

# CLINICAL EVALUATION OF CERVICAL ESOPHAGEAL RECONSTRUCTION AFTER RESECTION OF THORACIC ESOPHAGEAL CARCINOMA

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The data of 3,714 patients with thoracic esophageal carcinoma from Apr, 1979 to Dec, 1994 were analysed in purpose to estimate the value of cervical esophagogastrotomy (cervical reconstruction) in the treatment of thoracic esophageal carcinoma. The results show that while cervical esophagogastrotomy was rarely used in the early years (only 8.8% of the treated cases), it has been recently used as the routine standard procedure in our hospital (94.1%). This technic is of great importance and useful for the radical removal of tumor, the eradication of cervical and mediastinal lymph nodes, the reduction of post-operative complications and surgical mortality, as well as to improve the life quality of the patient. The operation indications, approach and the surgical efficacy are also discussed in the article.

**Key words: Esophageal neoplasm, Esophagectomy**

The resection extension and the mode of reconstruction of esophagus in the case of thoracic esophageal carcinoma are always the problems which attract the attention of experts both at home and abroad. From Apr. 1979 to Dec. 1994, a total of 3,714 patients with thoracic esophageal carcinoma were surgically treated in our hospital. In purpose to estimate the value of cervical esophagogastrotomy in

the treatment of thoracic esophageal carcinoma, a retrospective study was carried out. The following are the results of this study.

## MATERIALS AND METHODS

### Clinical Data

Of the 3,714 patients, 2,484 patients are male and 1,230 are female with age ranging from 26 to 76 years. According to the new criteria for segmenting and staging esophageal carcinoma of UICC since 1987, the cancer is defined as located at upper thoracic segment in 501 cases, at mid-thoracic segment in 2,818 cases, and at lower thoracic segment in 395 cases, in stage 0 in 29 cases, stage I in 82 cases, stage IIA for 1,435 cases, stage IIB for 375 cases, stage III in 1,692 cases and stage IV in 101 cases. The planned preoperative radiotherapy (35-40 GY/20 days) was done in 650 cases and the preoperative chemotherapy was done in 31 cases. The cancer recurrence occurred in 45 cases of patients with full-dose radiotherapy. The cancer was relapsed in 18 patients. The operation was done in 3,465 patients (93.3%), of them cervical esophagogastrotomy in 2,055 cases, thoracic esophagogastrotomy in 1,410 cases, and gastric

esophagoplasty in 3,442 cases, colonic esophagoplasty in 23 cases.

## Methods

The cervical reconstruction was developed widely in our hospital since Mar. 1989 with the development of technics for eradication of lymph nodes near the cervical esophagus and for stomach in esophageal bed. The comparison was done between the cases in the preceding 10 years before Mar. 1989 (1,666 cases, group B) and the cases of the later 5 years after Mar. 1989 (2,048 cases, group A).

## RESULTS

### Rate of surgical Resection

The surgical resection rate is increased from 91.1% (1,517/1,666) for group B to 95.1% (1,948/2,048) for group A, although the numbers of patients with advanced age (patients over 60 years, 19.8% in group B and 27.3% in group A), with high-located cancer (upper thoracic cancer, 9.0% in group B and 17.1% in group A) and at stage III (42.4% for group B and 48.1% for group A) of group A are all higher than the group B.

### Mode of Reconstruction

Table 1 shows the comparison between the two groups, the number of cervical anastomosis accounts for only 8.8% (41/487) in the early years (1979-1983) and it attains to 94.1% (916/973) in recent years.

