Table 5) Reason and basis for diagnosis according to clinical T-category

Reason for diagnosis	Superficial cancer (cTis cT1)	Advanced cancer (cT2 cT3 cT4)	Total (%)
Chief complaint	164 (31.4%)	998 (82.5%)	1162 (69.7%)
Detection survey / dock	215 (41.2%)	88 (7.8%)	303 (18.2%)
Examination for other disease	137 (26.2%)	51 (4.5%)	188 (11.3%)
Unknown	6 (1.1%)	9 (5.2%)	15 (0.9%)
Total	522 (100%)	1146 (100%)	1668* (100%)

Detection methods	Superficial cancer (cTis cT1)	Advanced cancer (cT2 cT3 cT4)	Total (%)
Esophagography	44 (8.4%)	243 (21.2%)	287 (17.2%)
Esophagoscopy	470 (90.0%)	848 (74.0%)	1318 (79.0%)
CT-scan	0	15 (1.3%)	15 (0.9%)
US	0	1 (0.1%)	1 (0.06%)
Biopsy	0	5 (0.4%)	5 (0.3%)
Others	1 (0.2%)	2 (0.2%)	3 (0.2%)
Unknown	7 (1.3%)	32 (2.8%)	39 (2.3%)
Total	522 (100%)	1146 (100%)	1668* (100%)

*: excluding 113 cTX, cT0, cT unknown cases

Table 6) Symptoms according to clinical T-category

Symptom	cTis cT1 Cases (%)	cT2 cT3 cT4 Cases (%)	Total (%)
None	317 (60.7%)	96 (8.4%)	413 (24.8%)
Chest pain	28 (5.4%)	37 (3.2%)	65 (3.9%)
Sense of stricture	45 (8.6%)	495 (43.2%)	540 (32.4%)
Unusual sensation	34 (6.5%)	49 (4.3%)	83 (5.0%)
Dysphagia	15 (2.9%)	329 (28.7%)	344 (20.6%)
Nausea / Vomiting	5 (1.0%)	27 (2.4%)	32 (2.0%)
Appetite loss	10 (1.9%)	14 (1.2%)	24 (1.4%)
Weight loss	7 (1.3%)	12 (1.0%)	19 (1.1%)
Swollen lymph node(s)	7 (1.3%)	7 (0.6%)	14 (0.8%)
Hoarseness	1 (0.2%)	21 (1.8%)	22 (1.3%)
Others	32 (6.1%)	38 (3.3%)	70 (4.2%)
Unknown	21 (4.0%)	21 (1.8%)	42 (2.5%)
Total	522 (100%)	1146 (100%)	1668* (100%)

*: excluding 113 cTX, cT0, cT unknown cases

Table 7) Double / multiple primary cancers

	Endoscopic treatment (EMR/Stenting)	Chemotherapy and/or radiotherapy	Surgery: Palliative operation	Surgery: Esophagectomy	Total (%)
None	127 (61.1%)	325 (75.4%)	12 (92.3%)	861 (79.5%)	1325 (76.3%)
Double	24 (11.5%)	44 (10.2%)	0	116 (10.7%)	184 (10.6%)
Metachronous					
Before E-Ca	42 (20.2%)	49 (11.4%)	0	76 (7.0%)	167 (9.6%)
After E-Ca	2 (1.0%)	1 (0.2%)	0	17 (1.6%)	20 (1.2%)
Multiple	5 (2.4%)	4 (0.9%)	0	8 (0.7%)	17 (1.0%)
Unknown	8 (3.8%)	8 (1.9%)	1 (7.7%)	5 (0.4%)	22 (1.3%)
Total	208 (100 %)	431 (100 %)	13 (100 %)	1083 (100 %)	1735* (100 %)

*: excluding 46 treatment unkown cases

Table 8) Double / multiple primary cancers and organs

Organs	Synchronous	Metachronous	Multiple	Total
Larynx/Maxilla	4 (2.0%)	24 (11.8%)	2 (5.4%)	30 (6.9%)
Pharynx	37 (18.9%)	28 (13.8%)	6 (16.2%)	71 (16.3%)
Oral cavity/gum/tongue	2 (1.0%)	7 (3.4%)	1 (2.7%)	10 (2.3%)
Stomach	93 (47.4%)	70 (34.5%)	9 (24.3%)	172 (39.4%)
Colon/Rectum	25 (12.8%)	18 (8.9%)	4 (10.8%)	47 (10.8%)
Liver	5 (2.6%)	3 (1.5%)	0	8 (1.8%)
Choledochus/Gallbladder	0	1 (0.5%)	1 (2.7%)	2 (0.5%)
Pancreas	2 (1.0%)	2 (1.0%)	0	4 (0.9%)
Lung/trachea/bronchus	7 (3.6%)	14 (6.9%)	1 (2.7%)	22 (5.0%)
Remnant esophagus	1 (0.5%)	7 (3.4%)	1 (2.7%)	9 (2.1%)
Uterus/ovarium	0	2 (1.0%)	0	2 (0.5%)
Breast	0	3 (1.5%)	0	3 (0.7%)
Prostate	2 (1.0%)	1 (0.5%)	1 (2.7%)	4 (0.9%)
Urinary bladder	3 (1.5%)	4 (2.0%)	1 (2.7%)	8 (1.8%)
Leukemia	0	0	1 (2.7%)	1 (0.2%)
Skin	0	1 (0.5%)	1 (2.7%)	2 (0.5%)
Brain	0	1 (0.5%)	0	1 (0.2%)
Thyroid	4 (2.0%)	0	0	4 (0.9%)
Bone	0	1 (0.5%)	0	1 (0.2%)
Kidney	3 (1.5%)	5 (2.5%)	1 (2.7%)	9 (2.1%)
Others	8 (4.1%)	11 (5.4%)	5 (13.5%)	24 (5.5%)
Unknown	0	0	2 (5.4%)	2 (0.5%)
Lesions	196 (100%)	203 (100%)	37 (100%)	436 (100%)
Cases	184	187	17	388

Table 13) Location of tumor

Location	Endoscopic treatment	Chemotherapy and/or radiotherapy	Surgery		Total (%)
			Palliative operation	Esophagectomy	
Not detected	2 (1.0%)	0	0	0	2 (0.1%)
Pharynx	7 (3.4%)	5 (1.2%)	1 (7.7%)	6 (0.6%)	19 (1.1%)
Cervical esophagus	5 (2.4%)	30 (7.0%)	1 (7.7%)	46 (4.2%)	82 (4.7%)
Upper thoracic esoph.	19 (9.1%)	77 (17.9%)	3 (23.1%)	129 (11.9%)	228 (13.1%)
Middle thoracic esoph.	112 (53.8%)	220 (51.0%)	4 (30.8%)	523 (48.3%)	859 (49.5%)
Lower thoracic esoph.	50 (24.0%)	84 (19.5%)	2 (15.4%)	284 (26.2%)	420 (24.2%)
Abdominal esophagus	6 (2.9%)	11 (2.6%)	1 (7.7%)	73 (6.7%)	91 (5.2%)
EG-Junction (E=G)	1 (0.5%)	1 (0.2%)	0	14 (1.3%)	16 (0.9%)
Cardia (G)	0	0	0	3 (0.3%)	3 (0.2%)
Unknown	6 (2.9%)	3 (0.7%)	1 (7.7%)	5 (0.5%)	15 (0.9%)
Total	208 (100%)	431 (100%)	13 (100%)	1083 (100%)	1735 (100%)

