



# Comprehensive registry of esophageal cancer in Japan, 2013

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## Abstract

**Background** Esophageal cancer is the eighth most common cause of cancer mortality in Japan. More than 11,000 people had died from esophageal cancer in 2018. The Japan Esophageal Society has collected the data on patients' characteristics, performed treatment, and outcomes annually.

**Methods** We analyzed the data of patients who had first visited the participating hospitals in 2013. In 2019, the data collection method was changed from an electronic submission to a web-based data collection using the National Clinical Database (NCD). Japanese Classification of Esophageal Cancer 10th by the Japan Esophageal Society (JES) and UICC TNM Classification 7th were used for cancer staging

**Results** A total of 8019 cases were registered from 334 institutions in Japan. Squamous cell carcinoma and adenocarcinoma accounted for 87.8% and 6.3%, respectively. The 5-year survival rates of patients treated using endoscopic resection, concurrent chemoradiotherapy, radiotherapy alone, or esophagectomy were 88.3%, 32.4%, 24.4%, and 59.3%, respectively. Esophagectomy was performed in 4910 cases. The operative and the hospital mortality rates were 0.77% and 1.98%, respectively. The survival curves showed a good discriminatory ability both in the clinical and pathologic stages by the JES system. The 5-year survival rate of patients with pStage IV in the UICC classification that included patients with supraclavicular node metastasis was better than that of patients with pStage IVb in JES classification.

**Conclusion** We hope this report contributes to improving all aspects of the diagnosis and treatment of esophageal cancer in Japan.

**Keywords** Esophageal cancer · Esophagectomy · Endoscopic resection · Chemotherapy · Chemoradiotherapy

## Preface 2013

We deeply appreciate the great contributions of many physicians in the registry of esophageal cancer cases. The Comprehensive Registry of Esophageal Cancer in Japan, 2013, was published here. In 2019, the data collection method was changed from an electronic submission to a web-based

data collection using the National Clinical Database (NCD). Personal information was replaced with individual management code inside each institute, and the NCD collected only anonymized information. The registry complies with the Act for the Protection of Personal Information.

We briefly summarized the Comprehensive Registry of Esophageal Cancer in Japan, 2013. Japanese Classification of Esophageal Cancer 10th by the Japan Esophageal Society (JES) [1] and UICC TNM Classification 7th [2] were used for cancer staging according to the subjected year. A total of 8019 cases were registered from 334 institutions in Japan. Tumor locations were cervical: 4.8%, upper thoracic: 12.1%, middle thoracic: 46.5%, lower thoracic: 28.2% and EG junction: 7.9%. Superficial carcinomas (Tis, T1a, T1b) were 38.6%. As for the histologic type of biopsy specimens, squamous cell carcinoma and adenocarcinoma accounted

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These data were first made available on July 15, 2020, as the Comprehensive Registry of Esophageal Cancer in Japan, 2013.

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The authors were members of the Registration Committee for Esophageal Cancer, the Japan Esophageal Society, and made great contribution to the preparation of this material.

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for 87.8% and 6.3%, respectively. Regarding clinical results, the 5-year survival rates of patients treated using endoscopic resection, concurrent chemoradiotherapy, radiotherapy alone, or esophagectomy were 88.3%, 32.4%, 24.4%, and 59.3%, respectively. The endoscopic submucosal dissection accounted for 91.6% of endoscopic resection. Esophagectomy was performed in 4910 cases. Concerning the approach used for esophagectomy, 43.0% of the cases were treated thoracoscopically. The operative mortality (within 30 days after surgery) was 0.77%, and the hospital mortality was 1.98%. The Kaplan–Meier survival curves diverged according to the N-grade both in the JES and the UICC classifications. The survival curves showed a good discriminatory ability both in the clinical and pathologic stages by the JES system. However, the survival of cStage IIB was better than those of IB and IIA, while the survival curves were almost identical between cStage IIIC and IV in the UICC system. Also, the survival curve of pStage IIA merged with that of IIB, and the survival of pStage IV was better than that of IIIC. The 5-year survival rate of patients with pStage IV in the UICC classification that included patients with supraclavicular node metastasis was better than that of patients with pStage IVb in JES classification.

We hope that this Comprehensive Registry of Esophageal Cancer in Japan for 2013 will help to improve all aspects of the diagnosis and treatment of esophageal cancer in Japan.

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## I. Clinical features of esophageal cancer patients treated in 2013

Institution-registered cases in 2013.

### Institutions

Ageo Central General Hospital  
 Aichi Cancer Center  
 Aichi Medical University Hospital  
 Aizawa Hospital  
 Akita University Hospital  
 Aomori Prefectural Central Hospital  
 Arao Municipal Hospital  
 Asahikawa Medical University Hospital  
 Cancer Institute Hospital of JFCR  
 Chiba Cancer Center  
 Chiba University Hospital  
 Chibaken Saiseikai Narashino Hospital  
 Chiba-Nishi General Hospital  
 Chigasaki Municipal Hospital  
 Chugoku Rosai Hospital  
 Dokkyo Medical University Hospital  
 Ehime Prefectural Central Hospital  
 Ejjiyu General Hospital  
 Fuchinobe General Hospital  
 Fuchu Hospital  
 Fujinomiya City General Hospital  
 Fujioka General Hospital  
 Fujisaki Hospital  
 Fujita Health University Hospital

continued

### Institutions

Fukaya Red Cross Hospital  
 Fukui Prefectural Hospital  
 Fukui University Hospital  
 Fukui-ken Saiseikai Hospital  
 Fukuoka City Hospital  
 Fukuoka Shin Mizumaki Hospital  
 Fukuoka University Chikushi Hospital  
 Fukuoka University Hospital  
 Fukuoka Wajiro Hospital  
 Fukushima Medical University Hospital  
 Fukuyama City Hospital  
 Gifu Prefectural General Center  
 Gifu University Hospital  
 Gunma Prefectural Cancer Center  
 Gunma Saiseikai Maebashi Hospital  
 Gunma University Hospital  
 Hachinohe City Hospital  
 Hakodate City Hospital  
 Hakodate Goryokaku Hospital  
 Hakodate National Hospital  
 Hamamatsu University Hospital  
 Heartlife Hospital  
 Higashiosaka City Medical Center  
 Hiraka General Hospital  
 Hiratsuka City Hospital  
 Hiratsuka Kyosai Hospital  
 Hirosaki University Hospital  
 Hiroshima City Asa Hospital  
 Hiroshima City Hospital  
 Hiroshima Red Cross Hospital & Atomic-bomb Survivors Hospital  
 Hiroshima University Hospital  
 Hitachi General Hospital  
 Hofu Institute of Gastroenterology  
 Hokkaido University Hospital  
 Hospital of the University of Occupational and Environmental Health, Japan  
 Hyogo Cancer Center  
 Hyogo Prefectural Amagasaki General Medical Center  
 Ibaraki Prefectural Central Hospital  
 Iizuka Hospital  
 International Goodwill Hospital  
 International University of Health and Welfare Atami Hospital  
 International University of Health and Welfare Hospital  
 International University of Health and Welfare Ichikawa Hospital  
 International University of Health and Welfare Mita Hospital  
 Isehara Kyodo Hospital  
 Ishikawa Prefectural Central Hospital  
 Itami City Hospital  
 Iwata City Hospital  
 Iwate Medical University Hospital

continued

## Institutions

Iwate Prefectural Central Hospital  
 Iwate Prefectural Chubu Hospital  
 JA Hiroshima General Hospital  
 JA Kouseiren Enshu Hospital  
 JA Onomichi General Hospital  
 Japanese Red Cross Ashikaga Hospital  
 Japanese Red Cross Fukuoka Hospital  
 Japanese Red Cross Ishinomaki Hospital  
 Japanese Red Cross Kitami Hospital  
 Japanese Red Cross Kyoto Daiichi Hospital  
 Japanese Red Cross Maebashi Hospital  
 Japanese Red Cross Medical Center  
 Japanese Red Cross Musashino Hospital  
 Japanese Red Cross Nagasaki Genbaku Hospital  
 Japanese Red Cross Nagoya Daiichi Hospital  
 Japanese Red Cross Saitama Hospital  
 Japanese Red Cross Society Nagano Hospital  
 Japanese Red Cross Tottori Hospital  
 Japanese Red Cross Wakayama Medical Center  
 JCHO Gunma Chuo Hospital  
 JCHO Kyushu Hospital  
 JCHO Miyazaki Konan Hospital  
 JCHO Osaka Hospital  
 JCHO Saitama Medical Center  
 JCHO Tokuyama Central Hospital  
 JCHO Yokohama Chuo Hospital  
 Jichi Medical University Hospital  
 Jichi Medical University Saitama Medical Center  
 Juntendo University Hospital  
 Juntendo University Shizuoka Hospital  
 Juntendo University Urayasu Hospital  
 Junwakai Memorial Hospital  
 Kagawa Prefectural Central Hospital  
 Kagawa Rosai Hospital  
 Kagawa University Hospital  
 Kagoshima University Hospital  
 Kaizuka City Hospital  
 Kakogawa Central City hospital  
 Kanagawa Cancer Center  
 Kanazawa Medical University Hospital  
 Kanazawa University Hospital  
 Kansai Denryoku Hospital  
 Kansai Medical University Hospital  
 Kansai Medical University Medical Center  
 Kansai Rosai Hospital  
 Kanto Central Hospital  
 Kashiwa Kousei General Hospital  
 Kasugai Municipal Hospital  
 Kawasaki Hospital  
 Kawasaki Medical School Hospital