Table 1. Mode of reconstruction

Groups	Cases	Cervicalanastomosis		Thoracicanastomosis	
		cases	%	cases	%
B	1,517	419	27.6	1,098	72.4
A	1,948	1,636	84.0	312	16.0
<i>P</i>		<0.01		<0.01	

### Pathological Examination

As the Table 2 shows, the occurrence of the esophageal stump carcinoma is higher in thoracic anastomosis and lower in cervical anastomosis. For

1,286 cases with cervical reconstruction of group A (without preoperative chemo-or radiotherapy), laboratory examinations indicate that cancer metastasis occurred in 620 cases with a rate of 48.2% (the lymph nodes were divided in groups, labelled and examined pathologically). The rates of cervical, thoracic and abdominal metastasis are 8.9%, 45.4% and 29.7% respectively. Examining the gross specimen of 1,106 cases with cancer at mid or lower segment, it shows that multi-origine cancerous lesion (distant more than 5 cm from the primary cancer) occurred in 68 cases with a rate of 6.1%.

Table 2. Stump carcinoma of esophagus

Groups	Cervicalanastomosis		Thoracicanastomosis	
	cases	%	cases	%
B	2	0.5	85	7.7 <sup>n</sup>
A	3 <sup>*</sup>	0.2	10	3.2 <sup>#</sup>

\* Residual cancer in lower incision

#  $P < 0.01$

### Surgical Complications

The Table 3 shows that the incidence of cervical anastomotic leakage is higher in group B, the occurrence of anastomotic leakage, empyema and pulmonary infection is lower than the thoracic anastomosis in group A.

### Surgical Mortality

56 cases of group B died within 30 days after the cancer resection, rating 3.7%, of them 10 cases received cervical reconstruction (2.4%), 46 cases received thoracic reconstruction (4.2%) ( $P > 0.05$ ). 26 cases of group A died, rating 1.3%, of them 14 cases received cervical reconstruction (0.9%) and 12 cases received thoracic reconstruction (3.8%) ( $P < 0.01$ ).

### Survival Rate

The follow-up was done to patients who survived more than 3 years after operation (follow-up rate 93.7%). For group B, the 3,5 year survival rate is 50.3% and 32.4% respectively, of them the survival rate of the cervical reconstruction group is 49.8% and 32.6%, and that of the thoracic reconstruction group is 51.3% and 31.7% ( $P > 0.05$ ) respectively. For the group

A, the 3-year survival rate is 52.1%, of them the survival rate of the cervical reconstruction group is 52.4% and that of the thoracic reconstruction is 51.4% ( $P>0.05$ ).

Table 3. Major Complications

Complications	Group B		Group A	
	cases	%	cases	%
anastomotic leakage				
cervical	36	8.6*	13	0.8**
thoracic	48	4.4	7	2.2
simple empyema				
cervical	7	1.6*	4	0.2*
thoracic	45	4.1	4	1.3
pulmonary infection				
cervical	13	3.1#	11	0.7#
thoracic	33	3.0	5	1.6

Notes: cervical: means cervical anastomosis group

thoracic: means thoracic anastomosis group

\* $P<0.01$  as compared with the thoracic group

\*\* $P<0.05$  as compared with the thoracic group

#  $P>0.05$  as compared with the thoracic group

## DISCUSSION

The results of the present study reflect the evolution in the surgical treatment of thoracic esophageal carcinoma within our hospital in the recent 15 years. Great changes have taken place in the mode of esophageal reconstruction. The mode of cervical reconstruction increases markedly, from a proportion of 8.8% in the early years to a proportion of 94.1% in the recent years and has become the routine standard operation in the treatment of thoracic esophageal carcinoma in our hospital.

The key point for surgical treatment of esophageal carcinoma is to remove radically the primary cancer with the involved tissues and the drainage lymph nodes.<sup>1</sup> The ordinary experiences regarded 5 cm distant from cancerous lesion as the standard extension of esophagus resection and the thoracic anastomosis as the most frequently used mode of esophageal reconstruction. But it exists some problems such as: 1. High incidence of esophageal stump residual cancer with a rate of 4.2% to 31.3%.<sup>2</sup> In our group, of 97 cases with upper incision cancer, 97.9% are from thoracic anastomosis. Insufficient