Table 14) Longitudinal tumor length on esophagography

Length	Endoscopic treatment	Chemotherapy and/or radiotherapy	Surgery		Total (%)
			Palliative operation	Esophagectomy	
not examined	2 (1.0%)	9 (2.1%)	3 (23.1%)	10 (0.9%)	24 (1.4%)
~1cm	7 (3.4%)	1 (0.2%)	1 (7.7%)	10 (0.9%)	19 (1.1%)
~2cm	24 (11.5%)	9 (2.1%)	0	61 (5.6%)	94 (5.4%)
~3cm	24 (11.5%)	25 (5.8%)	0	92 (8.5%)	141 (8.1%)
~4cm	15 (7.2%)	26 (6.0%)	0	124 (11.4%)	165 (9.5%)
~5cm	4 (1.9%)	39 (9.1%)	1 (7.7%)	132 (12.2%)	176 (10.1%)
~6cm	3 (1.4%)	40 (9.3%)	2 (15.4%)	144 (13.3%)	189 (10.9%)
~7cm	2 (1.0%)	55 (12.8%)	0	125 (11.5%)	182 (10.5%)
~8cm	5 (2.4%)	49 (11.4%)	1 (7.7%)	98 (9.0%)	153 (8.8%)
~9cm	1 (0.5%)	32 (7.4%)	0	70 (6.5%)	103 (5.9%)
~10cm	3 (1.4%)	21 (4.9%)	0	37 (3.4%)	61 (3.5%)
~11cm	1 (0.5%)	26 (6.0%)	0	30 (2.8%)	57 (3.3%)
~12cm	0	12 (2.8%)	0	12 (1.1%)	24 (1.4%)
~13cm	0	6 (1.4%)	1 (7.7%)	10 (0.9%)	17 (1.0%)
~14cm	0	3 (0.7%)	0	1 (0.1%)	4 (0.2%)
~15cm	0	4 (0.9%)	1 (7.7%)	2 (0.2%)	7 (0.4%)
~16cm	0	3 (0.7%)	0	4 (0.4%)	7 (0.4%)
~17cm	0	0	0	1 (0.1%)	1 (0.1%)
17.1cm~	0	1 (0.2%)	0	6 (0.6%)	7 (0.4%)
Unknown	117 (56.2%)	70 (16.2%)	3 (23.1%)	114 (10.5%)	304 (17.5%)
Total	208 (100%)	431 (100%)	13 (100%)	1083 (100%)	1735 (100%)

Table 15) Endoscopic features

Type	Endoscopic treatment	Chemotherapy and/or radiotherapy	Surgery		Total (%)
			Palliative operation	Esophagectomy	
Not examined	0	4 (0.9%)	0	1 (0.1%)	5 (0.3%)
0-I	4 (1.9%)	15 (3.5%)	0	61 (5.6%)	80 (4.6%)
0-IIa	24 (11.5%)	15 (3.5%)	0	74 (6.8%)	113 (6.5%)
0-IIb	24 (11.5%)	3 (0.7%)	1 (7.7%)	24 (2.2%)	52 (3.0%)
0-IIc	124 (59.6%)	43 (10.0%)	0	129 (11.9%)	296 (17.1%)
0-III	0	5 (1.2%)	0	12 (1.1%)	17 (1.0%)
0-V	3 (1.4%)	3 (0.7%)	0	4 (0.4%)	10 (0.6%)
1	2 (1.0%)	20 (4.6%)	1 (7.7%)	70 (6.4%)	93 (5.4%)
2	8 (3.8%)	131 (30.4%)	3 (23.1%)	326 (30.1%)	468 (27.0%)
3	6 (2.9%)	140 (32.5%)	7 (53.8%)	301 (27.8%)	454 (26.2%)
4	3 (1.4%)	9 (2.1%)	0	17 (1.6%)	29 (1.7%)
5	0	7 (1.6%)	0	13 (1.2%)	20 (1.2%)
Unknown	10 (4.8%)	36 (8.4%)	1 (7.7%)	51 (4.7%)	98 (5.6%)
Total	208 (100%)	431 (100%)	13 (100%)	1083 (100%)	1735 (100%)

0- I : superficial and protruding type
0- IIa : superficial and slight elevated type
0- IIb : superficial and flat type
0- IIc : superficial and slightly depressed
0- III : superficial and distinctly depressed

1 : protruding type
2 : ulcerative and localized type
3 : ulcerative and infiltrating type
4 : diffusely infiltrating type
5 : miscellaneous type

Table 17) Depth of tumor invasion cT (clinical TNM-classification)

cT	Endoscopic treatment	Chemotherapy and/or radiotherapy	Surgery		Total (%)
			Palliative operation	Esophagectomy	
cTx	2 (1.0%)	3 (0.7%)	0	1 (0.1%)	6 (0.3%)
cT0	6 (2.9%)	3 (0.7%)	0	4 (0.4%)	13 (0.7%)
cTis	45 (21.6%)	1 (0.2%)	0	8 (0.7%)	54 (3.1%)
cT1	29 (13.9%)	24 (5.6%)	0	58 (5.4%)	111 (6.4%)
cT1a	71 (34.1%)	13 (3.0%)	0	40 (3.7%)	124 (7.1%)
cT1b	13 (6.3%)	34 (7.9%)	0	182 (16.8%)	229 (13.2%)
cT2	2 (1.0%)	41 (9.5%)	1 (7.7%)	171 (15.8%)	215 (12.4%)
cT3	4 (1.9%)	151 (35.0%)	3 (23.1%)	494 (45.6%)	652 (37.6%)
cT4	11 (5.3%)	139 (32.3%)	6 (46.2%)	107 (9.9%)	263 (15.2%)
Unknown	25 (12.0%)	22 (5.1%)	3 (23.1%)	18 (1.7%)	68 (3.9%)
Total	208 (100%)	431 (100%)	13 (100%)	1083 (100%)	1735 (100%)

Table 18) Lymph node metastasis, cN; and organ metastasis, cM (clinical TNM-classification)

cN	Endoscopic treatment	Chemotherapy and/or radiotherapy	Surgery		Total (%)
			Palliative operation	Esophagectomy	
cNx	5 (2.4%)	10 (2.3%)	0	11 (1.0%)	26 (1.5%)
cN0	164 (78.8%)	122 (28.3%)	2 (15.4%)	485 (44.8%)	773 (44.6%)
cN1	13 (6.3%)	272 (63.1%)	8 (61.5%)	567 (52.4%)	860 (49.6%)
Unknown	26 (12.5%)	27 (6.3%)	3 (23.1%)	20 (1.8%)	76 (4.4%)
Total	208 (100%)	431 (100%)	13 (100%)	1083 (100%)	1735 (100%)

cM	Endoscopic treatment	Chemotherapy and/or radiotherapy	Surgery		Total (%)
			Palliative operation	Esophagectomy	
cMx	4 (1.9%)	5 (1.2%)	0	3 (0.3%)	12 (0.7%)
cM0	172 (82.7%)	271 (62.9%)	7 (53.8%)	954 (88.1%)	1404 (80.9%)
cM1	1 (0.5%)	20 (4.6%)	1 (7.7%)	15 (1.4%)	37 (2.1%)
cM1a	2 (1.0%)	31 (7.2%)	2 (15.4%)	42 (3.9%)	77 (4.4%)
cM1b	4 (1.9%)	83 (19.3%)	0	49 (4.5%)	136 (7.8%)
Unknown	25 (12.0%)	21 (4.9%)	3 (23.1%)	20 (1.8%)	69 (4.0%)
Total	208 (100%)	431 (100%)	13 (100%)	1083 (100%)	1735 (100%)

Table 19) Metastatic organs in cM1 cases (clinical TNM classification)

Metastatic organs	Endoscopic treatment	Chemotherapy and/or radiotherapy	Surgery		Total (%)
			Palliative operation	Esophagectomy	
PUL	1 (3.0%)	22 (11.9%)	0	8 (6.1%)	31 (8.7%)
OSS	0	9 (4.9%)	0	3 (2.3%)	12 (3.4%)
HEP	2 (6.1%)	34 (18.4%)	0	7 (5.3%)	43 (12.1%)
BRA	0	2 (1.1%)	0	0	2 (0.6%)
LYM	3 (9.1%)	81 (43.8%)	2 (33.3%)	83 (62.9%)	169 (47.5%)
MAR	0	0	0	0	0
PLE	0	0	0	1 (0.8%)	1 (0.3%)
PER	0	0	0	0	0
SKI	0	1 (0.5%)	0	2 (1.5%)	3 (0.8%)
OTH	0	2 (1.1%)	0	0	2 (0.6%)
Unknown	27 (81.8%)	34 (18.4%)	4 (66.7%)	28 (21.2%)	93 (26.1%)
Lesions	33 (100%)	185 (100%)	6 (100%)	132 (100%)	356 (100%)
One organ	4 (12.5%)	97 (62.6%)	2 (33.3%)	92 (73.0%)	195 (61.1%)
Two organs	1 (3.1%)	18 (11.6%)	0	5 (4.0%)	24 (7.5%)
Three organs	0	6 (3.9%)	0	1 (0.8%)	7 (2.2%)
Four organs~	0	0	0	0	0
Unknown	27 (84.4%)	34 (21.9%)	4 (66.7%)	28 (22.2%)	93 (29.2%)
Total cases	32 (100%)	155 (100%)	6 (100%)	126 (100%)	319 (100%)