continued

## Institutions

Kawasaki Medical School Kawasaki Hospital  
 Kawasaki Municipal Hospital  
 Kawasaki Municipal Ida Hospital  
 Kawasaki Saiwai Hospital  
 Keio University Hospital  
 Keiyukai Sapporo Hospital  
 Kindai University Hospital  
 Kindai University Nara Hospital  
 Kinki Central Hospital  
 Kiryu Kousei General Hospital  
 Kitaakita Municipal Hospital  
 Kitaharima Medical Center  
 Kitakyushu General Hospital  
 Kitakyushu Municipal Medical Center  
 Kitano Hospital  
 Kitasato University Hospital  
 Kobe City Medical Center General Hospital  
 Kobe University Hospital  
 Kochi Health Science Center  
 Kochi University Hospital  
 Kokura Memorial Hospital  
 Kouseiren Takaoka Hospital  
 Kumagai General Hospital  
 Kumamoto University Hospital  
 Kummoto Regional Medical Center  
 Kurashiki Central Hospital  
 Kurume University Hospital  
 Kyorin University Hospital  
 Kyoto University Hospital  
 Kyoto-Katsura Hospital  
 Kyushu Central Hospital  
 Kyushu University Hospital  
 Machida Municipal hospital  
 Matsudo City General Hospital  
 Matsushita Memorial Hospital  
 Matsuyama Red Cross Hospital  
 Mie University Hospital  
 Minamiosaka Hospital  
 Minoh City Hospital  
 Mito Red Cross Hospital  
 Mitsui Memorial Hospital  
 Miyazaki University Hospital  
 Mizushima Kyudo Hospital  
 Moriguchi Keijinkai Hospital  
 Murakami General Hospital  
 Nagahama City Hospital  
 Nagahama Red Cross Hospital  
 Nagano Municipal Hospital  
 Nagaoka Chuo General Hospital  
 Nagasaki University Hospital

continued

## Institutions

Nagoya City University Hospital  
 Nagoya City West Medical Center  
 Nagoya University Hospital  
 Nanpuh Hospital  
 Nara City Hospital  
 Nara Medical University Hospital  
 Nasu Red Cross Hospital  
 National Cancer Center Hospital  
 National Cancer Center Hospital East  
 National Center for Global Health and Medicine  
 National Defence Medical College Hospital  
 New Tokyo Hospital  
 NHO Beppu Medical Center  
 NHO Chiba Medical Center  
 NHO Fukuoka-Higashi Medical Center  
 NHO Iwakuni Clinincal Center  
 NHO Kanmon Medical Center  
 NHO Kure Medical Center  
 NHO Kyoto Medical Center  
 NHO Kyushu Cancer Center  
 NHO Matsumoto Medical Center  
 NHO Mito Medical Center  
 NHO Miyakonojo Medical Center  
 NHO Nagasaki Medical Center  
 NHO Nagoya Medical Center  
 NHO Okayama Medical Center  
 NHO Osaka Medical Center  
 NHO Saitama Hospital  
 NHO Sendai Medical Center  
 NHO Shikoku Cancer Center  
 NHO Tokyo Medical Center  
 NHO Yokohama Medical Center  
 Nihonkai General Hospital  
 Niigata Cancer Center Hospital  
 Niigata City General Hospital  
 Niigata Prefectural Central Hospital  
 Niigata Prefectural Shibata Hospital  
 Niigata University Medical & Detal Hospital  
 Nikko Memorial Hospital  
 Nippon Medical School Chiba Hokusou Hospital  
 Nippon Medical School Hospital  
 Nippon Medical School Musashi Kosugi Hospital  
 Nippon Medical School Tama Nagayama Hospital  
 Nishi Kobe Medical Center  
 Nissan Tamagawa Hospital  
 Nozaki Tokushukai Hospital  
 Numazu City Hospital  
 Obihiro Kousei Hospital  
 Ogaki Municipal Hospital  
 Ohta Hospital

continued

## Institutions

Ohta Nishinouchi Hospital  
 Oita Red Cross Hospital  
 Oita University Hospital  
 Okayama Red Cross General Hospital  
 Okayama Saiseikai General Hospital  
 Okayama University Hospital  
 Okitama Public General Hospital  
 Onomichi Municipal Hospital  
 Osaka City General Hospital  
 Osaka City University Hospital  
 Osaka Ekisaikai Hospital  
 Osaka General Medical Center  
 Osaka International Cancer Institute  
 Osaka Medical College Hospital  
 Osaka Police Hospital  
 Osaka Red Cross Hospital  
 Osaki City Hospital  
 Otsu City Hospital  
 Rinku General Medical Center  
 Saga Prefectural Hospital Koseikan  
 Saga University Hospital  
 Sagamihara National Hospital  
 Saiseikai Fukuoka General Hospital  
 Saiseikai Karatsu Hospital  
 Saiseikai Noe Hospital  
 Saiseikai Utsunomiya Hospital  
 Saiseikai Yokohama Tobu Hospital  
 Saitama Cancer Center  
 Saitama Medical University International Medical Center  
 Saitama Medical University Saitama Medical Center  
 Sakai City Medical Center  
 Saku Central Hospital  
 Sapporo Medical University Hospital  
 Seikei-kai Chiba Medical Center  
 Sendai City Hospital  
 Shiga General Hospital  
 Shiga University of Medical Science Hospital  
 Shimane University Hospital  
 Shin Takeo Hospital  
 Shinko Hospital  
 Shinshu University Hospital  
 Shizuoka Cancer Center  
 Shizuoka City Shizuoka Hospital  
 Shizuoka General Hospital  
 Shizuoka Saiseikai General Hospital  
 Showa University Hospital  
 Southern Tohoku General Hospital  
 St. Luke's International Hospital  
 St. Marianna University School of Medicine Hospital  
 St. Mary's Hospital

continued

## Institutions

Steel Memorial Yawata Hospital  
 Suita Municipal Hospital  
 Suzuka Chuo General Hospital  
 Tachikawa Hospital  
 Takatsuki Red Cross Hospital  
 Teikyo University Chiba Medical Center  
 Teikyo University Hospital  
 Teine Keijinkai Hospital  
 Tenri Hospital  
 The Hospital of Hyogo College of Medicine  
 The Jikei University Daisan Hospital  
 The Jikei University Hospital  
 Tochigi Cancer Center  
 Toho University Ohashi Medical Center  
 Toho University Omori Medical Center  
 Toho University Sakura Medical Center  
 Tohoku University Hospital  
 Tokai University Hachioji Hospital  
 Tokai University Hospital  
 Tokai University Tokyo Hospital  
 Tokushima Red Cross Hospital  
 Tokushima University Hospital  
 Tokyo Dental College Ichikawa General Hospital  
 Tokyo Medical and Dental University Hospital  
 Tokyo Medical University Hachioji Medical Center  
 Tokyo Medical University Hospital  
 Tokyo Metropolitan Cancer and Infectious Diseases Center Komagome Hospital  
 Tokyo Metropolitan Tama Medical Center  
 Tokyo Rosai Hospital  
 Tokyo University Hospital  
 Tokyo Women's Medical University Hospital  
 Tokyo Women's Medical University Medical Center East  
 Tokyo Women's Medical University Yachiyo Medical Center  
 Tonan Hospital  
 Toranomon Hospital  
 Tosei General Hospital  
 Toshima Hospital  
 Tottori Prefectural Central Hospital  
 Tottori University Hospital  
 Toyama Prefectural Central Hospital  
 Toyama University Hospital  
 Toyonaka Municipal Hospital  
 Toyota Memorial Hospital  
 Tsuchiura Kyodo Hospital  
 Tsukuba University Hospital  
 Tsuruoka Municipal Shonal Hospital  
 Tsuyama Chuo Hospital

continued

## Institutions

University Hospital Kyoto Prefectural University of Medicine  
 University of the Ryukyus Hospital  
 Wakayama Medical University Hospital  
 Yamagata Prefectural Central Hospital  
 Yamagata University Hospital  
 Yamaguchi University Hospital  
 Yamanashi Prefectural Central Hospital  
 Yamanashi University Hospital  
 Yao Municipal Hospital  
 Yokohama City Municipal Hospital  
 Yokohama City University Hospital  
 Yokohama City University Medical Center  
 Yokohama Sakae Kyosai Hospital  
 Yokosuka General Hospital Uwamachi

(Total 334 institutions)

## Patient background

Tables 1, 2, 3, 4, 5, 6, 7, 8

**Table 1** Age and gender

Age	Male	Female	Cases (%)
≤29	12	1	13 (0.2%)
30–39	16	6	22 (0.3%)
40–49	164	59	223 (2.8%)
50–59	917	174	1091 (13.6%)
60–69	2675	431	3106 (38.7%)
70–79	2403	437	2840 (35.4%)
80–89	570	133	703 (8.8%)
90≤	10	11	21 (0.3%)
Total	6767	1252	8019

**Table 2** Performed treatment

Treatments	Cases (%)
Surgery	5038 (62.8%)
Esophagectomy	4910 (61.2%)
Palliative surgery	128 (1.6%)
Chemotherapy and/or Radiotherapy	4062 (50.7%)
Endoscopic treatment	1421 (17.7%)

**Table 3** Tumor location

Location of tumor	Endoscopic treatment (%)	Surgery		Chemotherapy and/or radiotherapy (%)	Total (%)
		Esophagectomy (%)	Palliative surgery (%)		
Cervical	48 (3.4%)	163 (3.3%)	10 (7.8%)	256 (6.3%)	384 (4.8%)
Upper thoracic	142 (10.0%)	525 (10.7%)	25 (19.5%)	597 (14.7%)	969 (12.1%)
Middle thoracic	775 (54.5%)	2188 (44.6%)	61 (47.7%)	1864 (45.9%)	3726 (46.5%)
Lower thoracic	369 (26.0%)	1544 (31.4%)	26 (20.3%)	1118 (27.5%)	2264 (28.2%)
EG	61 (4.3%)	356 (7.3%)	5 (3.9%)	165 (4.1%)	470 (5.9%)
E=G	14 (1.0%)	66 (1.3%)		23 (0.6%)	88 (1.1%)
GE	6 (0.4%)	61 (1.2%)		15 (0.4%)	72 (0.9%)
Unknown	6 (0.4%)	7 (0.1%)	1 (0.8%)	45 (0.6%)	46 (0.6%)
Total	1421	4910	128	4062	8019

