

;

*

* . * . *

Post-operative Radiation Therapy for esophageal Cancer; Study of Failure Pattern

Mi Sook Kim, M.D., Jae Young Kim, M.D., Seoung Yul Yoo, M.D.
Hyung Jun Yoo, M.D., Jae Ill Zo, M.D.*, Hee Jong Baek, M.D.*
Jong Ho Park, M.D.*

Department of Radiation Oncology, Thoracic Surgery, Korea Cancer Center Hospital, Seoul, Korea*

Purpose : This study evaluated the survival, local control, prognostic factor, and failure pattern of patients with esophageal cancer treated with operation and adjuvant radiation therapy to use as fundamental data of postoperative radiation therapy.

Materials and Methods : A retrospective analysis was undertaken of 82 patients who had locally advanced esophageal cancer treated with operation and adjuvant radiation therapy from January 1988 to December 1995. According to AJCC staging, stage IIA were in 26 patients, stage IIB in 4 patients, and stage III in 52 patients. Squamous cell carcinoma were in 77 patients, adenosquamous carcinoma in 3 patients, and adenocarcinoma in 2 patients. The patients received radiation therapy ranging from 41 Gy to 64.8 Gy. Five patients received neoadjuvant chemotherapy.

Results : Two-year survival and local control rates for all patients were 36.8% and 30.4% respectively. And they were 9.3% and 26.3% respectively at 5 years. According to stages, 2-year survival rates were 50.2 % in IIA, 0 % in IIB and 23.3 % in III($p=0.004$). Two-year local control rates were 49.2 % in IIA, 66.6 % in IIB and 24.7 % in III($p=0.01$). Sixty patients developed recurrence, which were 3 tumor margin, 23 lymph node recurrence, 4 tumor margin and lymph node, 1 tumor margin and distant metastasis, 9 lymph node and distant metastasis, 17 distant metastasis and 3 unknown metastatic site. Prognostic factors affecting survival were smoking ($p=0.02$), Tstaging($p=0.0092$), Nstaging($p=0.0045$). Prognostic factors affecting local control were T-staging($p=0.019$), N-staging($p=0.047$).

Conclusion : In spite of post-operative radiation therapy, predominant failure pattern was local failure. Especially regional lymph node failure was major cause of local failure. So strategy of aggressive adjuvant radiation therapy to regional lymph node area in post operative treatment should be proposed.

Key Words : Esophageal cancer, Operation, Radiation Therapy, Failure pattern

가	6	가	.
	2	83	
		.	3
		가	.
	17.2	.	Kaplan
Meier			
Log-rank test			

36.8% (Fig. 1).
 9.3%, 30.4%, 26.2%, 5, 5 (Fig. 1).
 23.3% (p=0.004), 28.2, 15.3, 12.4 (Fig. 2).
 IIA가 49.2%, IIB가 66.6%, III가 24.7% (p=0.01) (Fig. 3).
 73.2% 60, 3, 23, 4, 가
 가 1, 가 9, 가 17. (Table 1)
 36, 8, 가 27

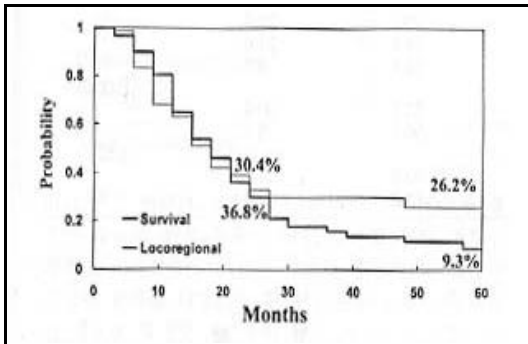


Fig. 1. Overall survival and locoregional control.

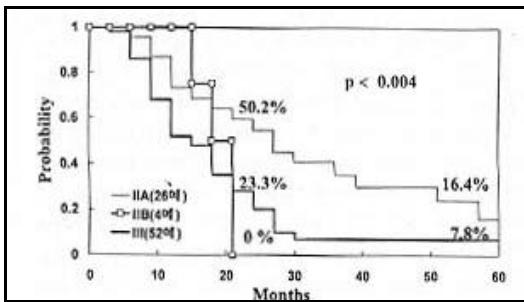


Fig. 2. Overall survival by stage for esophageal cancer.

가 6, 가 3, 가 3

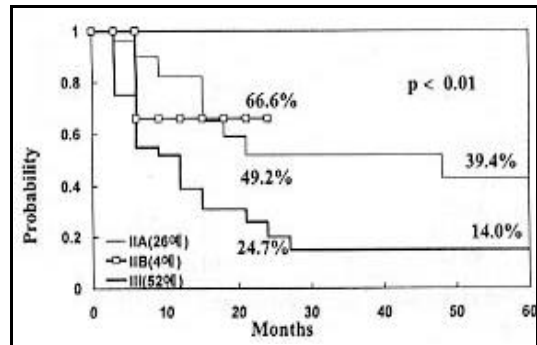


Fig. 3. Local control by stage for esophageal cancer.