Table 20) Clinical stage (clinical TNM-classificacation)

cStage	Endoscopic treatment	Chemotherapy and/or radiotherapy	Surgery		Total (%)
			Palliative operation	Esophagectomy	
0	64 (30.8%)	2 (0.5%)	0	11 (1.0%)	77 (4.4%)
I	93 (44.7%)	50 (11.6%)	0	225 (20.8%)	368 (21.2%)
IIA	2 (1.0%)	38 (8.8%)	0	221 (20.4%)	261 (15.0%)
IIB	1 (0.5%)	17 (3.9%)	0	109 (10.1%)	127 (7.3%)
III	8 (3.8%)	151 (35.0%)	7 (53.8%)	378 (34.9%)	544 (31.4%)
IV	1 (0.5%)	18 (4.2%)	1 (7.7%)	14 (1.3%)	34 (2.0%)
IVA	2 (1.0%)	30 (7.0%)	2 (15.4%)	42 (3.9%)	76 (4.4%)
IVB	4 (1.9%)	83 (19.3%)	0	49 (4.5%)	136 (7.8%)
Unknown	33 (15.9%)	42 (9.7%)	3 (23.1%)	34 (3.1%)	112 (6.5%)
Total	208 (100%)	431 (100%)	13 (100%)	1083 (100%)	1735 (100%)

II. Clinical Results in Patients treated Endoscopically in 2000

Table 21) Treatment details in patients with endoscopic treatment

Treatment details	Cases (%)
Endoscopic treatment only	201 (96.6%)
Endoscopic treatment + Radiotherapy	1 (0.5%)
Endoscopic treatment + Chemotherapy	6 (2.9%)
Endoscopic treatment + Hyperthermia	0
Endoscopic treatment + Chemoradiotherapy	0
Total	208 (100%)

Treatment details	Cases (%)
EMR	168 (80.8%)
EMR+PDT	3 (1.4%)
EMR+YAG laser	2 (1.0%)
EMR+MCT	0
EMR+Esophageal stenting	0
EMR+Other treatment	12 (5.8%)
Esophageal stenting	19 (9.1%)
Tracheal stenting	1 (0.5%)
Esophageal stenting + tracheal stenting	1 (0.5%)
Others	2 (1.0%)
Total	208 (100%)

EMR: endoscopic mucosal resection
PDT: photodynamic therapy
MCT:microwave coaguration therapy

Table 22) Endoscopic mucosal resection (EMR)

Method of EMR	Cases (%)
One piece resection	88 (47.6%)
Piecemeal resection	89 (48.1%)
Unknown	8 (4.3%)
Total	185 (100%)

No. of lesions treated by EMR	Cases (%)
1	102 (55.1%)
2	23 (12.4%)
3	12 (6.5%)
4	6 (3.2%)
5	2 (1.1%)
6	1 (0.5%)
7	1 (0.5%)
8	0
9	0
10 and/or over	0
Unknown	38 (20.5%)
Total	185 (100%)

Radicality of EMR	Cases (%)
Complete resection	130 (70.3%)
Non-complete resection	37 (20.0%)
Unknown	18 (9.7%)
Total	185 (100%)

Complications of EMR	Cases (%)
None	159 (85.9%)
Perforation	2 (1.1%)
Bleeding	3 (1.6%)
Mediastinitis	0
Stenosis	6 (3.2%)
Others	0
Unknown	15 (8.1%)
Total	185 (100%)

Table 24) Histologic findings of EMR specimens (tumor size, histologic type, and depth of tumor invasion)

Size of lesion	Cases (%)
~ 9mm	13 (7.0%)
10 ~19mm	41 (22.2%)
20~29mm	22 (11.9%)
30~39mm	16 (8.7%)
40~49mm	2 (1.1%)
50~59mm	3 (1.6%)
60~69mm	1 (0.5%)
70mm~`	0
Unknown	87 (47.0%)
Total	185 (100%)

Histologic type of EMR specimen	Cases (%)
Squamous cell ca (SCC)	97 (52.4%)
Well diff. SCC	15 (8.1%)
Moderately diff. SCC	32 (17.3%)
Poorly diff. SCC	1 (0.5%)
Adenocarcinoma	1 (0.5%)
Barrett's carcinoma	0
Dysplasia	3 (1.6%)
Others	0
Unknown	36 (19.5%)
Total	185 (100%)

Pathological depth of tumor invasion (pT)	Cases (%)
pT0	0
pTis	56 (30.3%)
pT1a(lpm)	32 (17.3%)
pT1a(mm)	41 (22.2%)
pT1b(sm)	16 (8.6%)
Unknown	40 (21.6%)
Total	185 (100%)

Subclassification of histological depth of invasion in superficial cancer	Cases (%)
m1(ep)	56 (30.3%)
m2(lpm)	32 (17.3%)
m3(mm)	41 (22.2%)
sm1	6 (3.2%)
sm2	7 (3.8%)
sm3	2 (1.1%)
Unknown	41 (22.2%)
Total	185 (100%)

ep: epithelium
lpm: lamina propria mucosa
mm: muscularis mucosa
SCC: squares cell carcinoma

Table 25) Histologic findings of EMR specimens (intraepithelial spread, vessel invasion, multiple cancer, and multiple lesion)

Intraepithelial spread (ie)	Cases (%)
(-)	34 (18.4%)
(+)	21 (11.4%)
(+++) superficial spread	1 (0.5%)
Unknown	129 (69.7%)
Total	185 (100%)

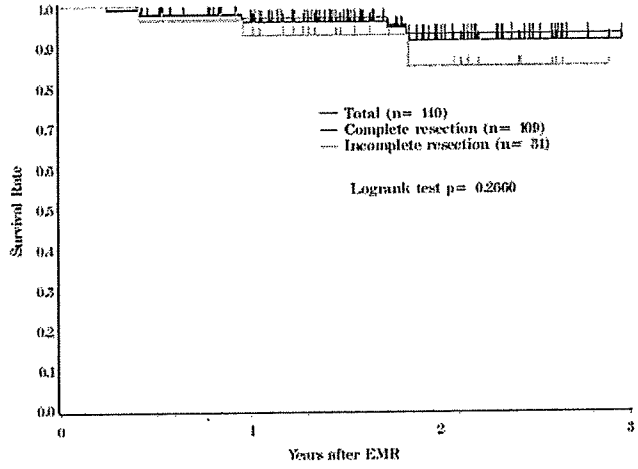
Lymphatic vessel invasion (ly)	Cases (%)
(-)	112 (60.5%)
(+)	11 (6.0%)
Unknown	62 (33.5%)
Total	185 (100%)

Blood vessel invasion (v)	Cases (%)
(-)	119 (64.7%)
(+)	5 (2.7%)
Unknown	60 (32.6%)
Total	185 (100%)

Multiple primary cancer	Cases (%)
(-)	53 (28.6%)
(+)	8 (4.3%)
Unknown	124 (67.0%)
Total	185 (100%)

Multiple malignant lesions	Cases (%)
(-)	56 (30.3%)
(+)	6 (3.2%)
Unknown	123 (66.5%)
Total	185 (100%)

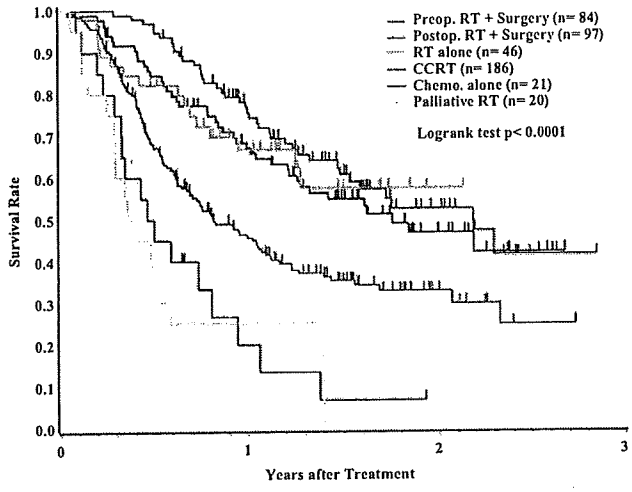
No. of multiple primary lesions	Cases (%)
2	3 (50.0%)
3	1 (16.7%)
5	0
Unknown	2 (33.3%)
Total	6 (100%)



	Years after EMR		
	1	2	3
Total	96.1%	91.2%	91.2%
Complete resection	97.1%	93.0%	93.0%
Incomplete resection	92.7%	85.0%	85.0%