*E* esophageal, *G* gastric

**Table 4** Histologic type of biopsy specimens

Histologic types	Endoscopic treatment (%)	Surgery		Chemotherapy and/or radiotherapy (%)	Total (%)
		Esophagectomy (%)	Palliative surgery (%)		
Squamous cell carcinoma	1101 (77.5%)	4291 (87.4%)	116 (90.6%)	3733 (91.9%)	6911 (86.2%)
Squamous cell carcinoma	867 (61.0%)	2442 (49.7%)	74 (57.8%)	2330 (57.4%)	4377 (54.6%)
Well differentiated	100 (7.0%)	387 (7.9%)	9 (7.0%)	259 (6.4%)	565 (7.0%)
Moderately differentiated	117 (8.2%)	1093 (22.3%)	24 (18.8%)	805 (19.8%)	1448 (18.1%)
Poorly differentiated	17 (1.2%)	369 (7.5%)	9 (7.0%)	339 (8.3%)	521 (6.5%)
Adenocarcinoma	38 (2.7%)	340 (6.9%)	4 (3.1%)	133 (3.3%)	419 (5.2%)
Barrett's carcinoma	33 (2.3%)	91 (1.9%)	1 (0.8%)	25 (0.6%)	133 (1.7%)
Adenosquamous carcinoma	2 (0.1%)	11 (0.2%)		4 (0.1%)	14 (0.2%)
Mucoepidermoid carcinoma		1 (0.0%)			1 (0.0%)
Basaloid carcinoma	2 (0.1%)	31 (0.6%)		16 (0.4%)	39 (0.5%)
Neuroendocrine tumor		1 (0.0%)		1 (0.0%)	2 (0.0%)
Neuroendocrine carcinoma	4 (0.3%)	21 (0.4%)		27 (0.7%)	34 (0.4%)
Undifferentiated carcinoma		6 (0.1%)		4 (0.1%)	9 (0.1%)
Malignant melanoma		15 (0.3%)		6 (0.1%)	19 (0.2%)
Carcinosarcoma		16 (0.3%)	1 (0.8%)	8 (0.2%)	19 (0.2%)
GIST		1 (0.0%)			1 (0.0%)
Adenoid cystic carcinoma		1 (0.0%)			1 (0.0%)
Nonepithelial tumors	2 (0.1%)				3 (0.0%)
Other epithelial tumors	17 (1.2%)	4 (0.1%)		8 (0.2%)	27 (0.3%)
Other tumors	51 (3.6%)	16 (0.3%)		13 (0.3%)	79 (1.0%)
Unknown	171 (12.0%)	64 (1.3%)	6 (4.7%)	84 (2.1%)	308 (3.8%)
Total	1421	4910	128	4062	8019

**Table 5** Depth of tumor invasion, cT (UICC TNM 7th)

Clinical T	Endoscopic treatment (%)	Surgery		Chemotherapy and/or radiotherapy (%)	Total (%)
		Esophagectomy (%)	Palliative surgery (%)		
cTX	12 (0.8%)	11 (0.2%)	1 (0.8%)	34 (0.8%)	80 (1.0%)
cT0	6 (0.6%)	4 (0.1%)		3 (0.1%)	14 (0.2%)
cT1a	1139 (80.2%)	247 (5.0%)		102 (2.5%)	1426 (17.8%)
cT1b	196 (13.8%)	1319 (26.9%)	9 (7.0%)	515 (12.7%)	1658 (20.7%)
cT2	4 (0.3%)	832 (16.9%)	4 (3.1%)	609 (15.0%)	1006 (12.5%)
cT3	41 (2.9%)	2223 (45.3%)	49 (38.3%)	2036 (50.1%)	2895 (36.1%)
cT4a	4 (0.3%)	133 (2.7%)	17 (13.3%)	257 (6.3%)	341 (4.3%)
cT4b	19 (1.3%)	141 (2.9%)	48 (37.5%)	506 (12.5%)	599 (7.5%)
Total	1421	4910	128	4062	8019

**Table 6** Lymph node metastasis, cN (UICC TNM 7th)

Clinical N	Endoscopic treatment (%)	Surgery		Chemotherapy and/or radiotherapy (%)	Total (%)
		Esophagectomy (%)	Palliative surgery (%)		
cN0	1351 (95.1%)	2278 (46.4%)	31 (24.2%)	1117 (27.5%)	4047 (50.5%)
cN1	38 (2.7%)	1704 (34.7%)	37 (28.9%)	1663 (40.9%)	2318 (28.9%)
cN2	22 (1.5%)	800 (16.3%)	43 (33.6%)	1009 (24.8%)	1301 (16.2%)
cN3	10 (0.7%)	128 (2.6%)	17 (13.3%)	273 (6.7%)	353 (4.4%)
Total	1421	4910	128	4062	8019

**Table 7** Distant metastasis, cM (UICC TNM 7th)

Clinical M	Endoscopic treatment (%)	Surgery		Chemotherapy and/or radiotherapy (%)	Total (%)
		Esophagectomy (%)	Palliative surgery (%)		
cM0	1406 (98.9%)	4753 (96.8%)	103 (80.5%)	3513 (86.5%)	7350 (91.7%)
cM1	15 (1.1%)	157 (3.2%)	25 (19.5%)	549 (13.5%)	669 (8.3%)
Total	1421	4910	128	4062	8019

**Table 8** Clinical Stage (UICC TNM 7th)

Clinical stage	Endoscopic treatment (%)	Surgery		Chemotherapy and/or radiotherapy (%)	Total (%)
		Esophagectomy (%)	Palliative surgery (%)		
Stage IA	1317 (92.7%)	1268 (25.8%)	7 (5.5%)	388 (9.6%)	2712 (33.8%)
Stage IB	3 (0.2%)	417 (8.5%)	3 (2.3%)	252 (6.2%)	492 (6.1%)
Stage IIA	8 (0.6%)	523 (10.7%)	10 (7.8%)	356 (8.8%)	629 (7.8%)
Stage IIB	15 (1.1%)	522 (10.6%)		389 (9.6%)	609 (7.6%)
Stage IIIA	19 (1.3%)	1169 (23.8%)	14 (10.9%)	952 (23.4%)	1375 (17.1%)
Stage IIIB	9 (0.6%)	514 (10.5%)	14 (10.9%)	488 (12.0%)	642 (8.0%)
Stage IIIC	17 (1.2%)	325 (6.6%)	55 (43.0%)	667 (16.4%)	821 (10.2%)
Stage IV	15 (1.1%)	157 (3.2%)	25 (19.5%)	549 (13.5%)	669 (8.3%)
Unknown	18 (1.3%)	15 (0.3%)		21 (0.5%)	70 (0.9%)
Total	1421	4910	128	4062	8019



## II. Results of endoscopically treated patients in 2013

Tables 9, 10, 11, and Figs. 1, 2, 3.

**Table 9** Details of endoscopic treatment for curative intent

Treatment details	Cases (%)
EMR	108 (8.0%)
EMR + YAG laser	1 (0.1%)
EMR + MCT/RFA	
ESD	1224 (90.2%)
ESD + EMR	4 (0.3%)
ESD + PDT	
ESD + YAG laser	5 (0.4%)
PDT	2 (0.1%)
YAG laser	13 (1.0%)
Total	1357

EMR endoscopic mucosal resection, PDT photodynamic therapy, YAG yttrium aluminum garnet, MCT microwave coagulation therapy, ESD endoscopic submucosal dissection

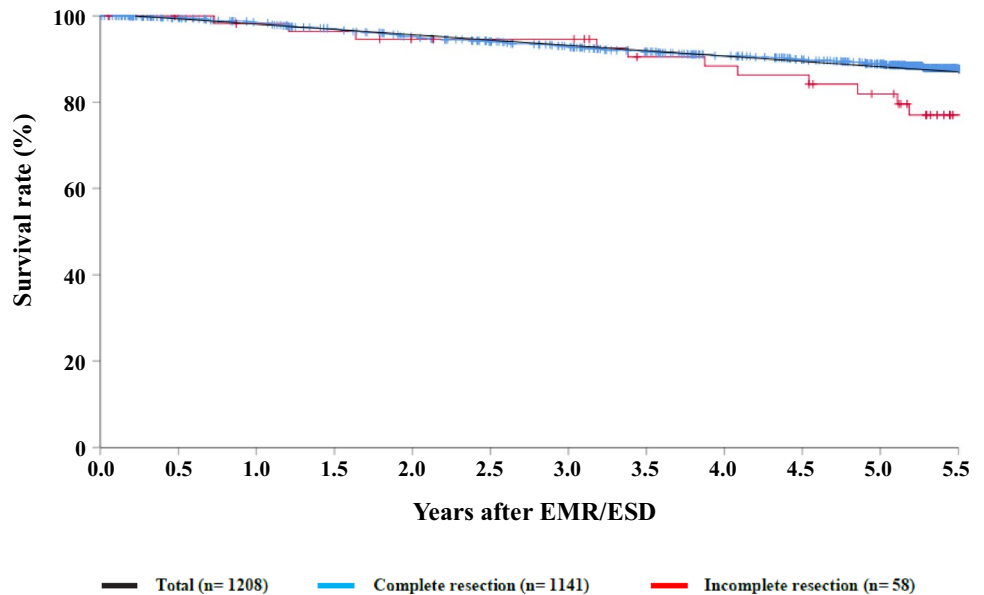
**Table 10** Complications of EMR/ESD

Complications of EMR/ESD	Cases (%)
None	1298 (92.7%)
Perforation	10 (0.7%)
Bleeding	1 (0.1%)
Mediastinitis	1 (0.1%)
Stenosis	23 (1.7%)
Others	
Unknown	2 (0.1%)
Total	1335

