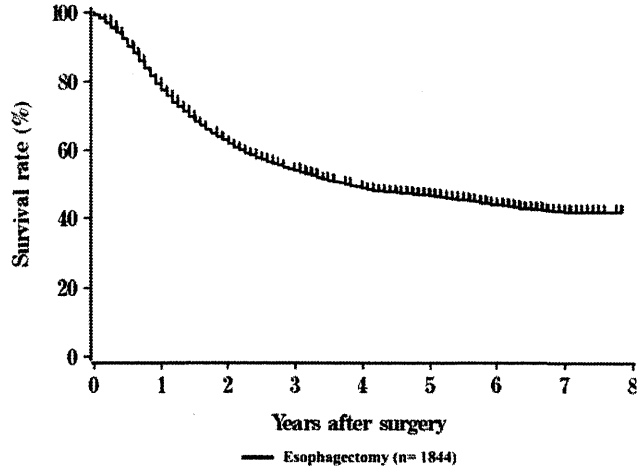


Fig. 8 Survival of patients treated by esophagectomy

	Years after surgery							
	1	2	3	4	5	6	7	8
Esophagectomy	**78.9%**	**62.8%**	**54.4%**	**48.9%**	**46.6%**	**44.0%**	**42.2%**	**41.9%**

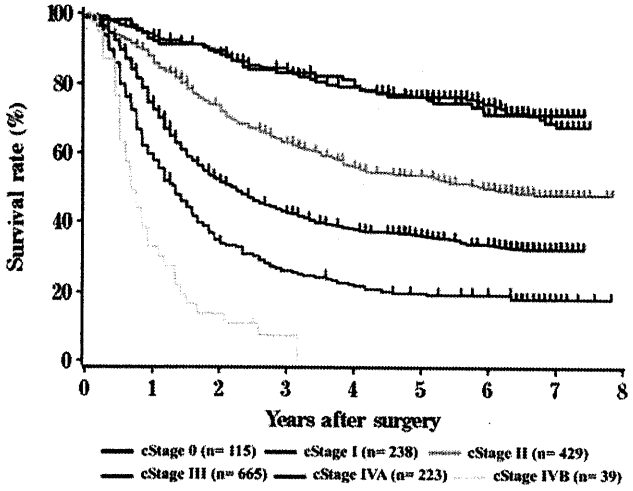


Fig. 9 Survival of patients treated by esophagectomy in relation to clinical stage (JSED-cTNM 9th)

	Years after surgery							
	1	2	3	4	5	6	7	8
cStage 0	92.9%	89.4%	83.0%	79.3%	76.5%	71.2%	71.2%	71.2%
cStage I	94.2%	89.0%	84.4%	79.3%	76.3%	74.3%	69.1%	67.7%
cStage II	87.5%	73.6%	62.9%	55.8%	53.4%	49.7%	47.9%	47.9%
cStage III	74.3%	52.3%	43.0%	37.9%	36.3%	33.7%	32.4%	32.4%
cStage IVA	59.1%	34.6%	26.2%	21.7%	19.7%	19.2%	17.9%	17.9%
cStage IVB	32.7%	13.6%	7.3%	-	-	-	-	-

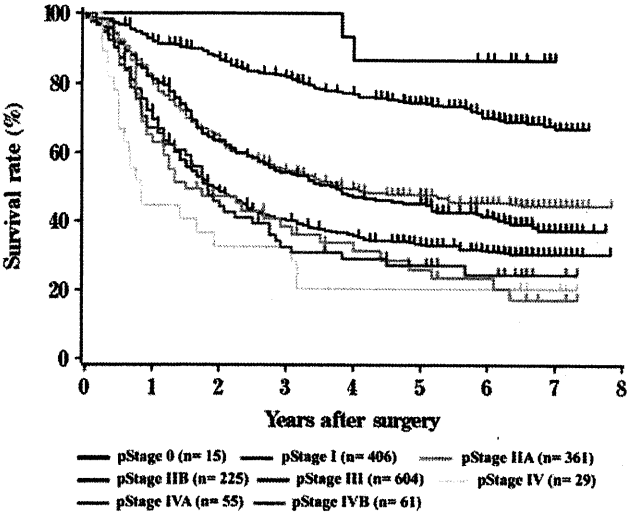


Fig. 10 Survival of patients treated by esophagectomy in relation to clinical stage (UICC-cTNM 5th)