Table 1. Patterns of Failure

Recurred Site	No. of pts
Locoregional Only	30 (36.5%)
Primary site	3
Regional lymph node	23
Primary site + regional lymph node	4
Locoregional + DM (distant metastasis)	10 (12.2%)
Primary site + DM	1
Regional lymph node + DM	9
Distant Metastasis Only	17 (20.7%)
Unknown Site	3 (3.6%)
Total	60 (73 %)

Table 2. Prognostic factors at starting oral control

Prognostic factors	No. of pts	No. of pts	MS*	1-YSR† (%)	1-YSR† (%)	3-YSR† (%)	3-YSR† (%)	p-value
Age								0.17
Age < 50	8	8	11	43.8	25.0	0	0	0.99
Age ≥ 50	40	40	19	67.3	74.0	40.3	25.9	
Diet								0.27
Diet General	20	19	17	51.2	65.0	0	15.0	0.48
Diet Vegetarian	34	34	17	68.0	69.2	24.2	0.87	
Weight Loss								0.85
Weight Loss Yes	43	43	17	64.6	64.4	28.7	54.7	0.02
Weight Loss No	29	29	18	64.8	74.0	39.6	18.5	
Tobacco								0.81
Tobacco Yes	19	19	19	72.0	66.6	40.0	33.2	0.39
Tobacco No	19	61	17	62.0	66.2	28.4	10.8	
Alcohol								0.27
Alcohol Yes	16	16	17	56.3	68.2	24.1	25.6	0.47
Alcohol No	16	66	17	68.2	75.0	31.4	14.6	
Location								0.97
Location Cervical	8	8	17	62.5	75.0	0	0	0.763
Location Upper Thorax	6	54	20	55.6	64.4	27.8	32.1	
Location Middle/Lower Thorax	54	14	17	64.4	65.1	42.2	19.4	
T stage								0.047
T stage Thorax	14	14	17	73.9	71.4	0.019	29.7	0.0092
Postop tumor size	1	1	100	100	100	100	100	
Postop tumor size T24 cm	16	7	21	50.0	86.7	25.0	0	0.84
Postop tumor size T38 cm	61	53	15	73.3	62.4	35.7	20.5	
Postop tumor size T48 cm	5	21	24	43.9	60.0	17.6	0	
N stage								0.0045
N stage N0	1	33	22	80.1	100	44.8	20.0	0.84
N stage N1	7	49	15	54.0	74.3	14.9	21.6	
Radiation therapy dose								0.0045
Radiation therapy dose T4 45 Gy	53	9	19	50.0	38.1	25.0	4.8	0.0045
Radiation therapy dose N-stage 45 Gy	21	73	9	66.7	66.7	30.6	5.7	
RT dose								0.52
RT dose < 45 Gy	9	9	11	33.3	33.3	11.1	11.1	0.52
RT dose > 45 Gy	73	73	17	71.3	71.3	17.3	17.3	

* Median survival, † year survival rate

1, 가
 1, 가 1
 (carina)
 (p=0.02), T Melo^{1, 2)} 1960 1979 20
 (p=0.0092), N (p=0.0045)가 83,783 가
 가 (Table 2). 58%, 가 39%, 29%, 5
 T (p=0.019) N (p=0.047) 2% 가 가 1 18%,
 가 (Table 3). 2 9%, 5 4%
 가 5% 10-27%
 5) 68% 85%, III 15-28%
 3, 6-10)

II 가

2

5 36.8% 9.3%

30.4% 26.3%

가

60 가

36.5% 30 가

12.2% 10 가

48.7% 32.7%

Pearson ¹¹⁾

100 20%

80% 가

가

35%

가

가

15-18) 40% 65%

15-19) 15 40%

36.5% Wu ²⁰⁾

가 30%

가 8 가 36

가

Yamana ²³⁾

21), Akakura ²²⁾ LaRoux (tumor bed failure), paraesophageal node 10-30%

3 Druker

5

20% 5%

3

5

Phase III

5-10% Wong ²⁴⁾ 6 cm

study Teniere ⁴⁾ Phase III

Ozawa ²⁵⁾ Kasai ¹¹⁾ 22% 44%

가

70-90%

15, 16)

가

recurrence

Intrathoracic

가

가

가

(tumor bed) 5

cm

가

(carina)

6
 3 가
 3
 1 , 가 1
 가
 가
 11, 26) , 26) , 11)
 , 11, 26) , 26) performance status 26)
 가
 가
 가

1. **Earlam R, Cunha-Melo JR.** Oesophageal squamous cell carcinoma I:A critical review of surgery. Br J Surg 1980; 67:381-340
2. **Earlam R, Cunha-Melo JR.** Oesophageal squamous cell carcinoma II:A critical review of radiotherapy. Br J Surg 1980; 67:457-461
3. **King RM, Pairloero PC, Trastek VF.** Ivor Lewis esophagogastrectomy for carcinoma of the esophagus:early and late functional results. Ann