**Table 11** Pathologic depth of tumor invasion of MER/ESD specimens

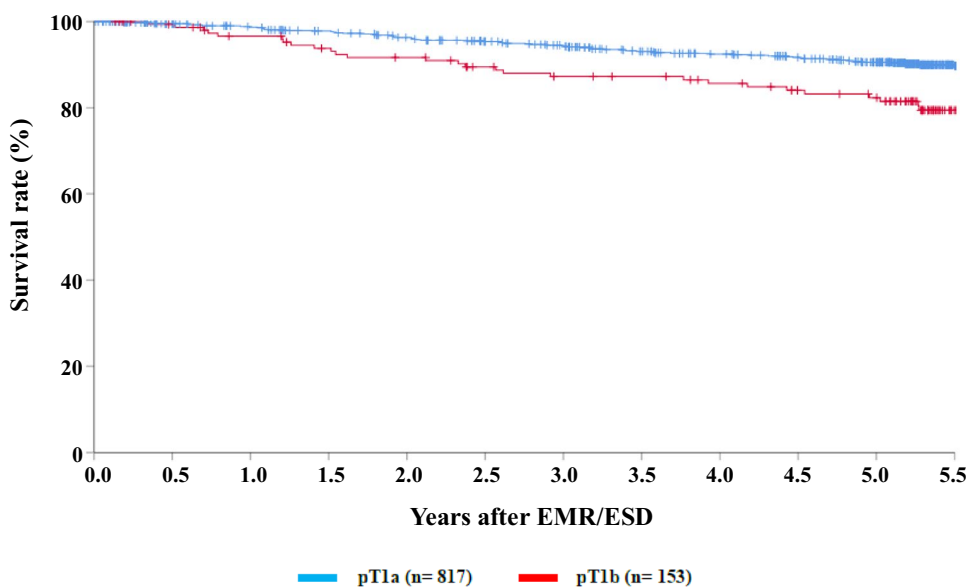
Pathological depth of tumor invasion (pT)	Cases (%)
pTX	22 (1.6%)
pT0	7 (0.5%)
pT1a	1111 (82.8%)
pT1b	201 (15.0%)
pT2	
pT3	1 (0.1%)
Total	1342

**Fig. 1** Survival of patients treated with EMR/ESD



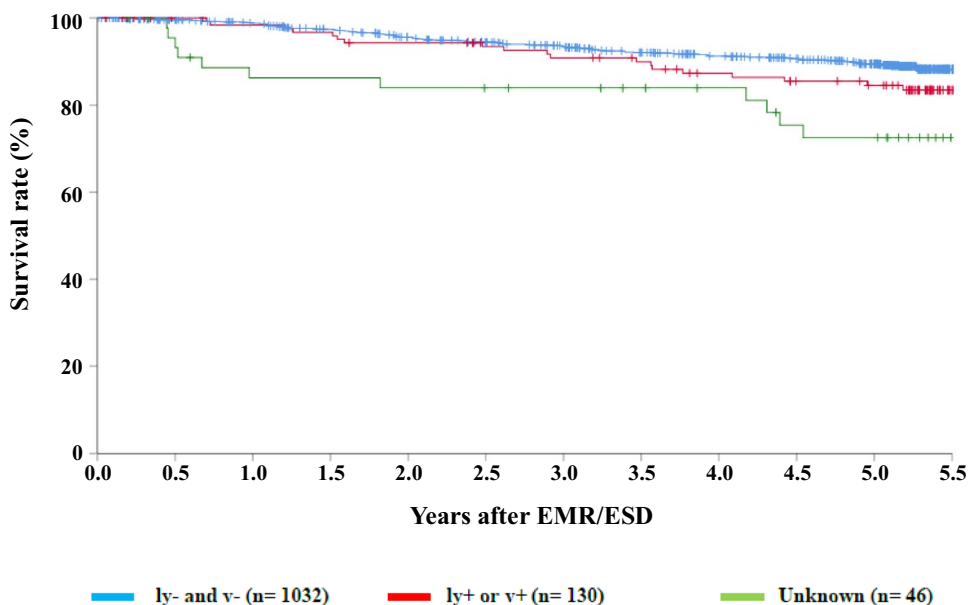
	Years after EMR/ESD				
	1	2	3	4	5
Total	98.4%	95.2%	92.9%	90.6%	88.5%
Complete resection	98.5%	95.2%	92.8%	90.7%	88.8%
Incomplete resection	98.2%	94.5%	94.5%	88.5%	81.9%

**Fig. 2** Survival of patients treated with EMR/ESD according to the pathological depth of tumor invasion, pT(JES 10th)



	Years after EMR/ESD				
	1	2	3	4	5
pT1a	98.7%	96.3%	94.2%	92.5%	90.6%
pT1b	96.6%	91.7%	87.3%	85.7%	82.4%

**Fig. 3** Survival of patients treated with EMR/ESD according to the lymphatic and venous invasion



	Years after EMR/ESD				
	1	2	3	4	5
ly- and v-	98.8%	95.6%	93.4%	91.2%	89.5%
ly+ or v+	98.4%	94.3%	90.9%	87.4%	84.5%
Unknown	86.5%	84.2%	84.2%	84.2%	72.8%

### III. Results in patients treated with chemotherapy and/or radiotherapy in 2013

Tables 12, 13 and Figs. 4, 5, 6.

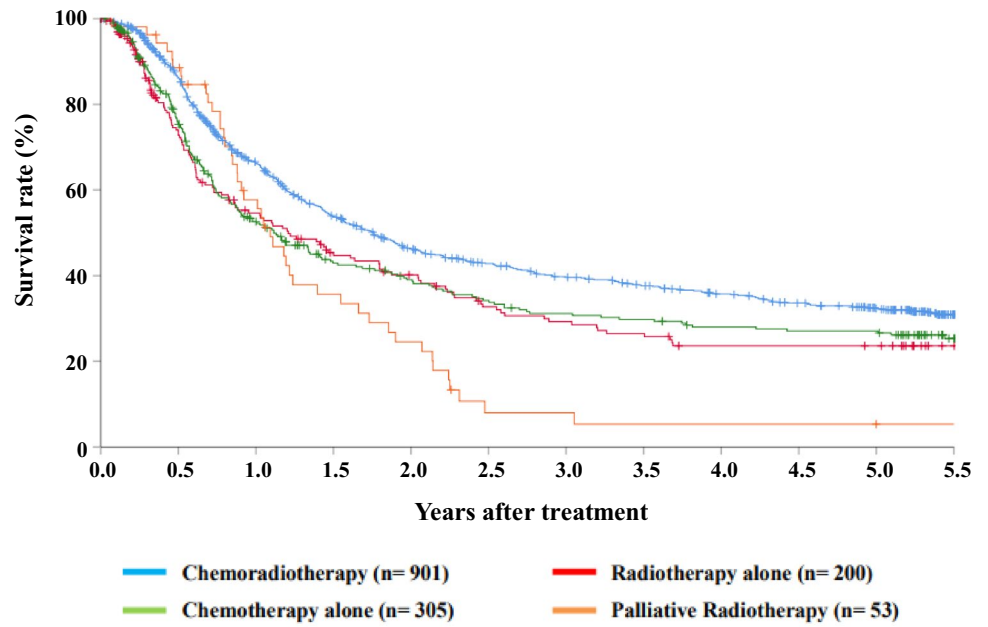
**Table 12** Dose of irradiation (non-surgically treated cases)

Dose of irradiation (Gy)	Definitive		Palliative (%)	Recurrence (%)	Others (%)	Total (%)
	Radiation alone (%)	With chemotherapy (%)				
–29	2 (1.5%)	20 (2.4%)	23 (11.7%)	2 (5.9%)	1 (10.0%)	48 (4.0%)
30–39	4 (3.0%)	16 (1.9%)	33 (16.8%)	1 (2.9%)	2 (20.0%)	56 (4.7%)
40–49	7 (5.3%)	33 (4.0%)	40 (20.4%)	1 (2.9%)	3 (30.0%)	84 (7.0%)
50–59	15 (11.4%)	233 (28.2%)	35 (17.9%)	10 (29.4%)	2 (20.0%)	295 (24.6%)
60–69	98 (74.2%)	505 (61.1%)	63 (32.1%)	19 (55.9%)	2 (20.0%)	687 (57.3%)
70–	6 (4.5%)	18 (2.2%)	1 (0.5%)	1 (2.9%)		26 (2.2%)
Unknown		2 (0.2%)	1 (0.5%)			3 (0.3%)
Total	132	827	196	34	10	1199
Median (min–max)	60.0 (5.4–80.0)	60.0 (2.0–99.0)	50.0 (2.0–70.0)	60.0 (11.0–70.0)	43.2 (26.0–66.0)	60.0 (2.0–99.0)

