

Fig. 1 Annual trend of in-patients with esophageal diseases. *EMR*, endoscopic mucosal resection (including endoscopic submucosal dissection)

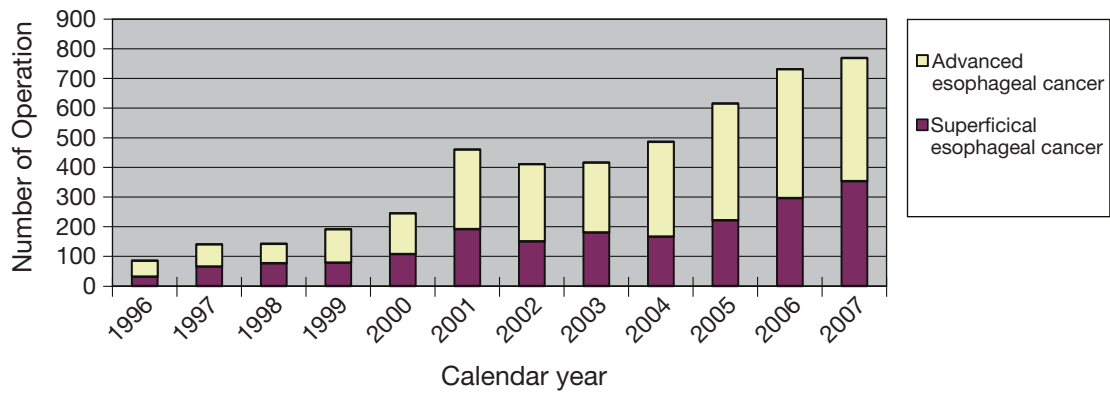


Fig. 2 Annual trend of video-assisted esophagectomy for esophageal malignancy

Table 1 Distribution of the number of esophageal operations in 2007 at the institutions in 2007

Esophageal surgery			
No. of operations in 2007	Benign esophageal disease	Malignant esophageal disease	Benign + malignant disease
1–4	188	182	180
5–9	32	115	112
10–19	12	82	95
20–29	2	39	46
30–39	0	16	17
40–49	0	7	11
≥50	0	26	28
Total	234	467	489

Table 2 Benign esophageal diseases in 2007

	Operation(+)									Endoscopic resection	Operation (–)	Total
	No. of patients			30-Day mortality			Hospital mortality					
	Total	Open	T/L	Total	Open surgery	T/L	Total	Open surgery	T/L			
1. Achalasia	140	26	114	0	0 (0.0)	0	0	0 (0.0)	0		46	186
2. Benign tumor	53	30	23	0	0 (0.0)	0	0	0 (0.0)	0	30	34	117
(1) Leiomyoma	37	18	19	0	0 (0.0)	0	0	0 (0.0)	0	10	25	72
(2) Cyst	5	2	3	0	0 (0.0)	0	0	0 (0.0)	0	1	6	12
(3) Others	11	10	1	0	0 (0.0)	0	0	0 (0.0)	0	15	2	28
(4) Not specified				0	0	0	0	0	0	4	1	1
3. Diverticulum	21	16	5	0	0 (0.0)	0	0	0 (0.0)	0		67	88
4. Hiatal hernia	226	84	142	1	1 (1.2)	0	2	1 (1.2)	1		638	864
5. Spontaneous rupture of the esophagus	76	72	4	3	3 (4.2)	0	7	7 (9.7)	0		12	88
6. Esophagotracheal fistula	16	16	0	0	0 (0.0)	0	0	0 (0.0)	0		16	32
7. Congenital esophageal atresia	52	52	0	0	0 (0.0)	0	0	0 (0.0)	0		7	59
8. Congenital esophageal stenosis	4	4	0	1	1 (25.0)	0	1	1 (25.0)	0		6	10
9. Corrosive stricture of the esophagus	8	8	0	0	0 (0.0)	0	0	0 (0.0)	0		14	22
10. Esophagitis, esophageal ulcer	30	11	19	0	0 (0.0)	0	0	0 (0.0)	0		474	504
11. Esophageal varices	33	33		1	1 (3.0)	0	1	1 (3.0)	0		885	918
(1) Laparotomy	29	29		1	1 (3.4)		1	1 (3.4)				29
(2) Others				0			0					0
(3) Sclerotherapy				0			0				601	601
12. Others	42	36	6	1	1 (2.8)	0	2	2 (5.6)	0		22	64
Total	701	388	313	7	7 (1.8)	0	13	12 (3.1)	1	30	2,221	2,952