Thorac Surg 1987; 44:119-122

4. **Teniere P, Hay JM, Fingerhurt A, et al.** Postoperative radiation therapy does not increase survival after curative resection for squamous cell carcinoma of the middle and lower esophagus as shown by a multicenter controlled trial. Gynecol Obstet 1991;173:123-130
5. **Shahian OM, Neptune WB, Ellis FH, et al.** Transthoracic versus extrathoracic esophagectomy: Mortality, morbidity and long-term survival. Ann Thorac Surg 1986; 41:237-246
6. **Roth JA, Putnam JB.** Surgery for cancer of the esophagus. Sem Oncol 1994;21:453-461
7. **Mathisen DJ, Grillo HC, Wikins EWJ, et al.** Transthoracic esophagectomy: A safe approach to carcinoma of the esophagus. Ann Thorac Surg 1988; 45:137-143
8. **Shao L, Gao Z Yang N, et al.** Results of surgical treatment in 6,123 cases of carcinoma of the esophagus and gastric cardia. J Surg Oncol 1989; 42:170-174
9. **Lozac'h P, Topart P, Etienne J, et al.** Ivor Lewis operation for epidermoid carcinoma of the esophagus. Ann Thorac Surg 1991; 52:1154-1157
10. **Mitchell RL.** Abdominal and right thoracotomy approach as standard procedure for esophagogastrectomy with low morbidity. J Thorac Cardiovascu Surg 1987; 93:205-211
11. **Pearson JG.** The present status and future potential of radiotherapy in the management of esophageal cancer. Cancer 1977; 39:882-892
12. **Kasai M, Mori S, Watanabe T.** Follow -up results after resection of thoracic resection of thoracic esophageal cancer. World J Surg 1978; 2:543-551
13. **Druker MH, Mansour KA, Hatcher CJ, et al.** Esophageal carcinoma : An aggressive approach. Ann Thorac Surg 1979; 28:133-138
14. **Fok M, Sham STS, Choy D, et al.** Postoperative radiotherapy for carcinoma of the esophagus: a prospective, randomized controlled study. Surgery 1993; 113:138-147
15. **Mandard AM, Chasle J, Marnay J, et al.** Autopsy findings in 111 cases of esophageal cancer. Cancer 1981; 48:329-335
16. **Anderson LL, Lad TE.** Autopsy findings in squamous cell carcinoma of the esophagus, Cancer 1982; 50:1587-1590
17. **Bosch A, Frias Z, Caldwell WL, et al.** Autopsy findings in carcinoma of the esophagus. Acta Radiol Oncol 1979; 18:103-112
18. **Raven RW.** Carcinoma of the esophagus. A clinicopathologic study. Br J Surg 1948; 36:70-73
19. **Appleqvist P.** Carcinoma of the esophagus and

= =

;

*

* * *

:

: 1988 1 1995 12 40 Gy

82

A가 26 , B가 4 , 가 52 77

, Adenosquamous 3 , 2 41 Gy 64.8 Gy (

50.4 Gy) .5 PFC

: 2 2 36.8% 30.4% 5

5 9.3% 26.3% 2 A가

50.2%, IIB가 0%, 가 23.3% ($p=0.004$). 2 IIA가 49.2%, IIB가 66.6%,

III가 24.7% ($p=0.01$) 73.2% 60

3 , 23 ,

가 4 , 1 , 9 ,

17 . 3

($p=0.02$), T ($p=0.0092$), N ($p=0.0045$)가

T ($p=0.019$), N ($p=0.047$)가

:

가

gastric cardia at autopsy in Finland. *Ann Clin Res* 1975; 7:334-340

20. **Wu YK, Chen PT, Fang JP, et al.** Surgical treatment of esophageal carcinoma. *Am J Surg* 1980; 139:18-24

21. **Yamana H.** Pattern of initial recurrence after radical surgery. Presented at US-Japan esophageal carcinoma summit, Honolulu. HA, February, 1993

22. **Akakura I, Nakamura Y, Kakegawa T, et al.** Surgery of carcinoma of the esophagus with preoperative radiation. *Chest* 1970; 57:47-51

23. **LeRoux BT.** The influence of resection on the natural history of carcinoma of the hypopharynx, esophagus and proximal stomach. *Surg Gynecol Obstet* 1962; 115:162-169

24. **Wong J.** Esophageal resection for cancer: The rationale of current practice. *Am J Surg* 1987; 153: 18-24

25. **Ozawa S, Ando N, Ueda M, et al.** Genetic change of esophageal cancer and a new treatment strategy. Presented at US-Japan esophageal Carcinoma summit, Honolulu. HA, February, 1993

26. **Hussey DH, Barakley T, Bloedorn F.** Carcinoma of the esophagus. In :Flecher GH, ed. *Textbook of Radiotherapy*. 3rd ed. Philadelphia, Lea & Febiger Co. 1980:688-697