**Table 13** Dose of irradiation (surgically treated cases)

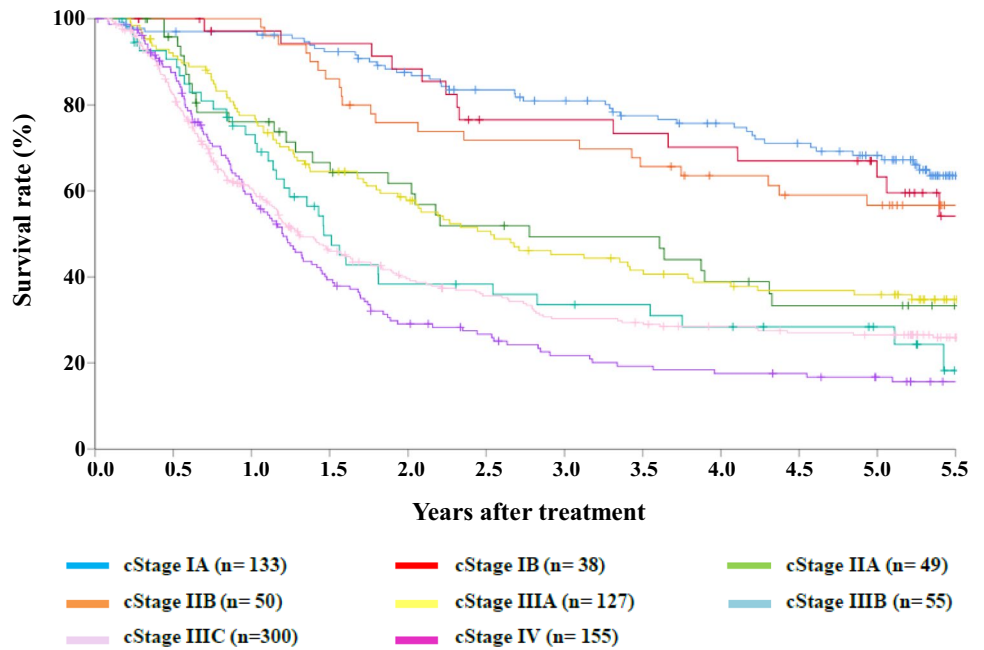
Dose of irradiation (Gy)	Preoperative irradiation (%)	Postoperative irradiation (%)
–29	4 (1.4%)	6 (10.0%)
30–39	62 (22.2%)	3 (5.0%)
40–49	177 (63.4%)	5 (8.3%)
50–59	19 (6.8%)	19 (31.7%)
60–69	10 (3.6%)	24 (40.0%)
70–	4 (1.4%)	2 (3.3%)
Unknown	3 (1.1%)	1 (1.7%)
Total	279	60
Median (min–max)	40.0 (2.0–99.0)	55.0 (16.0–75.9)

**Fig. 4** Survival of patients treated with chemotherapy and/or radiotherapy



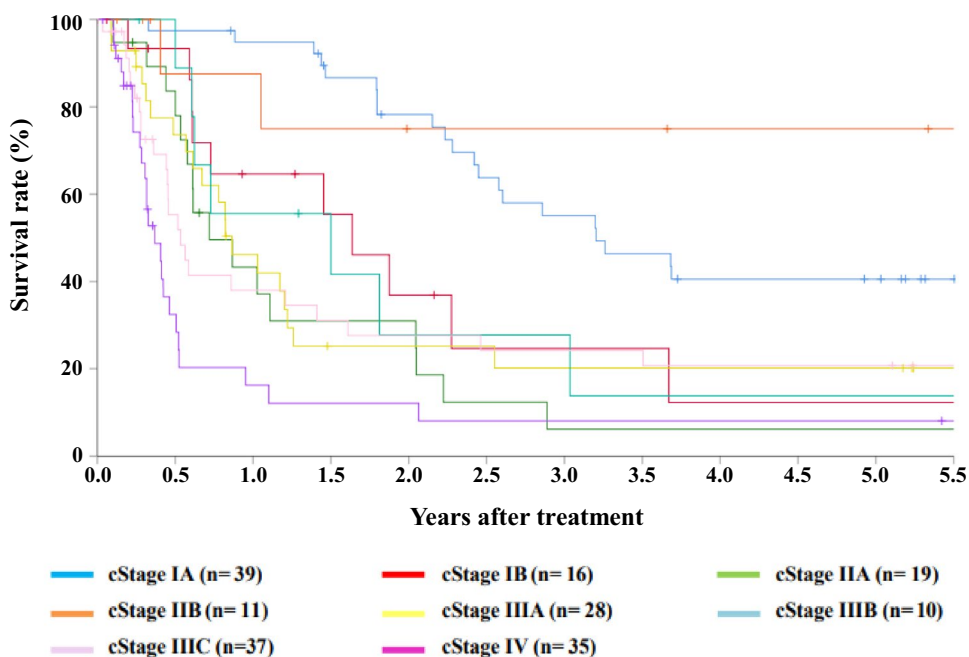
	Years after treatment				
	1	2	3	4	5
Chemoradiotherapy	66.5%	46.5%	39.9%	35.9%	32.4%
Radiotherapy alone	56.8%	41.7%	30.4%	24.4%	24.4%
Chemotherapy alone	53.7%	39.9%	31.8%	28.6%	27.6%
Palliative radiotherapy	58.4%	25.4%	8.5%	5.6%	5.6%

**Fig. 5** Survival of patients treated with definitive chemoradiotherapy according to clinical stage (UICC TNM 7th)



	Years after treatment				
	1	2	3	4	5
cStage IA	97.0%	87.5%	80.9%	75.6%	67.9%
cStage IB	97.2%	88.4%	76.2%	69.8%	63.0%
cStage IIA	76.6%	62.5%	49.7%	39.2%	33.8%
cStage IIB	100.0%	75.8%	71.7%	63.1%	56.2%
cStage IIIA	77.7%	57.7%	45.4%	38.9%	36.0%
cStage IIIB	73.3%	39.3%	34.6%	29.4%	29.4%
cStage IIIC	60.7%	39.7%	30.5%	28.6%	26.6%
cStage IV	59.3%	29.7%	22.5%	18.1%	17.2%

**Fig. 6** Survival of patients underwent radiotherapy alone according to clinical stage (UICC TNM 7th)



	Years after treatment				
	1	2	3	4	5
cStage IA	94.8%	78.3%	55.1%	40.2%	40.2%
cStage IB	65.5%	39.3%	28.1%	14.0%	14.0%
cStage IIA	44.4%	31.7%	6.3%	6.3%	6.3%
cStage IIB	89.5%	75.7%	75.7%	75.7%	75.7%
cStage IIIA	47.2%	24.7%	19.8%	19.8%	19.8%
cStage IIIB	57.9%	32.2%	32.2%	16.1%	16.1%
cStage IIIC	43.3%	31.5%	27.5%	23.6%	23.6%
cStage IV	25.8%	19.4%	12.9%	12.9%	12.9%

**IV. Results in patients who underwent esophagectomy in 2013**

Tables 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, and Figs. 7, 8, 9, 10, 11, 12, 13, 14, 15

**Table 14** Treatment modalities of esophagectomy

Treatment modalities	Cases (%)
Esophagectomy alone	2336 (47.6%)
Esophagectomy + postoperative chemotherapy	385 (7.8%)
Esophagectomy + postoperative chemoradiotherapy	109 (2.2%)
Esophagectomy + postoperative radiotherapy	34 (0.7%)
Preoperative chemotherapy + esophagectomy	1558 (31.7%)
Preoperative chemoradiotherapy + esophagectomy	286 (5.8%)
Definitive radiotherapy + esophagectomy	6 (0.1%)
Definitive chemoradiotherapy + esophagectomy	101 (2.1%)
Others	95 (1.9%)
Total	4910

**Table 15** Tumor location

Locations	Cases (%)
Cervical	166 (3.4%)
Upper thoracic	536 (10.9%)
Middle thoracic	2165 (44.1%)
Lower thoracic	1507 (30.7%)
EG	368 (7.5%)
E=G	85 (1.7%)
GE	72 (1.5%)
Unknown	11 (0.2%)
Total	4910

**Table 16** Approaches to tumor resection

Approaches	Cases (%)
Cervical	135 (2.7%)
Right thoracic	4171 (84.9%)
Left thoracic	63 (1.3%)
Left thoracoabdominal	115 (2.3%)
Abdominal	171 (3.5%)
Transhiatal lower esophagectomy	94 (1.9%)
Transhiatal thoracic esophagectomy	100 (2.0%)
Sternotomy	2 (0.0%)
Others	46 (0.9%)
Unknown	13 (0.3%)
Total	4910

Thoracic includes thoracotomy and thoracoscopic

Abdominal includes laparotomy and laparoscopic

**Table 17** Video-assisted surgery

Video-assisted surgery	Cases (%)
None	2444 (49.8%)
Thoracoscopy	1072 (21.8%)
Thoracoscopy + laparoscopy	1037 (21.1%)
Thoracoscopy + laparoscopy + mediastinoscopy	5 (0.1%)
Thoracoscopy + laparoscopy + other	
Thoracoscopy + mediastinoscopy	
Thoracoscopy + other	1 (0.0%)
Laparoscopy	237 (4.8%)
Laparoscopy + mediastinoscopy	11 (0.2%)
Laparoscopy + mediastinoscopy + other	11 (0.3%)
Mediastinoscopy	57 (1.2%)
Laparoscopy + other	2 (0.0%)
Others	30 (0.6%)
Unknown	3 (0.1%)
Total	4910