(), % mortality; T/L, thoracoscopic and/or laparoscopic resection

Table 3 Malignant esophageal diseases (histological classification) in 2007

	Resection(+)	Resection(–)	Total
Carcinomas	6,471	2,919	9,390
1. Squamous cell carcinoma	6,018	2,803	8,821
2. Basaloid(-squamous) carcinoma	58	8	66
3. Carcinosarcoma	39	8	47
4. Adenocarcinoma in Barrett's esophagus	167	21	188
5. Other adenocarcinoma	126	29	155
6. Adenosquamous carcinoma	21	5	26
7. Mucoepidermoid carcinoma	5	2	7
8. Adenoid cystic carcinoma	2	0	2
9. Endocrine cell carcinoma	11	2	13
10. Undifferentiated carcinoma	13	21	34
11. Others	11	20	31
Other malignancies	40	9	49
1. Malignant nonepithelial tumors	9	2	11
2. Malignant melanoma	20	5	25
3. Other malignant tumors	11	2	13
Not specified	5	0	5
Total	6,516	2,928	9,444

Resection includes endoscopic resection

Table 4 Malignant esophageal disease (clinical characteristics)

in 2007

	Operation(+)			EMR	Operation(-)	Total
	Cases	30-Day mortality	Hospital mortality			
1. Esophageal cancer	4,990	60 (1.2)	170 (3.4)	1,526	2,928	9,444
A. Location						0
(1) Cervical esophagus	175	3 (1.7)	8 (4.6)	22	223	420
(2) Thoracic esophagus	4,154	51 (1.2)	147 (3.5)	1,286	2,361	7,801
(3) Abdominal esophagus	419	5 (1.2)	10 (2.4)	79	187	685
(4) Multiple cancers	242	1 (0.4)	3 (1.2)	91	79	412
(5) Others/not described	0	0	2	48	78	126
B. Tumor depth						
(1) Superficial cancer	1,284	15 (1.2)	31 (2.4)	1,526	300	3,110
(2) Advanced cancer	3,706	45 (1.2)	139 (3.8)		2,628	6,334
(3) Not specified	775	4 (0.5)	18 (2.3)		441	1,216
2. Multiple primary cancers	775	4 (0.5)	18 (2.3)		441	1,216
A. Synchronous	472	4 (0.8)	14 (3.0)		230	702
(1) Head and neck	151	0 (0.0)	1 (0.7)		70	221
(2) Stomach	210	0 (0.0)	5 (2.4)		87	297
(3) Others	89	3 (3.4)	5 (5.6)		57	146
(4) Triple cancers	22	1 (4.5)	3 (13.6)		14	36
(5) Not specified					2	2
B. Metachronous	303	0 (0.0)	4 (1.3)		211	514
(1) Head and neck	71	0 (0.0)	1 (1.4)		50	121
(2) Stomach	89	0 (0.0)	1 (1.1)		70	159
(3) Others	119	0 (0.0)	2 (1.7)		68	187
(4) Triple cancers	24	0 (0.0)	0 (0.0)		23	47

(), % mortality; EMR, endoscopic mucosal resection (including endoscopic submucosal dissection)