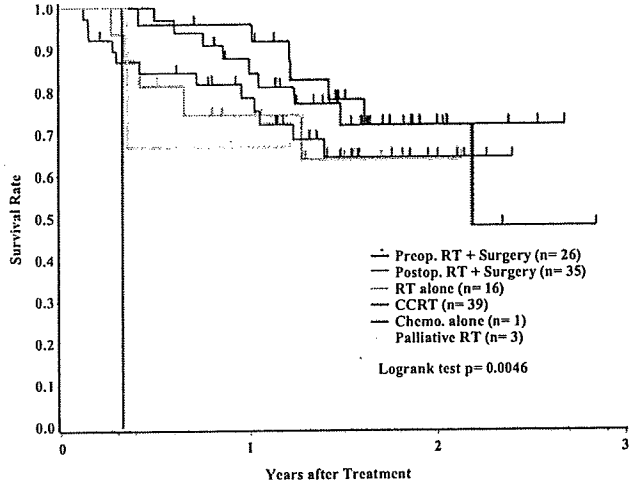
Figure 1 Survival of patients treated with EMR

III. Clinical Results in Patients treated with Chemotherapy and/or Radiotherapy in 2000



	Years after Treatment		
	1	2	3
Preop. RT + Surgery	67.0%	46.7%	42.1%
Postop. RT + Surgery	75.5%	52.5%	-
RT alone	66.6%	57.4%	-
CCRT	45.6%	32.8%	24.8%
Chemo. alone	20.0%	-	-
Palliative RT	25.0%	–	–

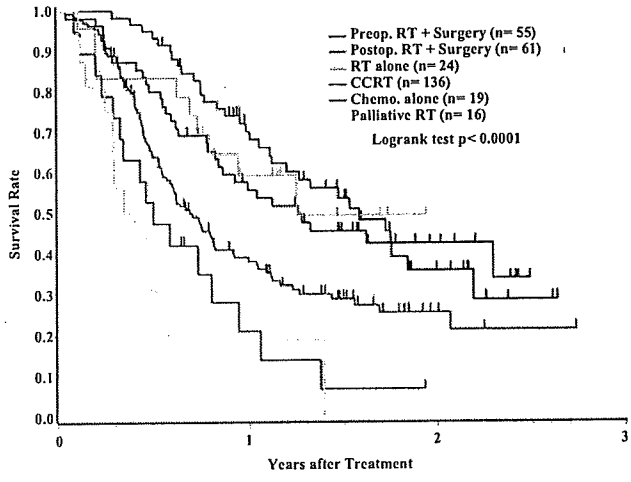
Figure 2 Survival of patients treated by chemotherapy and/or radiotherapy



	Years after Treatment		
	1	2	3
Preop. RT + Surgery	96.0%	72.0%	72.0%
Postop. RT + Surgery	84.3%	71.9%	–
RT alone	74.5%	63.8%	–
CCRT	78.4%	64.3%	–
Chemo. alone	–	–	–
Palliative RT	66.7%	–	–

Figure 3 Survival of patients treated by chemotherapy and/or radiotherapy (cStage I-IIA)

Figure 4 Survival of patients treated by chemotherapy and/or radiotherapy (cStage IIB-IVB)



	Years after Treatment		
	1	2	3
Preop. RT + Surgery	55.6%	35.8%	–
Postop. RT + Surgery	70.1%	42.3%	–
RT alone	59.1%	–	–
CCRT	38.2%	25.5%	21.2%
Chemo. alone	21.1%	–	–
Palliative RT	18.8%	–	–

V. Clinical Results in Patients treated with Esophagectomy in 2000

Table 34) Cases of esophagectomy (treatment, surgical procedure, and location of the tumor)

Treatment	Cases (%)
Esophagectomy	568 (52.4%)
Esophagectomy + radiotherapy*	108 (10.0%)
Esophagectomy + chemoradiotherapy**	186 (17.2%)
Esophagectomy + chemotherapy***	202 (18.7%)
Esophagectomy + endoscopic treatment	19 (1.8%)
Esophagectomy + other treatment	0
Total	1083 (100%)

*: + endoscopic treatment (1 cases)
**: + hyperthermia (9 cases), + endoscopic treatment (2 cases), + other treatment (1 case)
+ other treatment (2 case)
***: + endoscopic treatment (2 cases), + other treatment (1 case)

Surgical procedures	Cases (%)
Esophagectomy without reconstruction	4 (0.4%)
Esophagectomy + reconstruction (2-stage operation)	27 (2.5%)
Esophagectomy with reconstruction	1045 (96.5%)
Unknown	7 (0.6%)
Total	1083 (100%)

Location	Cases (%)
Pharynx	8 (0.3%)
Cervical esophagus	11 (4.3%)
Upper thoracic esophagus	119 (10.0%)
Middle thoracic esophagus	479 (49.6%)
Lower thoracic esophagus	263 (27.0%)
Abdominal esophagus	68 (5.5%)
EG junction	22 (0.8%)
Cardia	4 (0.2%)
Unknown	79 (2.4%)
Total	1083 (100%)

Table 35) Cases of esophagectomy (surgical approach and region of lymphadenectomy)

Approach	Cases (%)
Cervical approach	33 (3.0%)
Right thoracotomy	866 (80.0%)
Left thoracotomy	21 (1.9%)
Left thoracoabdominal approarch	29 (2.7%)
Laparotomy	21 (1.9%)
Transhiatal (without blunt dissection)	3 (0.3%)
Transhiatal (with blunt dissection)	46 (4.2%)
Sternotomy	15 (1.4%)
Others	8 (0.7%)
Unknown	41 (3.8%)
Total	1083 (100%)

Region of lymphadenectomy	Cases (%)
(-)	23 (2.1%)
C	23 (2.1%)
C+UM	11 (1.0%)
C+UM+MLM	4 (0.4%)
C+UM+MLM+A	421 (38.9%)
C+UM+A	3 (0.3%)
C+MLM	0
C+MLM+A	5 (0.5%)
C+A	6 (0.6%)
UM	11 (1.0%)
UM+MLM	14 (1.3%)
UM+MLM+A	323 (29.8%)
UM+A	3 (0.3%)
MLM	14 (1.3%)
MLM+A	115 (10.6%)
A	39 (3.6%)
Unknown	68 (6.3%)
Total	1083 (100%)

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

Table 36) Cases of esophagectomy (esophageal reconstruction)

Reconstruction route	Cases (%)
(-)	4 (0.4%)
Antethoracic	114 (10.5%)
Retrosternal	324 (29.9%)
Posterior mediastinal	311 (28.7%)
High intrathoracic*	132 (12.2%)
Low intrathoracic**	71 (6.6%)
Transhiatal	17 (1.6%)
Cervical	18 (1.7%)
Others	1 (0.1%)
Unknown	91 (8.4%)
Total	1083 (100%)

* with upper mediastinal anastomosis
** with middle/lower mediastinal anastomosis

Organs for esophageal replacement	Cases (%)
(-)	4 (0.4%)
Whole stomach	79 (7.3%)
Gastric tube*	799 (73.8%)
Jejunum	48 (4.4%)
Free junum**	25 (2.3%)
Colon	55 (5.1%)
Free colon	2 (0.2%)
Skin graft	0
Others	3 (0.3%)
Unknown	68 (6.3%)
Total	1083 (100%)

*: Free jujunum+gastric tube (2 cases), Gastric tube+other (1 case)
***: Free jejunum+colon (1 case)

Table 37) Cases of intrathoracic esophagectomy (location of the tumor and reconstruction route)

Location	Upper thoracic	Middle thortacic	Lower thoracic	Total thoracic
Reconstruction route	Cases (%)	Cases (%)	Cases (%)	Cases (%)
(-)	0	2 (0.4%)	2 (0.8%)	4 (0.5%)
Antethoracic	10 (8.4%)	73 (15.2%)	27 (10.3%)	110 (12.8%)
Retrosternal	43 (36.1%)	179 (37.4%)	76 (28.9%)	298 (34.6%)
Posterior mediastinal	53 (44.5%)	133 (27.8%)	80 (30.4%)	266 (30.9%)
High intrathoracic*	8 (6.7%)	61 (12.7%)	49 (18.6%)	118 (13.7%)
Low intrathoracic**	0	16 (3.3%)	22 (8.4%)	38 (4.4%)
Transhiatal	0	1 (0.2%)	3 (1.1%)	4 (0.5%)
Cervical	0	1 (0.2%)	0	1 (0.1%)
Others	0	0	0	0
Unknown	5 (4.2%)	13 (2.7%)	4 (1.5%)	22 (2.6%)
Total	119 (100%)	479 (100%)	263 (100%)	861 (100%)

Table 38) Cases of esophagectomy for external lesion of the thorax (location of the tumor and reconstruction route)

