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TRANSHIATAL ESOPHAGECTOMY FOR CARCINOMA OF THE THORACIC ESOPHAGUS

Hiroyoshi Ayabe, Hiroharu Tsuji, Shinsuke Hara, Yutaka Tagawa, Katsunobu Kawahara, Masao Tomita

The First Department of Surgery, Nagasaki University School of Medicine.

Abstract: One-hundred and seventy-two patients underwent esophageal resection for thoracic esophageal carcinoma in the First Department of Surgery of Nagasaki University Hospital between 1969 and December 1991. Among them, 12 patients (7.0%) had transhiatal esophagectomy without thoracotomy. There were nine men and three women with a mean age of 69.3 years (range, 57-80). Three patients had tumors located in the upper third of thoracic esophagus; 4, in the middle third and 5, in the lower third. The reasons for performing of this type of operation were older ages in 6 patients, cardiovascular disease in 4 and poor pulmonary function in 2. There were a pathological Stage I esophageal cancer in 3 patients, Stage II A in 4, Stage II B in 4 and Stage III in one. Nine patients had curative resection, but 3 had non-curative operation because of residual tumor in tracheal wall, positive devided esophageal margin or extended lymph node metastasis.

Postoperative complications occurred in 6 patients (50%). However, there were no operative deaths and hospital deaths in 12 patients. Seven patients died at 2, 5, 8, 13, 18, 26, and 57 months after operation. Two patients survived more than two years died of pneumonia without cancer recurrences. The remaining 5 are now alive without diseases at 15, 18, 57, 60 and 96 months after esophagectomy.

Transhiatal esophagectomy for the thoracic esophageal carcinoma may be useful for the patients with the adversed factors for operation.

Key Words: esopageal cancer, transhiatal esophagectomy, blunt esophagectomy, thoracic esophagus

Introduction

It is generally accepted that the standard radical operation for thoracic esophageal cancer is a subtotal or total thoracic esophagectomy with intrathoracic and intraabdominal lymph node dissection through right thoracotomy and laparotomy (l). However, transthoracic esophagectomy have high morbidity and mortality rates (2, 3). On the other hand, patients with esophageal cancer are in the state of poor nutritional condition and have low cardiopulmonary reserve. The surgical treatment is the best mannagement for the patients with the symptoms of dysphagia, therefore resection should be performed if it is possible. Transhiatal esophagectomy without thoracotomy for esoghageal cancer may have less morbidity and mortality (4, 5).

The objective of this paper is to report the experience of transhiatal esophagectomy for thoracic esophgeal cancer in our institution.

Patients and methods

Between 1969 and December 1991, 172 patients underwent esophagectomy for carcinoma of the thoracic esophagus at the First Department of Surgery, Nagasaki, University Hospital. One hundred and sixty patients underwent transthoracic esophagectomy (TTE) and 12 (7.0%) had transhiatal esophagectomy (THE). All underwent immediate cervical esophagogastrostomy or esophagoileostomy with colon interposition. Of the 12 patients with THE, 9 were men and 3, women. Their ages ranged from 57 to 80 years (mean 69.3). The location of the tumor was the upper thoracic esophagus in 3 patients, the middle esophagus in 4 and the lower esophagus in 5. Nine patients had symptoms of dysphagia and one had heart burn with epigastralgia. Two patients showed no symptoms, but was pointed out esophageal abnormality during screening of the upper gastrointestinal examination. The length of the lesions, defined by esophagography was within 3 cm in 4 patients, 3 to 5 cm in 5 and 5 to 8 cm in 3. All tumors were squamous cell carcinoma. Accoring to criteria established by the UICC in 1987, 3 patients had Stage I , 4 Stage II A, 4 Stage II B and one Stage III on the basis of pathologic findings (Table 1). The reasons of selection for THE were older ages over 70 years in 6 patients, angina pectoris in one, atrial fibrillation in 3, respiratory dysfunction in 2. Respiratory function study with spirometry revealed obstructive disturbance in 6 (FEV 1.0%, 33 to 63) and restrictive disturbance in one with % VC of 32.4.