	Years after surgery							
	1	2	3	4	5	6	7	8
cStage 0	93.3%	93.3%	93.3%	86.7%	86.7%	86.7%	86.7%	-
cStage I	92.9%	87.8%	82.2%	76.9%	74.3%	67.8%	66.8%	-
cStage IIA	81.9%	65.1%	55.0%	49.3%	47.5%	45.3%	44.4%	44.4%
cStage IIB	82.0%	63.6%	54.2%	47.0%	45.1%	41.5%	37.4%	37.4%
cStage III	71.6%	49.3%	40.5%	35.6%	33.3%	31.4%	30.4%	30.4%
cStage IV	44.4%	32.3%	28.3%	20.2%	20.2%	20.2%	20.2%	-
cStage IVA	65.0%	47.2%	38.4%	31.1%	25.9%	23.3%	20.2%	20.2%
cStage IVB	67.2%	45.9%	32.5%	29.0%	27.0%	24.3%	24.3%	24.3%

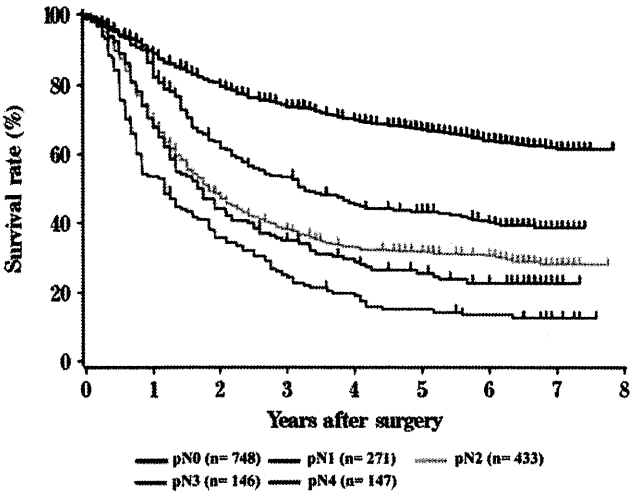


Fig. 13 Survival of patients treated by esophagectomy in relation to lymph node mentastasis (JSED-pTNM 9th: pN)

	Years after surgery							
	1	2	3	4	5	6	7	8
pN0	89.8%	80.5%	74.1%	69.6%	67.0%	63.7%	61.8%	61.2%
pN1	86.3%	63.5%	53.4%	45.3%	43.3%	40.6%	38.5%	38.5%
pN2	69.8%	48.4%	38.2%	32.7%	31.7%	30.4%	28.0%	28.0%
pN3	69.7%	44.2%	34.9%	28.8%	25.5%	22.8%	22.8%	22.8%
pN4	53.5%	35.7%	25.0%	18.9%	15.0%	13.3%	12.4%	12.4%

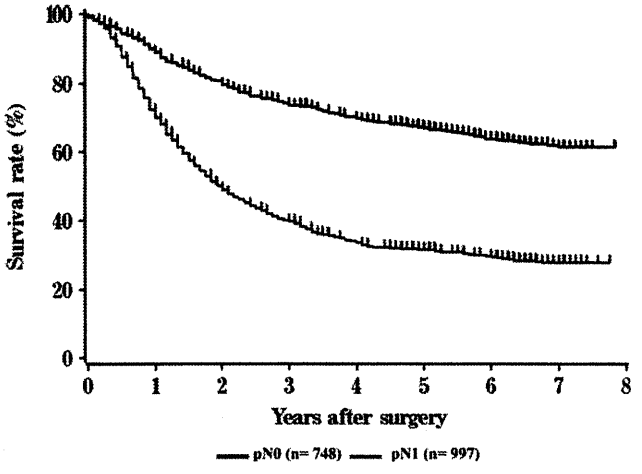


Fig. 14 Survival of patients treated by esophagectomy in relation to lymph node mentastasis (UICC-pTNM 5th: pN)