Location	Pharynx	Cervical esophagus	Abdominal esophagus	EGJ/Cardia
Reconstruction route	Cases (%)	Cases (%)	Cases (%)	Cases (%)
(-)	0	0	0	0
Antethoracic	0	1 (2.4%)	2 (2.9%)	1 (3.8%)
Retrosternal	1 (12.5%)	3 (7.3%)	11 (16.2%)	3 (11.5%)
Posterior mediastinal	5 (62.5%)	20 (48.8%)	14 (20.6%)	5 (19.2%)
High intrathoracic*	0	0	12 (17.6%)	1 (3.8%)
Low intrathoracic**	0	0	22 (32.4%)	9 (34.6%)
Transhiatal	0	0	7 (10.3%)	6 (23.1%)
Cervical	2 (25.0%)	15 (36.6%)	0	0
Others	0	0	0	1 (3.8%)
Unknown	0	2 (4.9%)	0	0
Total	8 (100%)	41 (100%)	68 (100%)	26 * (100%)

* E=G:22cases, G:4 casese

Table 42) Cases of esophagectomy (operative findings of cT and combined resected organs)

Macroscopic T-category (cT)	Cases	(%)
T0	62	(5.7%)
T1	242	(22.3%)
T2	195	(18.0%)
T3	388	(35.8%)
T4	121	(11.2%)
Unnkown	75	(6.9%)
Total	1083	(100%)

cT4 by lymphatic metastasis	Cases	(%)
(-)	931	(86.0%)
N1(T4)	27	(2.5%)
N2(T4)	15	(1.4%)
N3(T4)	10	(0.9%)
N4(T4)	15	(1.4%)
Nx(T4)	2	(0.2%)
Unnkown	83	(7.7%)
Total	1083	(100%)

Organs*	Cases	(%)
(-)	61	(28.6%)
Larynx	14	(6.6%)
Trachea	11	(5.2%)
Aorta	2	(0.9%)
Lung	15	(7.0%)
Pericardium	11	(5.2%)
Diaphragm	15	(7.0%)
Stomach	11	(5.2%)
Pancreas+spleen	10	(4.7%)
Thoracic duct	19	(8.9%)
Recurrent nerve	8	(3.8%)
Recurrent nerve (main trunk)	2	(0.9%)
Others	32	(15.0%)
Unknown	2	(0.9%)
Total of resected organs	213	(100%)
Total of cT4 cases	121	

*: Organs resected in addition to the esophagus

Table 43) Cases of esophagectomy (operative findings of the tumor feature and size)

Macroscopic type	Cases	(%)
0-Ip	18	(1.7%)
0-Ipl	41	(3.8%)
0-Isep	18	(1.7%)
0-IIa	64	(5.9%)
0-IIb	28	(2.6%)
0-IIc	131	(12.1%)
0-III	8	(0.7%)
0-V	14	(1.3%)
1p	18	(1.7%)
1c	10	(0.9%)
1pl	30	(2.8%)
1sep	0	
2	290	(26.8%)
3	261	(24.1%)
4s	23	(2.1%)
4ns	3	(0.3%)
5c	7	(0.6%)
5s	2	(0.2%)
5u	49	(4.5%)
Unknown	68	(6.3%)
Total	1083	(100%)

Size of tumor (mm)	Cases	(%)
- 9	12	(1.1%)
10 - 19	62	(5.7%)
20 - 29	134	(12.4%)
30 - 39	117	(10.8%)
40 - 49	187	(17.3%)
50 - 59	185	(17.1%)
60 - 69	110	(10.2%)
70 - 79	74	(6.8%)
80 - 89	57	(5.3%)
90 - 99	33	(3.1%)
100 -109	23	(2.1%)
110 -119	11	(1.0%)
120 -129	5	(0.5%)
130 -139	1	(0.1%)
140 -149	1	(0.1%)
150 -	4	(0.4%)
Unknown	67	(6.2%)
Total	1083	(100%)

Table 44) Histologic types of resected specimen and multiple primary cancers

Histologic types		Cases (%)
Not examined		2 (0.2%)
SCC	SCC	45 (4.2%)
	Well diff.	239 (22.1%)
	Moderately diff.	485 (44.8%)
	Poorly diff.	171 (15.8%)
Adenocarcinoma		32 (3.0%)
Barrett's adenocarcinoma		14 (1.3%)
Adenosquamous cell carcinoma		7 (0.6%)
Epidermoid carcinoma		0
Adenoid cystic carcinoma		0
Basaloid carcinoma		10 (0.9%)
Undiff. carcinoma (small cell)		8 (0.7%)
Undiff. carcinoma		1 (0.1%)
Sarcoma		0
So-called carcinosarcoma		11 (1.0%)
Pseudosarcoma		1 (0.1%)
True carcinosarcoma		0
Malignant melanoma		0
Dysplasia		1 (0.1%)
Other		7 (0.6%)
Unknown		49 (4.5%)
Total		1083 (100%)

Multiple primary cancer	Cases (%)
(-)	863 (79.7%)
(+)	132 (12.2%)
Unknown	88 (8.1%)
Total	1083 (100%)

Table 45) Pathological findings of resected specimen (residual cancer, intraepithelial spread, and infiltrative growth pattern)

Residual cancer cells at the transected stump

proximal (p)/distal (d)	Cases (%)
p / d (-)	956 (88.3%)
p / d (+)	41 (3.8%)
Unknown	86 (7.9%)
Total	1083 (100%)

Residual cancer cell in the cut surface of the esophageal wall (ew) of the resected specimen

ew	Cases (%)
ew(-)	889 (82.1%)
ew(+)	99 (9.1%)
Unknown	95 (8.8%)
Total	1083 (100%)

Intraepithelial spread (ie)

ie	Cases (%)
ie(-)	568 (52.4%)
ie(+)	423 (39.1%)
ie(++)superficial	28 (2.6%)
Unknown	64 (5.9%)
Total	1083 (100%)

Infiltrative growth pattern (inf)

inf	Cases (%)
infα	207 (19.1%)
infβ	591 (54.6%)
infγ	120 (11.1%)
Unknown	165 (15.2%)
Total	1083 (100%)

Table 46) Pathological findings of resected specimen (vessel invasion and skip metastasis)

Lymphatic vessel invasion (ly)		Cases (%)
ly0		312 (28.8%)
ly(+)	ly(+)	32 (3.0%)
	ly1	299 (27.6%)
	ly2-3	379 (35.0%)
Unknown		61 (5.6%)
Total		1083 (100%)

Blood vessel invasion (v)		Cases (%)
v0		484 (44.7%)
v(+)	v(+)	25 (2.3%)
	v1	271 (25.0%)
	v2-3	239 (22.1%)
Unknown		64 (5.9%)
Total		1083 (100%)

Skip metastasis in the esophageal wall (im-e)	Cases (%)
im-e (-)	900 (83.0%)
im-e (+)	88 (8.1%)
Unknown	95 (8.8%)
Total	1083 (100%)

Skip metastasis in the stomach wall (im-st)	Cases (%)
im-st (-)	958 (88.5%)
im-st (+)	28 (2.6%)
Unknown	97 (9.0%)
Total	1083 (100%)

Table 47) Pathological findings of resected specimen (pT)

Depth of tumor invasion

pT-categoly	Cases (%)
Not examined	4 (0.4%)
pT0	9 (0.8%)
pTis	14 (1.3%)
pT1a	81 (7.5%)
pT1b	222 (20.5%)
pT2	141 (13.0%)
pT3	469 (43.3%)
pT4	93 (8.6%)
Unknown	50 (4.6%)
Total	1083 (100%)

Subclassification of superficial carcinoma

Subclassification	Cases (%)
m1 (pTis)*	14 (4.4%)
m2 (pT1a)**	22 (6.9%)
m3 (pT1a)***	59 (18.6%)
sm1(pT1b)	29 (9.1%)
sm2 (pT1b)	69 (21.8%)
sm3 (pT1b)	86 (27.1%)
Unknown	38 (12.0%)
Total	317 (100%)

* ep = epithel
** lpm = lamina propria mucosa
*** mm = muscularis mucosa

Table 48) Pathological findings of resected specimen (pN)

Lymph node metastasis	Cases (%)
n(-)	419 (38.7%)
n1+)	129 (11.9%)
n2(+)	271 (25.0%)
n3(+)	124 (11.5%)
n4(+)	84 (7.8%)
Unknown	56 (5.2%)
Total	1083 (100%)

Number of lymph node metastases	Cases (%)
0	419 (38.7%)
1~3	338 (31.2%)
4~7	149 (13.8%)
8~	129 (11.9%)
Unknown	48 (4.4%)
Total	1083 (100%)