resection esophagus is the major cause. 2. Cancer recurrence occurs frequently in the residual esophagus.<sup>3</sup> Results of the follow-up study of 18 cases with cancer recurrence in our group coincides well with that of 204 post-operative cases with early esophageal and cardia carcinoma. Both are patients with esophagus partially resected and with thoracic esophagogastrotomy. The multi-focus of esophageal carcinoma is the major cause of recurrence. Even in early stage of the disease, isolated multiple cancerous lesions exist in 88.4% of the patients. These lesions, unperceivable in operation, lead to insufficient resection of esophagus. Of 1,106 gross specimens of esophagus examined recently, the multiple cancerous lesions distant more than 5 cm from the primary cancer present in 6.1% of the total. The clear incision of the residual esophagus doesn't be equal to the absence of cancerous focus in the another part of esophagus. The esophageal dysplasia and inter-epithelial cancer may disseminate continuously or intermittently over the total esophageal mucosa. So we conclude that the extension of esophagus resection should not be limited within 5 cm distant from the cancer. In the case of thoracic esophageal carcinoma, total thoracic esophagus resection or total esophagus resection must be the choice. Even for early esophageal carcinoma, the radical resection both in width or in length must be done according the principle of oncological surgery.

The characteristics of lymphatic metastasis of esophageal carcinoma is regional, bi-directional, continuous or intermittent along the longitudinal axis of esophagus and unrelated with esophageal segment. The metastasis rate of thoracic esophageal carcinoma for cervical, thoracic and abdominal regions is 21.1%, 49.7% and 42.1% respectively according to the data of Kasuo, et al,<sup>4</sup> 36.7% 59.5% and 41.8% according to the data of Kato, et al.<sup>5</sup> and 8.9%, 45.4% and 29.7% according to our data. The lymph node eradication, especially for cervical lymph node in the case of thoracic esophageal carcinoma, have attracted more attention recently. Some authors believe that the active eradication of lymph nodes can improve the long-term efficacy.<sup>5</sup> We observed that the cervical juxta-esophageal lymph nodes, especially those lie hidden in the cervico-thoracic junction, difficult to be discovered before operation and with high metastasis rate, are always unexpectedly discovered when isolating the esophagus toward the cervical region. They are always missed within thoracic reconstruction and may be the

cause of hoarseness which occurs in some patients within a certain period after operation. To facilitate the removal of the cancer and lymph nodes, we have designed recently a right cervical plus right thoracic postero-exterior thoraco-abdominal incision which needn't change the position, provide satisfactory exposure and facilitate the surgical operation.

By the improvement of cervical anastomosis technic, particularly the use of stomach in esophageal bed technic, the substituting stomach like a straight line, no tension but good blood supply, so that avoiding the interference and compression to cardio-pulmonary system, reducing the occurrence of thoracic constamination and the incidence of anastomotic leakage, empyema and pulmonary infection as well as the surgical mortality and improving the life quality. Provided the cases selected rationally, the operation processed carefully and correctly, the cervical reconstruction is safe, reliable and easy to be manipulated.

650 patients of our group received planned radiotherapy preoperatively, accounting for 17.5%. The pre-operative semi-dose radiotherapy can increase the radical resection rate, create appropriate condition for cervical reconstruction, widen the surgical indications. Many patients with advanced age, high-located or stage III cancer will be able to receive radical therapy. Cautions must be taken in the following instances: 1. The primary cancer may be incised palliatively; 2. Severe lymphatic metastasis in thoraco-abdominal region difficult to be radically removed; 3. Esophageal adeno-carcinoma or small

cell carcinoma; 4. Lower thoracic cancer near or involving the cardia. In these instances, the cervical reconstruction is contra-indicated in order to prevent the residual lower incision cancer.

Many factors can affect the long-term outcome of esophageal carcinoma. Among them, the stage of cancer, with or without lymphatic metastasis and the mode of surgical incision are of great importance. The data of our group show that no significant difference exist in short term efficacy, further study may be needed to determine if the use of cervical reconstruction will prolong the survival time of patient. Because only the patients of recent 5 years have received the cervical reconstruction, further study must be needed to appreciate the long-term efficacy of this treatment.

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