**Table 18** Fields of lymph node dissection according to the location of tumor

Field of lymphadenectomy	Cervical	Upper thoracic	Middle thoracic	Lower thoracic	Abdominal	E = G	GE	Unknown	Total
None	5 (3.0%)	15 (2.8%)	24 (1.1%)	31 (2.1%)	6 (1.6%)	2 (2.4%)	2 (2.8%)	3 (27.3%)	88 (1.8%)
C	36 (21.7%)	8 (1.5%)	16 (0.7%)	10 (0.7%)					70 (1.4%)
C + UM	21 (12.7%)	1 (0.2%)	1 (0.0%)	4 (0.3%)				1 (9.1%)	28 (0.6%)
C + UM + MLM	10 (6.0%)	14 (2.6%)	47 (2.2%)	15 (1.0%)	1 (0.3%)				87 (1.8%)
C + UM + MLM + A	69 (41.6%)	336 (62.7%)	1098 (50.7%)	532 (35.3%)	62 (16.8%)	10 (11.8%)	1 (1.4%)	5 (45.5%)	2113 (43.0%)
C + UM + A	5 (3.0%)	4 (0.7%)	17 (0.8%)	7 (0.5%)	1 (0.3%)		1		35 (0.7%)
C + MLM				1 (0.1%)					1 (0.0%)
C + MLM + A	3 (1.8%)	6 (1.1%)	14 (0.6%)	9 (0.6%)	1 (0.3%)				33 (0.7%)
C + A	3 (1.8%)	3 (0.6%)	4 (0.2%)	6 (0.4%)			1 (1.4%)		17 (0.3%)
UM	1 (0.6%)	2 (0.4%)	9 (0.4%)	1 (0.1%)	1 (0.3%)				14 (0.3%)
UM + MLM	3 (1.8%)	8 (1.5%)	41 (1.9%)	24 (1.6%)	5 (1.4%)	1 (1.2%)			82 (1.7%)
UM + MLM + A	3 (1.8%)	124 (23.1%)	792 (36.6%)	668 (44.3%)	116 (31.5%)	16 (18.8%)	10 (13.9%)		1729 (35.2%)
UM + A		2 (0.4%)	12 (0.6%)	9 (0.6%)	2 (0.5%)				25 (0.5%)
MLM		3 (0.6%)	8 (0.4%)	8 (0.5%)	4 (1.1%)	1 (1.2%)	2 (2.8%)		26 (0.5%)
MLM + A	3 (1.8%)	4 (0.7%)	62 (2.9%)	154 (10.2%)	141 (38.3%)	43 (50.6%)	39 (54.2%)		446 (9.1%)
A	4 (2.4%)	6 (1.1%)	20 (0.9%)	28 (1.9%)	28 (7.6%)	12 (14.1%)	16 (22.0%)	2 (18.2%)	116 (2.4%)
Total	166	536	2165	1507	368	85	72	11	4910

C bilateral cervical nodes, UM upper mediastinal nodes, MLM middle-lower mediastinal nodes, A abdominal nodes

**Table 19** Reconstruction route

Route	Cases (%)
None	62 (1.3%)
Subcutaneous	353 (7.2%)
Retrosternal	1971 (40.1%)
Posterior mediastinal	1972 (40.2%)
Intrathoracic	462 (9.4%)
Cervical	49 (1.0%)
Others	26 (0.5%)
Unknown	15 (0.3%)
Total	4910

**Table 20** Organs used for reconstruction

Organs	Cases (%)
None	88 (1.3%)
Whole stomach	215 (4.3%)
Gastric tube	4114 (83.1%)
Jejunum	249 (5.0%)
Free jejunum	85 (1.7%)
Colon	162 (3.3%)
Free colon	8 (0.2%)
Others	32 (0.6%)
Total organs	4953
Total cases	4822

**Table 21** Histological classification

Histological classification	Cases (%)
Squamous cell carcinoma	4086 (83.2%)
Squamous cell carcinoma	756 (15.4%)
Well differentiated	750 (15.3%)
Moderately differentiated	1989 (40.5%)
Poorly differentiated	591 (12.0%)
Adenocarcinoma	306 (6.2%)
Barrett’s carcinoma	118 (2.4%)
Adenosquamous carcinoma	22 (0.4%)
Mucoepidermoid carcinoma	1 (0.0%)
Basaloid carcinoma	86 (1.8%)
Neuroendocrine tumor	1 (0.0%)
Neuroendocrine carcinoma	32 (0.7%)
Undifferentiated carcinoma	8 (0.2%)
Malignant melanoma	16 (0.3%)
Carcinosarcoma	43 (0.9%)
GIST	2 (0.0%)
Adenoid cystic carcinoma	3 (0.1%)
Sarcoma	2 (0.0%)
Other carcinomas	3 (0.1%)
Other tumors	41 (0.8%)
Unknown	140 (2.9%)
Total	4910

**Table 22** Pathological depth of tumor invasion, pT (JES 10th)

Pathological depth of tumor invasion	Cases (%)
pTx	72 (1.5%)
pT0	161 (3.3%)
pT1a	589 (12.0%)
pT1b	1339 (27.3%)
pT2	607 (12.4%)
pT3	1898 (38.7%)
pT4a	138 (0.8%)
pT4b	106 (2.2%)
Total	4910

**Table 23** Pathological grading of lymph node metastasis, pN (JES 10th)

Lymph node metastasis	Cases (%)
pN0	2335 (47.6%)
pN1	936 (19.1%)
pN2	1000 (20.4%)
pN3	354 (7.2%)
pN4	254 (5.2%)
Unknown	31 (0.6%)
Total	4910

**Table 24** Pathological grading of lymph node metastasis, pN (UICC TNM 7th)

Lymph node metastasis	Cases (%)
pN0	2361 (48.1%)
pN1 (1–2)	1374 (28.0%)
pN2 (3–6)	757 (15.4%)
pN3 (7–)	366 (7.5%)
Unknown	52 (1.1%)
Total	4910

**Table 25** Pathological findings of distant organ metastasis, pM (JES 10th)

Distant metastasis (M)	Cases (%)
MX	125 (2.5%)
M0	4715 (96.0%)
M1	70 (1.4%)
Total	4910

**Table 26** Residual tumor

Residual tumor (R)	Cases (%)
RX	126 (2.6%)
R0	4359 (88.8%)
R1	239 (4.9%)
R2	186 (3.8%)
Total	4910

**Table 27** Cause of death

Cause of death	Cases (%)
Death due to recurrence	1584 (63.8%)
Death due to other cancer	193 (7.8%)
Death due to other disease (with recurrence)	50 (2.0%)
Death due to other disease (without recurrence)	330 (13.3%)
Death due to other disease (recurrence unknown)	15 (0.6%)
Operative death <sup>a</sup>	38 (1.5%)
Postoperative hospital death <sup>b</sup>	59 (2.4%)
Unknown	213 (8.6%)
Total of death cases	2482

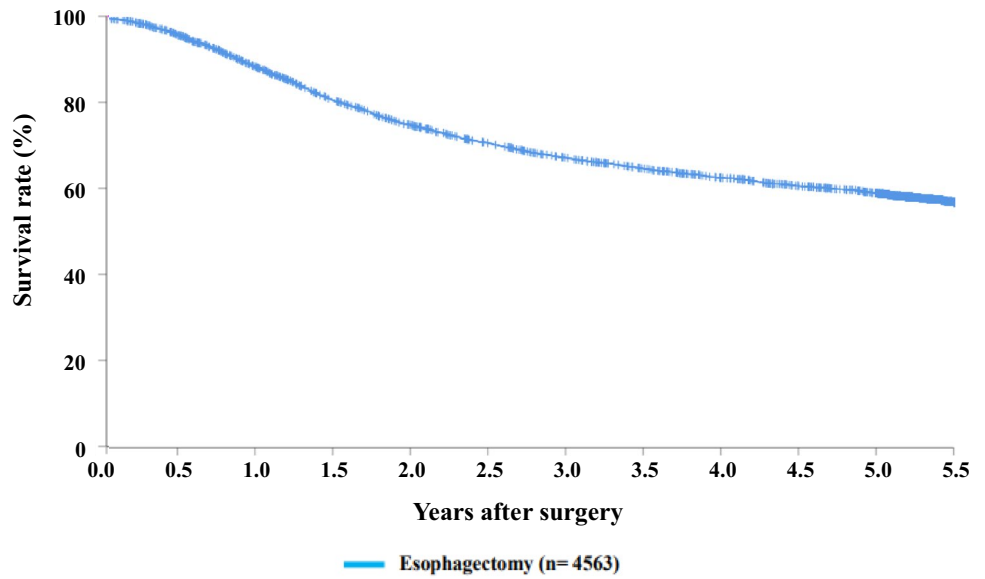
<sup>a</sup>Operative death means death within 30 days after operation in or out of hospital. Operative mortality rate: 0.77%

<sup>b</sup>Hospital death is defined as death during the same hospitalization, regardless of department at time of death. Hospital mortality rate: 1.98%

Follow-up period (months)	
Median (min - max)	59.76 (0.33 - 83.25)