Table 49) Pathological findings of resected specimen (grade of lymph node metastasis corrected using number of metastases and fields of lymph node metastasis)

Grade of lymph node metastasis (corrected using number of metastases)

Grade of metastasis	Cases	(%)
gN0	419	(38.7%)
gN1(n1a)	113	(10.4%)
gN2(n1b)	12	(1.1%)
gN2(n2a)	163	(15.1%)
gN3(n1c)	3	(0.3%)
gN3(n2b)	75	(6.9%)
gN3(n3a)	44	(4.1%)
gN4(n2c)	32	(3.0%)
gN4(n3b)	35	(3.2%)
gN4(n3c)	43	(4.0%)
gN4(n4a)	10	(0.9%)
gN4(n4b)	25	(2.3%)
gN4(n4c)	48	(4.4%)
Unknown	61	(5.6%)
Total	1083	(100%)

Number of lymph node metastases
a : 1~3 nodes positive
b : 4~7 nodes positive
c : 8~ nodes positive

Fields of lymph node metastasis

Field of metastasis	Cases	(%)
n(-)	419	(38.7%)
C	37	(3.4%)
A+C	11	(1.0%)
A+B+C	73	(4.5%)
C+B	54	(1.4%)
A	136	(12.6%)
A+B	164	(15.1%)
B	135	(12.5%)
Unknown	54	(5.0%)
Total	1083	(100%)

A: mediastinal lymph nodes
B: abdominal lymph nodes
C: cervical lymph nodes

Table 50) Pathological findings of resected specimen (distant metastasis, stage, grade of dissection, and curability)

Distant metastasias (pM)	Cases	(%)
pM0	981	(90.6%)
pM1	23	(2.1%)
Unknown	79	(7.3%)
Total	1083	(100%)

Pathological stage	Cases	(%)
0	94	(8.7%)
I	128	(11.8%)
II	242	(22.3%)
III	279	(25.8%)
IVa	205	(18.9%)
IVb	23	(2.1%)
Unknown	112	(10.3%)
Total	1083	(100%)

Grade of dissection (D)	Cases	(%)
D0	61	(5.6%)
DI	136	(12.6%)
DII	352	(32.5%)
DIII	430	(39.7%)
Unknown	104	(9.6%)
Total	1083	(100%)

Curability (pathological)	Cases	(%)
Absolutely curative	626	(57.8%)
Relatively curative	286	(26.4%)
Absolutely non-curative	102	(9.4%)
Unknown	69	(6.4%)
Total	1083	(100%)

Table 51) Pathological findings of resected specimen (residual tumor, multiple cancers, and multiple lesions)

Residual tumor (R)	Cases (%)
R0	841 (77.7%)
R1	68 (6.3%)
R2	65 (6.0%)
Rx	109 (10.1%)
Total	1083 (100%)

Primary multiple cancers	Cases (%)
(-)	863 (79.7%)
(+)	132 (12.2%)
Unknown	88 (8.1%)
Total	1083 (100%)

Multiple malignant lesions	Cases (%)
(-)	816 (75.3%)
(+)	172 (15.9%)
Unknown	95 (8.8%)
Total	1083 (100%)

Number of malignant lesions	Cases (%)
0	816 (75.3%)
1	67 (6.2%)
2	68 (6.3%)
3	17 (1.6%)
4	4 (0.4%)
5 ~	5 (0.5%)
Unknown	106 (9.8%)
Total	1083 (100%)

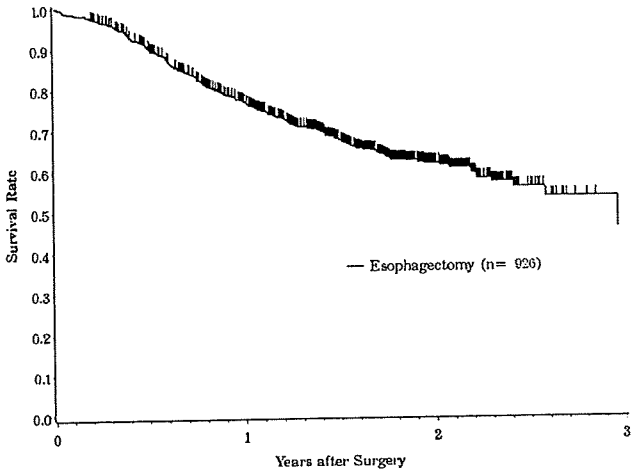
Table 52) Adjuvant therapy for cases of esophagectomy

Radiotherapy	Cases (%)
(-)	753 (69.5%)
Preoperative	109 (10.1%)
Pre+intraoperative (IOR)	4 (0.4%)
Pre+postoperative	12 (1.1%)
IOR	22 (2.0%)
IOR+postoperative	11 (1.0%)
Postoperative	126 (11.6%)
Time to recurrence	45 (4.2%)
Unknown	1 (0.1%)
Total	1083 (100%)

Doses of irradiation (Gy)	Cases (%)
0	753 (69.5%)
1 ~ 19	24 (2.2%)
20 ~ 39	64 (5.9%)
40 ~ 59	131 (12.1%)
60 ~ 79	75 (6.9%)
80 ~ 99	4 (0.4%)
100~	1 (0.1%)
Unknown	31 (2.9%)
Total	1083 (100%)

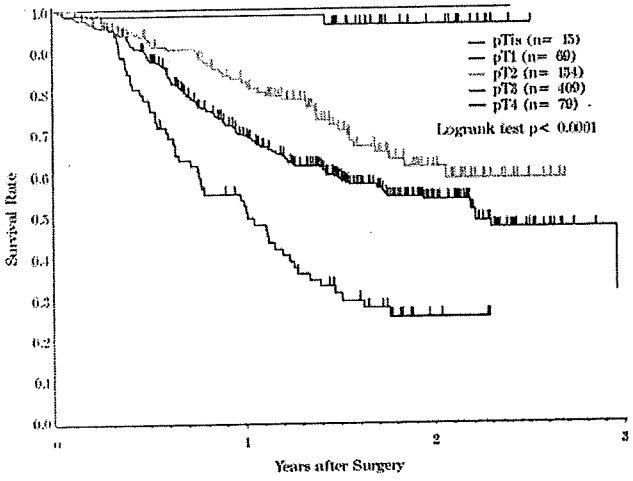
Chemotherapy	Cases (%)
(-)	651 (60.1%)
Preoperative	150 (13.9%)
Pre+intraoperative(IOR)	0
Pre+postoperative	31 (2.9%)
Intraoperative (IOR)	5 (0.5%)
IOR+postoperative	0
Postoperative	214 (19.8%)
Time to recurrence	31 (2.9%)
Unknown	1 (0.1%)
Total	1083 (100%)

Type of chemotherapy	Cases (%)
(-)	651 (60.1%)
Chemotherapy alone	226 (20.9%)
Concurrent chemoradiotherapy	162 (15.0%)
Sequential chemoradiotherapy	43 (4.0%)
Others	0
Unknown	1 (0.1%)
Total	1083 (100%)



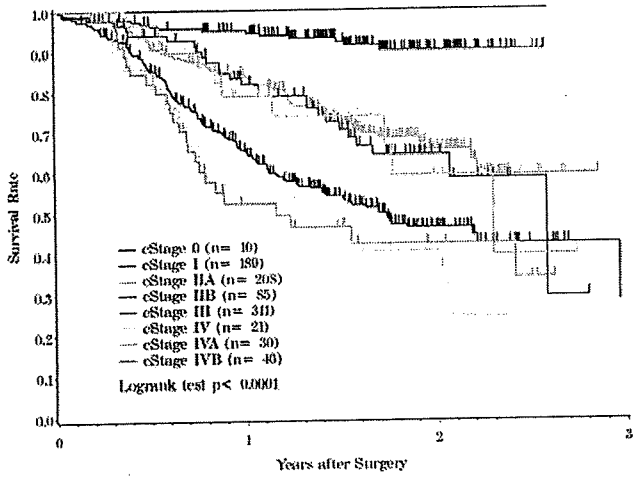
	Years after Surgery		
	1	2	3
Esophagectomy	76.8%	61.6%	45.6%