	Years after surgery							
	1	2	3	4	5	6	7	8
pN0	89.8%	80.5%	74.1%	69.6%	67.0%	63.7%	61.8%	61.2%
pN1	72.0%	50.1%	40.0%	33.6%	31.6%	29.6%	27.8%	27.8%

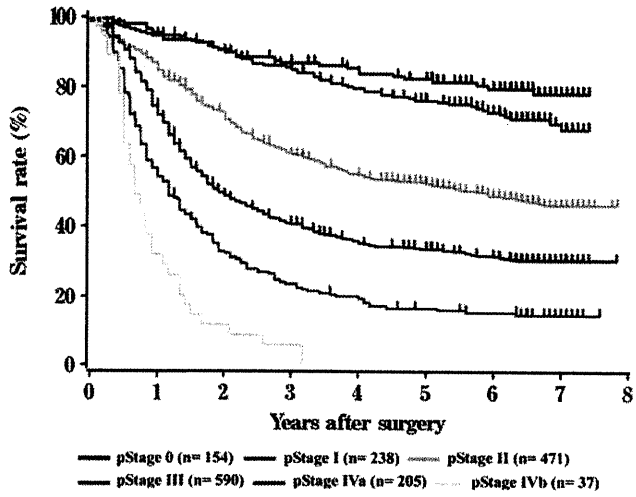


Fig. 15 Survival of patients treated by esophagectomy in relation to pathological stage (JSED-pTNM 9th)

	Years after surgery							
	1	2	3	4	5	6	7	8
pStage 0	95.3%	90.5%	86.9%	83.9%	82.3%	79.6%	78.3%	78.3%
pStage I	94.8%	90.8%	85.8%	79.7%	76.3%	73.0%	69.8%	68.1%
pStage II	86.6%	72.7%	61.1%	54.9%	52.6%	48.9%	46.2%	46.2%
pStage III	74.4%	49.8%	41.0%	35.3%	33.7%	31.7%	30.5%	30.5%
pStage IVa	55.8%	32.7%	23.6%	19.3%	16.5%	15.3%	14.6%	14.6%
pStage IVb	31.7%	11.5%	5.8%	0.0%	-	-	-	-

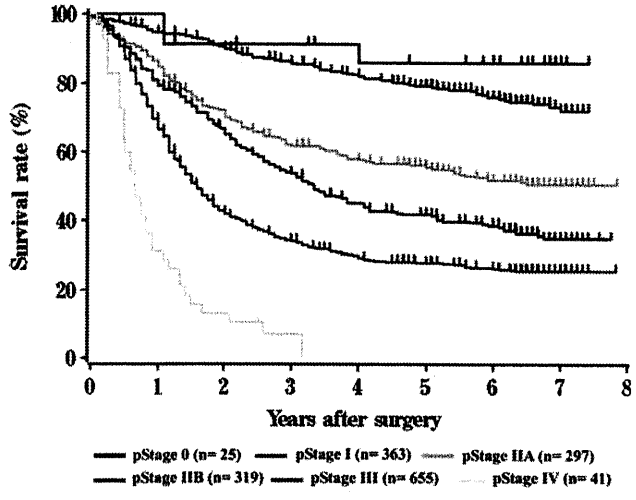


Fig. 16 Survival of patients treated by esophagectomy in relation to pathological stage (UICC-pTNM 5th)

	Years after surgery							
	1	2	3	4	5	6	7	8
pStage 0	100.0%	91.3%	91.3%	85.9%	85.9%	85.9%	85.9%	-
pStage I	94.6%	90.5%	86.4%	82.0%	79.1%	75.8%	73.2%	72.1%
pStage IIA	86.1%	72.1%	62.0%	57.6%	55.8%	51.6%	50.5%	50.5%
pStage IIB	80.8%	66.7%	54.0%	45.3%	41.8%	38.7%	34.9%	34.9%
pStage III	69.0%	42.9%	34.2%	29.1%	27.7%	26.3%	25.4%	25.4%
pStage IV	31.1%	13.0%	6.9%	-	-	-	-	-