The curative operation was performed in 9 patients. However, the other 3 parients underwent non-curative resection because of residual cancer in the membranous portion of the trachea, positive margin of the esophageal stump or extended lymph node metastasis. Two patients were given preoperative adjuvant therapy and 4 had postoperative chemo and/or radiotherapy. The remaining 6 recieved no pre- or postoperative adjuvant therapy. Actual

Table 1. Preoperative characteristics

Variable	No. of Patients
M/F	9/3
Age (years)	69.3 (57~80)
Histology	
Squamous cell ca.	12
Adenoca.	0
Location	
Upper	3
Middle	4
Lower	5
Length of tumor	
~ 3.0	4
3.1 ~ 5.0	5
5.1 ~	3
Stage	
I	3
II A	4
II B	4
III	1

survival curve was produced according to the Kaplan-Meier mehtod (6).

Operative technique

The patient in placed in the supine position with the head inclined to the right. The neck, thorax and abdomen are prepared and draped. The abdomen is entered through a midline. The liver metastasis or celiac node enlargement do not contraindicate resection. After abdominal exploration, the stomach is mobilized preserving the right gastric vessels and the right gastroepiploic vessels. The left gastric vessels is ligated at its origin. After placing the upper hand retractor to have a good view of the upper abdominal cavity, the esophageal hiatus is enlarged by dividing the crus of the diaphragm anteriorly. This enable the lower esophagus to be mobilized under direct vision and allow sharp dissection of some esophageal attachments, vascular connections and paraesophageal lymph nodes. Careful monitoring of arterial pressure during manual freeing of the intrathoracic esophagus will minimize dangerous change in the hemodynamics.

Through the oblique left neck incision, cervical esophagus is separated from the trachea and is circled with a tape. The upper thoracic esophagus is mobilized from the neck as far distally as possible, care being taken to avoid injury to both recurrent nerves and the membranous portion of the trachea. The dissection of the esophagus around the distal trachea and carina is blind, and dissection is kept close to the esophageal wall. After the intrathoracic esophagus has been freed, the esophagus is devided at the neck using a stapling device, and delivered into the abdomen. The esophagus is devided distally to the cardia with staples. After removal of the esophagus, a pyloromyotomy or pyloroplasty is performed and the stomach is pulled up into the neck either through the posterior mediastinum, retrosternal space or antesternal route. Esophagogastric anastomosis is completed with two layers with interrupted sutures. A nasogastric tube is passed into the intrathoracic stomach for postoperative decompression. The cervical wound is drained with Penrose drain. When a total gastrectomy is performed together or a previous gastrectomy has been performed, a segment of ileo-colon is interposed between the cervical esophagus and duodenum or distal stomach.

Operation was also attempted in two additional patients, but because of massive bleeding from esophageal varices in one and fracture of tumor in another, left thoracotomy was performed for completion of the procedures.

Results

The average duration of the surgical procedure including esophageal reconstruction was 4 hours and 30 minutes (range 2 hours and 55 minutes to 5 hours and 25 minutes). Estimated blood loss was 300 gram (range 140 to 1085).

One patient had pneumothorax due to rupture of the pleura during transhiatal blunt resection of the esophagus. This complication was treated by introducing a chest tube and establishing a continuous drainage. Tracheal tear was not observed in our series.

Postoperative complications occurred in 6 patients (50 per cent). There were arrhythmia in 3, minor anastomotic leakage in 2, late anastomotic stenosis in 2, sputum retension in one, recurrent nerve palsy in one, hemothorax in one and wound infection in one (Table 2). However, these cpmplications were improved by conservative therapy and no patients died within 30 days after operation or during the hospitalization.

Table 2. Complications after transhiatal esophagectomy for intrathoracic esophageal cancer

Complications	No. of Patients
Arrhythmia	3
Anastomotic leakage	2
Anastomotic stenosis	2
Sputum retension	1
Recurrent nerve palsy	1
Hemothorax	1
Neck wound infection	1

Seven patients have died at 2, 5, 8, 13, 18, 26 and 57 months after operation. Causes of deaths were cancer recurrence in 3 patients, pneumonia in 2, complications due to anti-cancerous chemotherapy in one and unknown in one. No patients had evidence of local recurrence. The remaining 5 patients are alive well at 15, 18, 57, 60 and 96 months after esophageal resection. One year survival rate was 75.0%, 2 years survival rates, 57.1% and 3 years

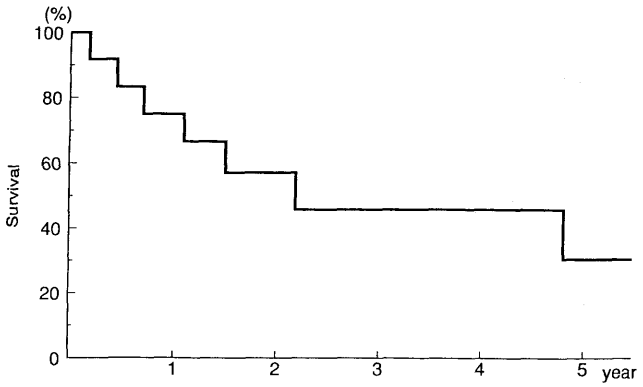

Fig. 1. Survival curve for patients who underwent transhiatal esophagectomy for intrathoracic esophageal carcinoma

survival rates, 30.5% (Fig. 1). Four patients survived more than 4 years. All of them had no nodal involvement.