Figure 5 Survival of patients treated by esophagectomy



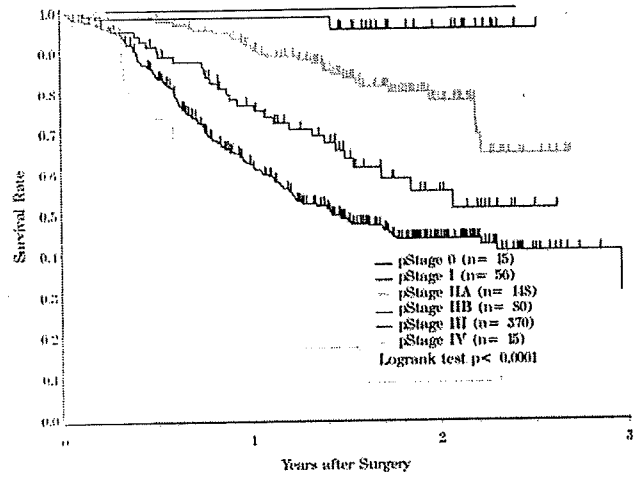
	Years after Surgery		
	1	2	3
pTis	100.0%	100.0%	-
pT1	98.4%	96.1%	96.1%
pT2	82.4%	61.5%	-
pT3	69.2%	53.6%	31.1%
pT4	52.2%	25.1%	25.1%

Figure 7 Survival of patients treated by esophagectomy in relation to the depth of tumor invasion (pT)



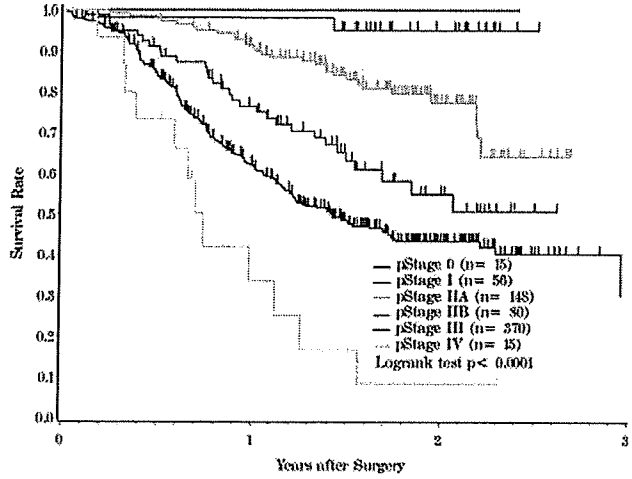
	Years after Surgery		
	1	2	3
cStage 0	100.0%	100.0%	100.0%
cStage I	95.0%	90.0%	90.0%
cStage IIA	83.8%	65.5%	59.2%
cStage IIB	81.8%	64.2%	–
cStage III	65.2%	46.1%	28.2%
cStage IV	57.1%	40.4%	–
cStage IVA	78.7%	59.1%	39.4%
cStage IVB	52.3%	42.2%	–

Figure 6 Survival of patients treated by esophagectomy in relation to clinical stage (cStage)



	Years after Surgery		
	1	2	3
pStage 0	100.0%	100.0%	-
pStage I	98.1%	95.1%	95.1%
pStage IIA	90.7%	77.4%	-
pStage IIB	76.5%	54.9%	-
pStage III	61.9%	43.3%	30.2%
pStage IV	33.5%	8.4%	-

Figure 8 Survival of patients treated by esophagectomy in relation to lymph node mentastasis (pN)



	Years after Surgery		
	1	2	3
pStage 0	100.0%	100.0%	-
pStage I	98.1%	95.1%	95.1%
pStage IIA	90.7%	77.4%	-
pStage IIB	76.5%	54.9%	-
pStage III	61.9%	43.3%	30.2%
pStage IV	33.5%	8.4%	-

Figure 9 Survival of patients treated by esophagectomy in relation to pathological stage (pStage)

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RADIATION THERAPY FOR ESOPHAGEAL CANCER IN JAPAN: RESULTS OF THE PATTERNS OF CARE STUDY 1999–2001

MASAHIRO KENJO, M.D.,* TAKASHI UNO, M.D.,† YUJI MURAKAMI, M.D.,* YASUSHI NAGATA, M.D.,* MASAHIKO OGUCHI, M.D.,‡ SUSUMU SAITO, M.D.,§ HODAKA NUMASAKI, M.S.,§ TERUKI TESHIMA, M.D.,§ AND MICHIHIDE MITSUMORI, M.D.‖

*Division of Radiation Oncology, Hiroshima University Hospital, Hiroshima, Japan; †Department of Radiation Oncology, Chiba University, Graduate School of Medicine, Chiba, Japan; ‡Department of Medical Engineering, Osaka University Medical School, Osaka, Japan; §Department of Radiation Oncology, Cancer Institute Ariake Hospital, Tokyo, Japan; and ‖Department of Radiation Oncology, Kyoto University, Graduate School of Medicine, Kyoto, Japan

Purpose: To describe patient characteristics and the process of radiotherapy (RT) for patients with esophageal cancer treated between 1999 and 2001 in Japan.

Methods and Materials: The Japanese Patterns of Care Study (PCS) Working Group conducted a third nationwide survey of 76 institutions. Detailed information was accumulated on 621 patients with thoracic esophageal cancer who received RT.

Results: The median age of patients was 68 years. Eighty-eight percent were male, and 12% were female. Ninety-nine percent had squamous cell carcinoma histology. Fifty-five percent had the main lesion in the middle thoracic esophagus. Fourteen percent had clinical Stage 0–I disease, 32% had Stage IIA–IIB, 43% had Stage III, and 10% had Stage IV disease. Chemotherapy was given to 63% of patients; 39% received definitive chemoradiotherapy (CRT) without surgery and 24% pre- or postoperative CRT. Sixty-two percent of the patients aged ≥75 years were treated with RT only. Median total dose of external RT was 60 Gy for definitive CRT patients, 60 Gy for RT alone, and 40 Gy for preoperative CRT.

Conclusions: This PCS describes general aspects of RT for esophageal cancer in Japan. Squamous cell carcinoma accounted for the majority of patients. The standard total external RT dose for esophageal cancer was higher in Japan than in the United States. Chemoradiotherapy had become common for esophageal cancer treatment, but patients aged ≥75 years were more likely to be treated by RT only. © 2009 Elsevier Inc.

Patterns of Care Study, Esophageal cancer, Radiotherapy, Chemoradiation, Japan.

INTRODUCTION

The Patterns of Care Study (PCS) was established and developed in the radiation oncology field in the United States. The PCS retrospectively investigates the nationwide structure and practice of care in specific malignancies and provides useful data for improving cancer management. Patient backgrounds and standard clinical practices can be described by PCS. Penetration of clinical evidence and the compliance status of clinical guidelines can be evaluated through PCS results. The PCS also reveals the time-dependent transition of cancer treatments and provides data for international comparison. The U.S. PCS for esophageal cancer demonstrated that a majority of patients treated by radiotherapy (RT) received chemotherapy concurrently and that chemoradiotherapy (CRT) followed by surgery had become important in treatment strategies (1–4).

The PCS was introduced to Japan in the early 1990s. The Japanese PCS Group started a national survey for the major diseases in radiation oncology and has been continuously working. We previously reported PCS results for esophageal cancer for the periods 1992–1994 and 1995–1997 (5, 6).

The objectives of this study were (*1*) to summarize the structure and process of RT for patients with esophageal cancer treated between 1999 and 2001 and show comparable data from the U.S. PCS study; and (*2*) to compare patient characteristics and treatment strategies with regard to patient age.

Reprint requests to: Masahiro Kenjo, M.D., Division of Radiation Oncology, Hiroshima University Hospital, Kasumi 1-2-3, Hiroshima 734-8551, Japan. Tel: (+81) 82-257-1545; Fax: (+81) 82-257-1546; E-mail: kenjom@hiroshima-u.ac.jp

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Table 1. Investigated institutions and patients with esophageal cancer in the Japanese Patterns of Care Study (1999–2001)

Institutions	No. of Institutions	Patients	Age group		
			<65 y	65–74 y	≥75 y
Total institutions	76	621	244	213	164
Academic (A)	38	358 (57.6)	164 (67.2)	126 (59.2)	68 (41.5)
Treat ≥430/y (A1)	20	196 (31.6)	89 (36.5)	69 (32.4)	38 (23.2)
Treat <430/y (A2)	18	162 (26.1)	75 (30.7)	57 (26.8)	30 (18.3)
Nonacademic (B)	38	263 (42.4)	80 (32.8)	87 (40.8)	96 (58.5)
Treat ≥130/y (B1)	20	186 (30.0)	52 (21.3)	62 (29.1)	72 (43.9)
Treat <130/y (B2)	18	77 (12.4)	28 (11.5)	25 (11.7)	24 (14.6)

Values in parentheses are percentages.