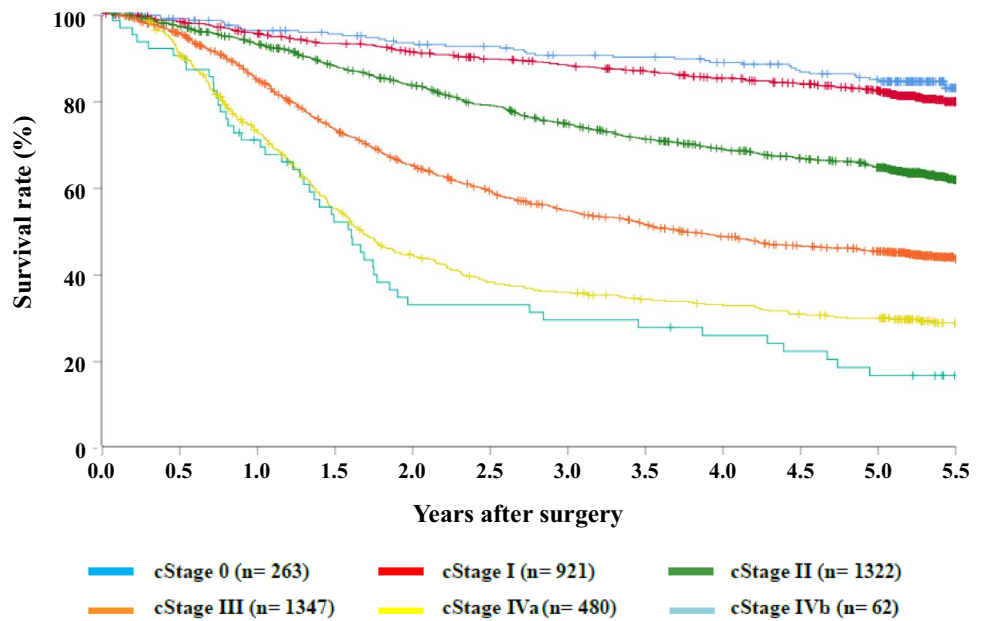


**Fig. 7** Survival of patients who underwent esophagectomy



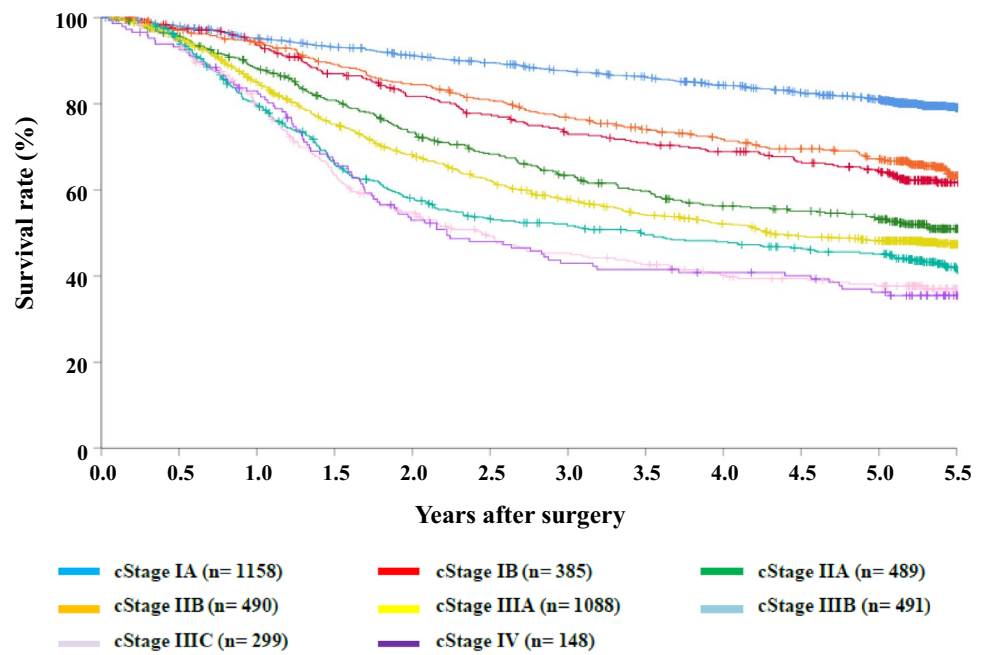
	Years after surgery				
	1	2	3	4	5
Esophagectomy	88.7%	75.2%	67.6%	62.9%	59.3%

**Fig. 8** Survival of patients who underwent esophagectomy according to clinical stage (JES 10th)



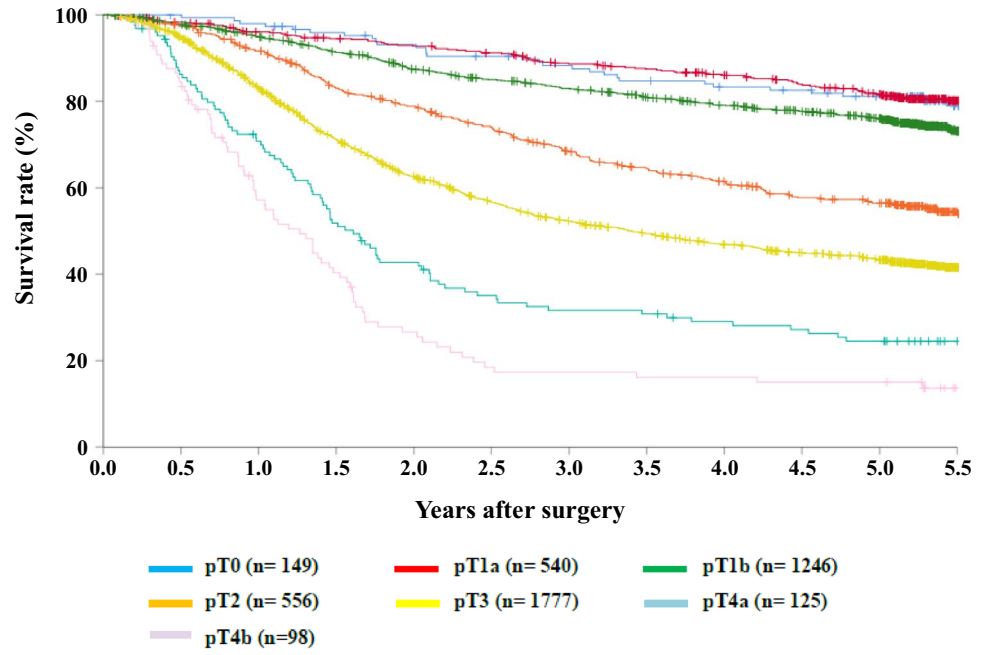
	Years after surgery				
	1	2	3	4	5
cStage 0	96.1%	93.3%	90.5%	88.8%	84.9%
cStage I	95.5%	91.1%	88.2%	85.1%	82.4%
cStage II	93.0%	83.6%	74.7%	68.9%	64.6%
cStage III	84.8%	65.3%	54.7%	48.8%	45.3%
cStage IVa	73.0%	44.5%	35.9%	33.0%	29.8%
cStage IVb	70.5%	33.1%	29.6%	26.0%	16.7%

**Fig. 9** Survival of patients who underwent esophagectomy according to clinical stage (UICC TNM 7th)



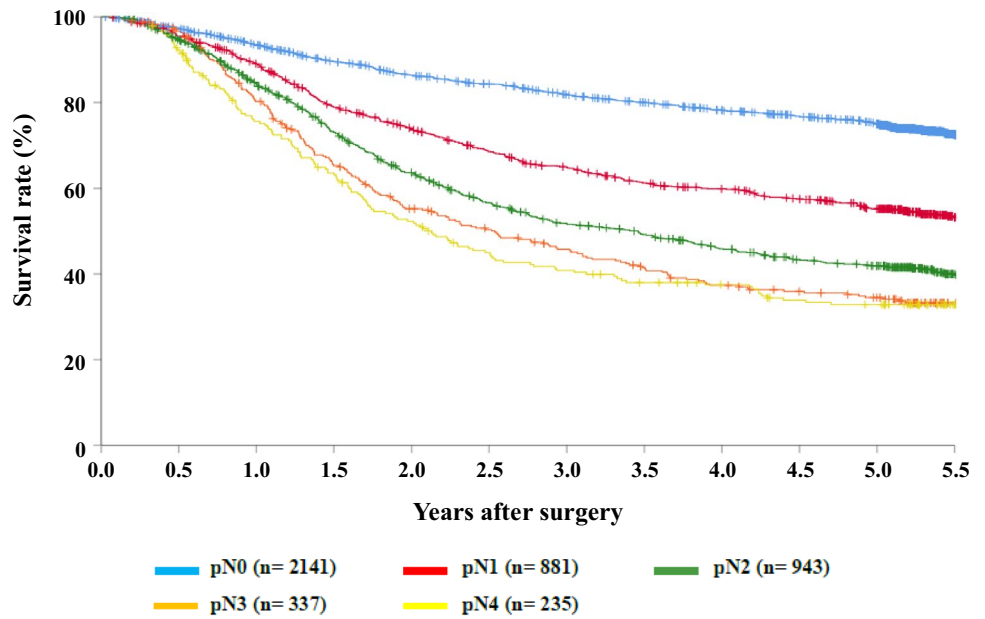
	Years after surgery				
	1	2	3	4	5
cStage IA	95.2%	91.2%	87.6%	84.3%	81.0%
cStage IB	93.6%	81.8%	73.3%	69.0%	64.5%
cStage IIA	88.4%	73.6%	63.5%	56.4%	53.2%
cStage IIB	94.2%	84.5%	77.0%	71.9%	67.3%
cStage IIIA	85.0%	68.3%	57.8%	52.2%	48.1%
cStage IIIB	79.9%	58.3%	51.8%	48.1%	45.2%
cStage IIIC	79.1%	54.8%	45.5%	40.3%	37.8%
cStage IV	82.9%	53.0%	43.0%	40.8%	36.3%

**Fig. 10** Survival of patients who underwent esophagectomy according to the depth of tumor invasion, pT (JES 10th)



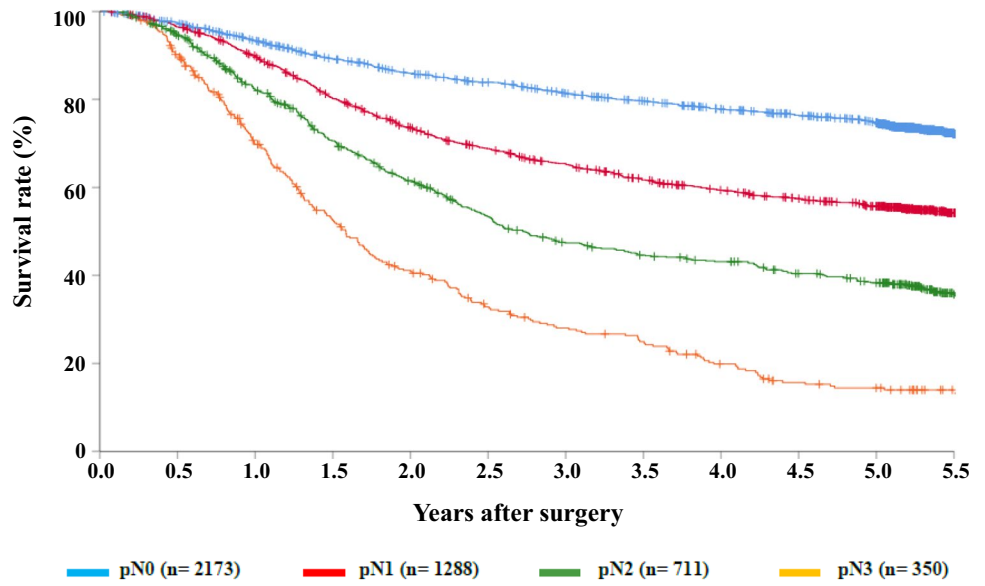
	Years after surgery				
	1	2	3	4	5
pT0	98.0%	93.2%	88.3%	83.3%	81.1%
pT1a	96.0%	92.8%	88.6%	86.0%	81.6%
pT1b	95.0%	87.4%	83.0%	79.1%	76.0%
pT2	91.6%	78.9%	68.4%	61.5%	56.4%
pT3	83.1%	62.8%	52.4%	47.0%	43.4%
pT4a	70.9%	42.7%	31.7%	29.0%	24.5%
pT4b	57.7%	26.8%	17.5%	16.3%	15.2%