Discussion

Turner first performed esophagectomy without thoracotomy for thoracic esophageal cancer in 1933 (7). Ong and Lee (8) in 1960 demonstrated the potential benefit of transhiatal esophagectomy without thoracotomy in the management of lesions requiring removal of the thoracic esophagus. Orringer and Sloan accumulated extensive experiences of this procedure (9, 10).

The esophagectomy without thoracotomy is performed to reduce the risk of esophagectomy. The benefits of transhiatal esophagectomy are 1) a short operative time, 2) ease of performance, and 3) low morbidity and mortality rates. On the other hand, the disadvantages are less curable because of incompleteness of lymph node dissection and tumor residue at the adjacent structures (11). Therefore, the selection of the patients for this procedure are 1) early esophageal cancer without nodal metastasis which is diagnosed by endoscopy or radiogram, 2) the high risk patients with poor cardiopulmonary reserve, and 3) previous thoracotomy with dense pleural adhesion (12). The contraindications for this procedure are esophageal cancer which invades the adjacent structures such as aorta and tracheobronchus and esophageal cancer with esophageal varices due to liver cirrhosis (10, 12). For the former patients, radical operation through thoracotomy, simple bypass operation or non-operative approach such as radiotherapy may be chosen. For the latter, the risk of uncontrollable massive bleeding may be concerned, then, transthoracic esophagectomy is considered to be safe.

Esophagectomy through the esophageal hiatus and upper thoracic inlet, special complications such as tracheal tear (12, 13), bleeding from avulsion of azygos vein or esophageal artery (13) or rupture of esophageal tumor (14) is concerned, and careful dissection is important. If these intraoperative complications occurr, prompt thoracotomy is necessary to repair the condition. Left recurrent nerve paralysis ocurred in one of 12 patients (8.3 percent) in our series. This complication occurred from 3.6 to 31 percent in reported series (13). The cause of this complication is transection of this nerve at the aortic arch or extensive traction during the dissection of the cervical esophagus. The latter is more frequent, then, careful manipulation during cervical esophageal dissection is important to prevent this complication.

Postoperative respiratory complications in the patients with transhiatal esophagectomy have been approximately 6 percent (range 2 to 20) (12, 15). In our experience, postoperative respiratory camplication ocurred in only one (8.3 percent) which was sputum retension. The reasons for low incidence of pulmonary complications are contributable to the less surgical trauma to the lung, a short operative time and less painful condition in the chest wall after operation. The hospital mortality observed with transhiatal esophagectomy has ranged between 0 and 13.3 percent (average 8) in reported series. Hankins et al (12), Shahian and associates (13) and Fok and coauthors (14) reported that there were no differences in the mortality rates between two procedures of THE and TTE.

In the literatures which compared the results between transthoracic esophagectomy and transhiatal esophagectomy, Fok and associates (14) stated the median survival of those with TTE was 11.3 months and those of THE, 6.3 months. The reasons were contributed to the incomplete dissection of regional lymph node and adjacent structures. Shahian and associates (13) and Hankins et al (12) stated that there was no difference of median survival between two procedures. In our series, 4 of 12 patients survived more than 4 years and 3-year survival was 30.5 percent which was identical with the results of Terz et al (11). The morbidity and mortality after transthoracic esophagectomy for esophageal cancer have decreased markedly in the last 10 years, as results of respiratory support in the mangement of pulmonary complication, perioperative nutritional improvement with enteral or parenteral alimentation and advances of surgical techiniques. Therefore, transthoracic esophagectomy for thoracic esophageal cancer can be performed with safety and recommended from the point of radicality (16, 17).

Transhiatal esophagectomy without thoracotomy should be performed for the patients with early esophageal cancer without nodal metastasis and the patients in Stage I and II with poor cardiopulmonary reserve.

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