Table 5 Malignant esophageal disease (surgical procedures)

in 2007

	Cases	30-Day mortality	Hospital mortality
Superficial cancer			
1. Endoscopic mucosal resection	1,526	0 (0.0)	0 (0.0)
2. Esophagectomy	1,284	15 (1.2)	31 (2.4)
(1) Transhiatal esophagectomy	67	1 (1.5)	2 (3.0)
(2) Thoracoscopic and/or laparoscopic procedure	354	3 (0.8)	9 (2.5)
(3) Transthoracic (rt.) esophagectomy and reconstruction	777	8 (1.0)	17 (2.2)
(4) Transthoracic (lt.) esophagectomy and reconstruction	39	2 (5.1)	2 (5.1)
(5) Cervical esophageal resection and reconstruction	13	0 (0.0)	0 (0.0)
(6) Two-stage operation	5	0 (0.0)	0 (0.0)
(7) Others/not specified	29	1 (3.4)	1 (3.4)
Advanced cancer			
1. Endoscopic mucosal resection	0		
2. Esophagectomy	3,706	45 (1.2)	139 (3.8)
(1) Transhiatal esophagectomy	77	0 (0.0)	4 (5.2)
(2) Thoracoscopic and/or laparoscopic procedure	415	5 (1.2)	10 (2.4)
(3) Transthoracic (rt.) esophagectomy and reconstruction	2,789	34 (1.2)	102 (3.7)
(4) Transthoracic (lt.) esophagectomy and reconstruction	152	0 (0.0)	6 (3.9)
(5) Cervical esophageal resection and reconstruction	126	2 (1.6)	10 (7.9)
(6) Two-stage operation	50	0 (0.0)	2 (4.0)
(7) Others/not specified	97	4 (4.1)	5 (5.2)
(Depth not specified)			(18.8)
Combined resection of other organs	207	4 (1.9)	12 (5.8)
1. Aorta	0	0 (0.0)	0 (0.0)
2. Trachea, bronchus	25	1 (4.0)	1 (4.0)
3. Lung	44	1 (2.3)	4 (9.1)
4. Others	138	2 (1.4)	7 (5.1)
Salvage surgery	168	5 (3.0)	12 (7.1)

Table 6 Mortality after combined resection of neighboring organs in 2007

Year	Esophagectomy			Combined resection											
	a	b	c	Aorta			Tracheobronchus			Lung			Others		
1996	4,194	120	2.86%	7	3	42.86%	24	0	0.00%	50	2	4.00%	78	4	5.13%
1997	4,441	127	2.86%	1	0	0.00%	34	5	14.71%	56	1	1.79%	94	3	3.19%
1998	4,878	136	2.79%	4	0	0.00%	29	0	0.00%	74	1	1.35%	128	2	1.56%
1999	5,015	116	2.31%	5	0	0.00%	23	2	8.70%	68	0	0.00%	122	1	0.82%
2000	5,350	81	1.51%	2	0	0.00%	23	2	8.70%	69	0	0.00%	96	1	1.04%
2001	5,521	110	1.99%	1	0	0.00%	26	1	3.85%	83	3	3.61%	99	2	2.02%
2002	4,904	66	1.35%	3	1	33.33%	20	2	10.00%	63	0	0.00%	63	1	1.59%
2003	4,639	45	0.97%	0	0	0.00%	24	2	8.33%	58	0	0.00%	88	1	1.14%
2004	4,739	64	1.35%	2	0	0.00%	17	0	0.00%	59	5	8.47%	119	2	1.68%
2005	5,163	52	1.01%	1	0	0.00%	11	1	9.09%	67	1	1.49%	73	1	1.37%
2006	5,236	63	1.20%	0	0	0.00%	17	0	0.00%	62	2	3.23%	122	3	2.46%
2007	4,990	60	1.20%	0	0	0.00%	25	1	4.00%	44	1	2.27%	138	2	1.45%
Total	59,070	1,040	1.76%	26	4	15.38%	273	16	5.86%	753	16	2.12%	1,220	23	1.89%

a, number of patients who underwent the operation

b, number of patients who died within 30 days after the operation

c, % ratio of b/a (i.e., direct operative mortality)