**Fig. 11** Survival of patients who underwent esophagectomy according to lymph node metastasis (JES 10th)



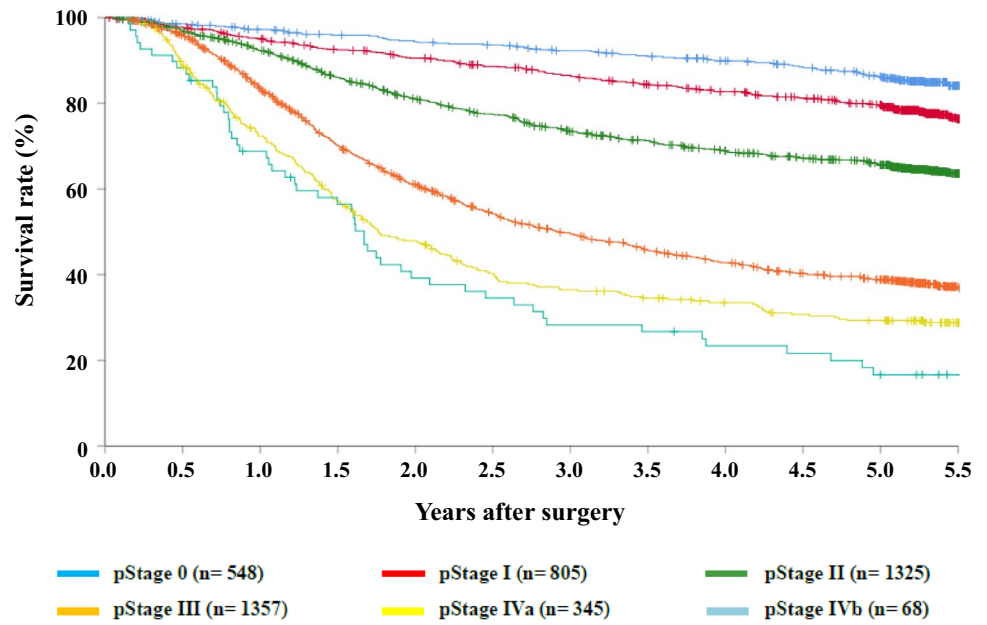
	Years after surgery				
	1	2	3	4	5
pN0	93.5%	86.4%	81.8%	78.2%	75.0%
pN1	88.9%	73.9%	64.9%	59.8%	55.1%
pN2	84.3%	63.8%	51.8%	46.0%	42.0%
pN3	80.4%	55.4%	46.0%	37.5%	34.6%
pN4	75.7%	52.4%	41.0%	37.6%	32.8%

**Fig. 12** Survival of patients who underwent esophagectomy according to lymph node metastasis (UICC TNM 7th)



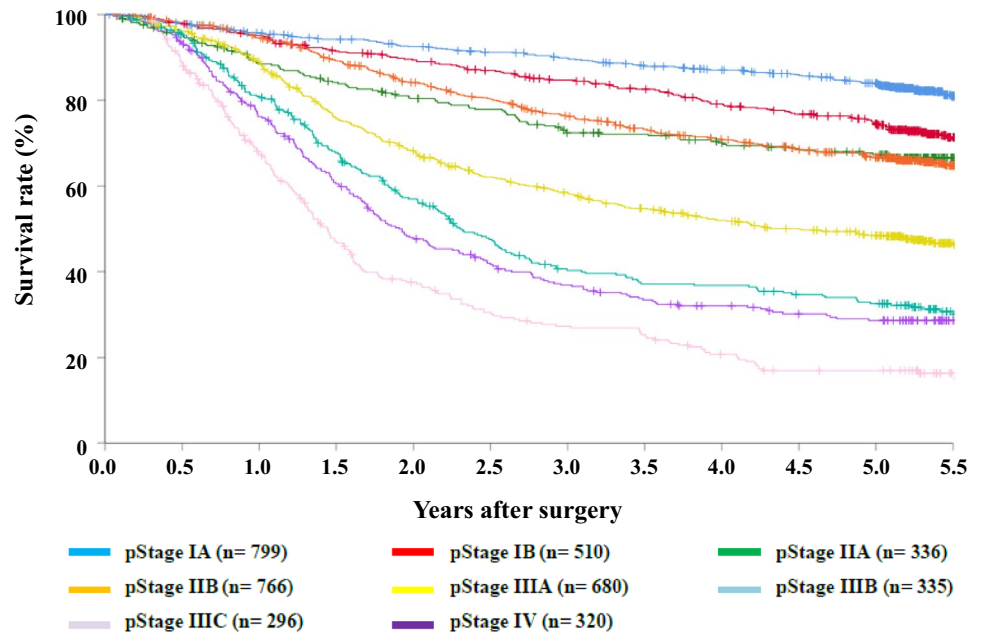
	Years after surgery				
	1	2	3	4	5
pN0	93.4%	86.0%	81.4%	77.9%	74.7%
pN1	89.9%	73.6%	65.4%	59.4%	55.7%
pN2	82.3%	61.7%	47.6%	43.3%	38.5%
pN3	70.0%	41.3%	28.3%	20.0%	14.4%

**Fig. 13** Survival of patients who underwent esophagectomy according to pathological stage (JES 10th)



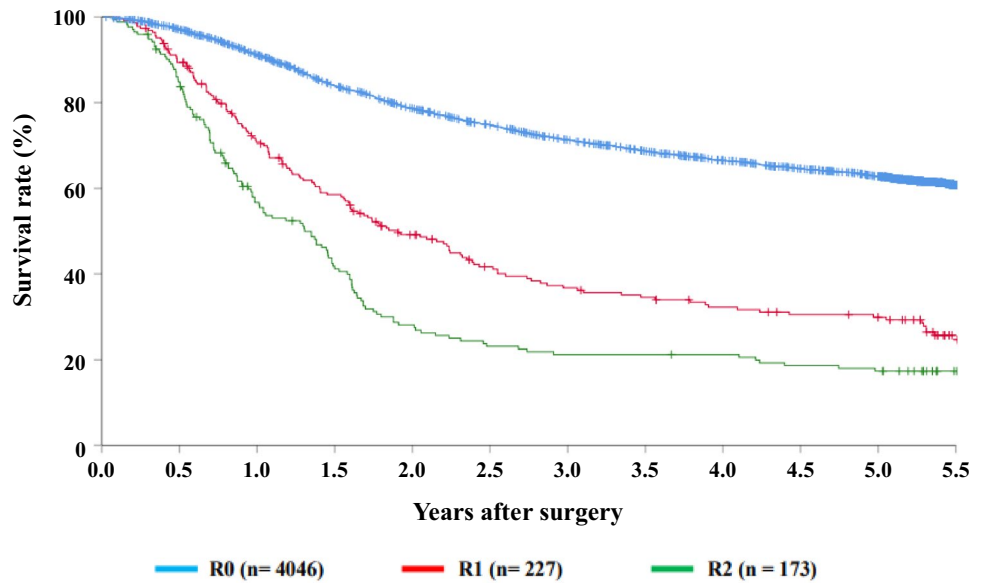
	Years after surgery				
	1	2	3	4	5
pStage 0	97.2%	94.4%	92.2%	89.9%	86.2%
pStage I	95.1%	90.5%	86.5%	82.7%	79.5%
pStage II	92.3%	81.0%	73.4%	68.9%	65.6%
pStage III	83.4%	61.3%	49.8%	42.9%	38.9%
pStage IVa	72.5%	47.9%	36.6%	33.6%	29.3%
pStage IVb	68.7%	39.3%	28.3%	23.5%	16.5%

**Fig. 14** Survival of patients who underwent esophagectomy according to pathological stage (UICC TNM 7th)



	Years after surgery				
	1	2	3	4	5
pStage IA	95.8%	92.5%	89.9%	87.1%	84.0%
pStage IB	95.1%	89.4%	84.7%	79.2%	74.5%
pStage IIA	88.5%	80.4%	72.4%	70.1%	67.4%
pStage IIB	94.6%	84.2%	76.3%	70.9%	66.7%
pStage IIIA	88.9%	68.3%	58.6%	52.0%	48.5%
pStage IIIB	81.1%	57.3%	40.6%	37.0%	32.7%
pStage IIIC	67.6%	37.6%	27.3%	20.8%	16.8%
pStage IV	76.2%	48.2%	37.0%	32.1%	28.7%

**Fig. 15** Survival of patients who underwent esophagectomy according to residual tumor (R)



	Years after surgery				
	1	2	3	4	5
R0	91.2%	78.7%	71.4%	66.6%	62.8%
R1	71.0%	49.1%	36.9%	32.4%	30.0%
R2	56.8%	28.2%	21.3%	21.3%	17.5%

**Compliance with ethical standards**

**Conflict of interest** All authors have nothing to disclose with regard to commercial support.

**Ethical statement** All procedures followed in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later versions.

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**Reference**

1. Japan Esophageal Society. Japanese classification of esophageal cancer, 10th edition: part 1. Esophagus. 2009;6:1–25.
2. Sobin LH, Gospodarowicz MK, Wittekind C, UICC International Union Against Cancer. TNM classification of malignant tumors. 7th ed. New York: Wiley-Blackwell; 2009.

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