METHODS AND MATERIALS

Between July 2002 and June 2004, the Japanese PCS Group conducted a third national survey for esophageal cancer. Eligibility criteria were as follows: (*1*) thoracic esophageal cancer, (*2*) squamous cell carcinoma (SCC), adenocarcinoma, or adenosquamous cell carcinoma, (*3*) no distant metastasis, (*4*) no prior or concurrent malignancies within 5 years, (*5*) Karnofsky performance score (KPS) >50, and (6) RT started between January 1999 and December 2001. Seventy-six of approximately 700 institutions were selected for the survey by use of a stratified two-stage cluster sampling method. Before the random sampling, all RT institutions were classified into four groups according to type and number of patients who received RT. The criteria for stratification have been detailed elsewhere (7). In brief, Japanese RT institutions were stratified as follows: A1, academic institutions including university hospitals and cancer centers treating ≥430 newly diagnosed patients by RT per year; A2, <430 patients; B1 nonacademic institutions including national, prefectural, municipal, or private hospitals treating ≥130 patients per year; B2, <130 patients.

The Japanese PCS surveyors, who were active radiation oncologists, performed on-site review at each participating facility. They used an originally developed database format for esophageal cancer and investigated patient charts, radiotherapy records, and image films. Data collection included patient characteristics (*e.g.*, history, age, KPS, clinical examination results, laboratory data, diagnostic procedures, histology, and stage), details of therapeutic information (*e.g.*, RT, chemotherapy, surgery, and combinations thereof), and treatment outcomes. The Japanese PCS collected detailed clinical data on 621 patients who met the eligibility criteria for this study. Table 1 lists the number of the investigated institutions and the patients in this study. Three hundred fifty-five patients (57.6%) were from 38 academic institutions, and 263 (42.4%) were from 38 nonacademic institutions. Two hundred forty-four patients (39.3%) were aged <65 years (younger age group), 213 patients (34.3%) were aged 65–74 years (middle age group), and 164 patients (26.4%) were aged ≥75 years (older age group).

Statistical significance was tested using the χ^2 test. Ratios were calculated including unknown data but excluding missing data.

RESULTS

Median age of the patients was 68 years. Median height and body weight were 162 cm and 52.5 kg, respectively. Regarding comorbid diseases, hypertension was seen in 25% of patients, ischemic heart disease in 7%, cerebrovascular disease in 16%, chronic hepatitis in 13%, diabetes in 13%, and chronic nephritis or renal failure in 4%. Fifteen percent of esophageal cancers were detected by mass screening or medical checkup for other disease. Swallowing function at diagnosis was evaluable in 588 patients: 20% had no symptoms related to swallowing function, 33% could eat a normal diet with some symptoms, 32% could eat soft food only, 12% could drink liquids but could not eat solid food, and 3% could take nothing by mouth. Patient and tumor characteristics are shown in Table 2. Eighty-seven percent were male, and 13% were female. The female ratio in the older age group was 21% and was higher than in the other age groups ($p = 0.001$). Median KPS score was 80; 76% of patients had a score of ≥80. Patients with a good KPS score of 90–100 were fewer in the older age group than in the other groups (25% vs. 39%; $p = 0.001$). Six-hundred six (99%) of the evaluable 612 patients had SCC histology. Adenocarcinoma and adenosquamous cell carcinoma accounted for <1%. Fifty-five percent had the main lesion in the middle thoracic esophagus, 27% in the lower esophagus, and 19% in the upper esophagus. The ratio of tumor histology and main tumor location were not different among age groups. Fourteen percent had clinical Stage 0 or I disease, 32% had Stage IIA or IIB, 43% had Stage III, and 10% had Stage IV disease. The ratio clinical of Stage 0 to IIb was different among age groups (41% in the younger age group, 40% in the middle age group, and 59% in older age group).

Major treatment combinations are shown in Table 3. All patients except 8 who were treated by brachytherapy alone received external-beam RT. Chemotherapy was given to 63% of the patients; 39% received definitive CRT without surgery, and 24% received surgery in combination with RT or CRT. Fifty patients (8%) who were treated by RT and surgery did not receive chemotherapy. Twenty-seven percent of the all patients were treated by RT alone without chemotherapy or surgery. In the older age group, 62% were treated by RT alone, 35% by chemotherapy, and only 4% received surgery. Utilization ratios of chemotherapy and surgery in the older age group were significantly lower than in the younger and middle age groups ($p < 0.01$). Combinations of surgery and CRT were more frequently used in academic institutions than in nonacademic institutions (31% vs. 14%; $p < 0.01$); RT alone was applied to 33% of patients in nonacademic institutions.

Regarding drugs used for chemotherapy, 5-fluorouracil was used by 98% of patients who received CRT, cisplatin

Table 2. Characteristics of esophageal cancer patients according to age groups

Characteristic	Age group <65 y (n = 244)	65–74 y (n = 213)	≥75 y (n = 164)	Total (n = 621)	p
Gender					0.014
Male	219 (90)	191 (90)	129 (79)	539 (87)	
Female	25 (10)	22 (10)	35 (21)	82 (13)	
KPS					0.001
60–70	42 (20)	33 (18)	49 (36)	124 (24)	
80	85 (41)	79 (43)	54 (39)	218 (41)	
90–100	81 (39)	70 (39)	34 (25)	185 (35)	
Missing	36	31	27	94	
Histology					0.547
SCC	238 (99)	209 (99)	159 (100)	606 (99)	
Adeno.	1 (0)	2 (1)	0	3 (0)	
Adenosq.	2 (1)	1 (1)	0	3 (0)	
Missing	3	1	5	9	
Site of lesion					0.8422
Upper	42 (18)	43 (20)	31 (18)	116 (19)	
Middle	132 (55)	114 (54)	89 (62)	335 (55)	
Lower	65 (27)	56 (26)	42 (20)	163 (27)	
Missing	5	—	2	7	
Longitudinal tumor size by endoscopy (cm)					0.595
≤5.0	75 (52)	63 (49)	67 (59)	205 (53)	
5.1–10.0	56 (39)	54 (42)	40 (35)	150 (39)	
10.1–15.0	12 (8)	10 (8)	6 (5)	28 (7)	
≥15.1	2 (1)	3 (2)	0	5 (1)	
Missing	99	83	51	233	
Median (cm)	5	6	5	5	
Clinical stage*					0.001
0, I	21 (10)	28 (15)	26 (18)	75 (14)	
IIa, IIb	68 (31)	48 (25)	59 (41)	175 (32)	
IIII	96 (44)	94 (49)	47 (33)	237 (43)	
V	30 (14)	30 (10)	7 (5)	57 (10)	
Unknown	4 (2)	3 (2)	5 (4)	12 (2)	
Missing	25	20	20	65	

Abbreviations: KPS = Karnofsky performance status; SCC = squamous cell carcinoma; Adeno. = adenocarcinoma; Adenosq. = adenosquamous cell carcinoma.

Values are number (percentage) except where noted.

* Staging system by the International Union Against Cancer, 1997.

by 85%, and nedaplatin by 98%. Only 1 patient used a taxane.

Thirty-eight patients (6%) received brachytherapy. High-dose-rate iridium or cobalt therapy was used for 28 patients, and low-dose-rate therapy was given to 10 patients. Five hundred fifty-six patients (90%) were admitted to hospitals during RT. Fifteen patients (3%) were treated on investigational approved protocols.

Details about external RT given to 412 patients who did not receive surgery but were treated by definitive CRT or RT alone are shown in Table 4. The median total dose of external RT was 60 Gy and did not differ among age groups. The median fractionation dose was 2 Gy.

Hyperfractionation was used for 16% of patients. The median initial longitudinal field size was 17 cm. Significant differences in field size among age groups were observed (mean value: 20 cm, 17 cm, and 15 cm in the younger, middle, and older age groups, respectively).

Mediastinal nodal RT for apparent or subclinical lymph node metastases was given to 82% of patients, whereas supraclavicular or upper abdominal area irradiation was given to 33% and 22%, respectively.

Table 5 shows patient backgrounds and RT parameters for definitive CRT, RT alone, and preoperative CRT. Median age of the preoperative CRT patients was 63 years and was younger than for definitive CRT and RT-alone patients. The preoperative CRT group contains 71% of the patients with Stage III–IV disease, and the ratio was higher than in the definitive CRT and RT-alone groups (62% and 58%, respectively). Median total dose was 60 Gy in definitive CRT and RT-alone patients and 40 Gy for preoperative CRT patients. Median initial longitudinal field size was 18 cm for definitive CRT patients and was longer than in RT-alone patients.

DISCUSSION

In the United States two PCSs for esophageal cancer were conducted for the periods 1992–1994 and 1996–1999 (1–4). They established the national and international benchmarks of esophageal cancer treatments and showed the role of RT