

## NON-THORACOTOMY ESOPHAGECTOMY FOR CARCINOMA OF THE ESOPHAGUS AND CARDIA

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**Objective:** To try to use Non-Thoracotomy Esophagectomy (NTE) for patient with carcinoma of esophagus and cardia avoiding thoracotomy, and by utilizing a cervical esophagogastric anastomosis in order to reduce perioperative morbidity and mortality. **Methods:** 18 patients were treated with NTE between 1989 to 1998. Of them, 5 adenocarcinoma of the cardia and 13 squamous cell carcinoma of the esophagus (2 upper thoracic, and 11 distal third). Everting stripping were performed in all patients. Esophagus were extracted either upwards (n=2) or downwards (n=16). The esophageal substitute was a resulting gastric tube (n=5) or the stomach (n=13) and was positioned in the posterior mediastinum. **Results:** The mean age of the patients was 64 years (ranged 40 to 72). The male:female ratio was 10:8. The mean intraoperative blood loss was 400 ml. There was no hospital deaths. Only one patient had a cervical esophagogastric anastomotic leakage. **Conclusion:** NTE is to be recommended because of its operative ease, safety and rare operative complications. CT scanning of the thorax and bronchoscopy is necessary before using the technique of NTE.

**Key words:** Non-thoracotomy, Esophagectomy, Esophageal and cardiac carcinoma.

Non-thoracotomy esophagectomy (NTE) is a selective operation for carcinoma of the esophagus and cardia. Eighteen patients with carcinoma involving the esophagus and cardia were treated with NTE. This

report reviews the therapeutic effect.

### MATERIALS AND METHODS

During a 10-year period from 1989 through 1998, 18 patients with carcinoma of the esophagus and cardia underwent NTE at the Department of Surgery, Tanggu Hospital, Tianjin.

The male: female ratio was 10:8. The patients' ages ranged from 40 to 72 years. The average age for patients in the entire series was 64 years.

Histologically, all 13 of the esophageal tumors (two upper, 11 lower) were squamous cell carcinoma, and 5 cardiac tumors were adenocarcinoma.

The preoperative assessments included a barium swallow examination, CT, and esophagoscopy with biopsy in all patients. Those with the upper third tumors (n=2) had bronchoscopy to assess possible tracheobronchial invasion.

There were not the conventional blunt manual techniques. The esophagus were extracted either upwards (n=2) or downwards (n=16). Everting stripping were performed in all patients. The small curvature of the stomach was resected and the resulting gastric tube was pulled into the posterior mediastinum up to the neck without problem in five patients.

### RESULTS

There were no intraoperative deaths. No intra-

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mediastinal bleeding and posterior membranous tracheal tear, chylothorax, pulmothorax, cardio pulmonary complications were observed. There was not left recurrent laryngeal nerve paresis with resulting hoarseness. A cervical esophagogastric anastomotic leakage occurred in one patient. Intraoperative bleeding was 400 ml on an average.

## DISCUSSION

NTE was described by Denk in 1913 and performed for the first time by Turner in 1933.<sup>1</sup> The technique has been popularized in the last decade and has been extensively used for resection of tumors of the esophagus and cardia as it offers some very distinct advantages.<sup>2</sup> The esophagus can be extracted by the following methods: Blunt finger dissection and eversion stripping. We only used everting stripping in this group.

As far as our knowledge goes, carcinoma of the esophagus spreads mostly in a longitudinal direction with intramural skip lesions but lymph node metastases in carcinoma of the cardia has early developed.<sup>2</sup> This means that partial removal of the intrathoracic esophagus (partial esophagogastricectomy) should not be performed. Subtotal or total esophagectomy is the treatment of choice. Malignant involvement of resection margins has been implicated as a prognostic factor for carcinoma of the esophagus and Cardia. There was not malignant involvement of resection margins by using NTE in entire series. The role of obtaining negative resection margin by this technique is obvious.

In the general, NTE is the preferable approach in most patients requiring esophageal resection. Controversy continues to surround the relative safety of this operation, particularly in patients with the thoracic middle third carcinomas.<sup>3</sup> Steiger has reported that they do not recommend NTE if the lesion is adjacent to the azygos vein or hilar structures and the tumor is firmly attached to surrounding tissue.<sup>4</sup> Inasmuch as, Orringer was performed in 100 patients with carcinoma of the thoracic esophagus (7 upper, 45 mid, and 48 lower third). There were not intraoperative deaths, and 15% have lived 2 years or more. This was suggested that the thoracic middle carcinomas of the esophagus can be performed by NTE. Care must be taken to the risks in the dissection of this portion of the esophagus by NTE. There were the two upper third

carcinomas which involved the esophagus from the thoracic inlet to the level of the carina. Those with upper third tumors underwent bronchoscopy to assess possible tracheobronchial invasion and relation with surround structures so that NTE can be safely undertaken. Nevertheless, intramediastinal dissection of the esophagus under endoscopic control or video-assisted surgery may be helpful to reduce mortality and morbidity.<sup>1</sup> Furthermore, five patients for carcinoma of the cardia in our series underwent NTE, in which abdominal cavity only is opened. This not only is beneficial to radically resecting the metastatic lymphatic nodules in the abdominal cavity, but to obtaining negative resection margin in the stomach and proper mobilization of the stomach as well as creating an untethered gastric tube which should reach to the neck without significant tension. At time, it has been demonstrated that complete lymph node dissection is necessary in the mediastinum and in the abdomen for carcinoma of the cardia and inferior esophagus so NTE is more satisfactory method.

NTE should be a shorter, simpler and less traumatic procedure than a classical transthoracic esophageal resection.<sup>2,5</sup> Blood loss is usually minimal. The operative morbidity and mortality are greatly reduced (as low as 0%–6%). Of 18 patients, intraoperative bleeding of the esophageal bed, were 400 ml on the average. Libermann-Meffert DMI has reported that it has 1.6% bleeding morbidity in 453 patients, of 7 instances, a more serious complication is damage to the azygos vein. (Seven out of 453 patients with three deaths). It is very necessary for surgeon to prevent this complication. The blood supply of the intrathoracic esophagus arises mainly from one to two small and singular vessels from the aorta, the so-called 'proper' esophageal arteries. The distal thoracic, intra-abdominal and the proximal section of the esophagus are however well vascularized by large branches from the left gastric and the inferior thyroid artery respectively.<sup>2,6</sup> This is an important factor for safety by this technique.

Ten of this series were 65 years of age or older. There was one patient who is 72 years of age, and had cardiopulmonary insufficiency, but he was discharged after 12 postoperative days. It is obvious that in NTE, blunt dissection of the esophagus only one body cavity and non mediastinal pleura is opened. Even so, there also was not a semilunar incision in the diaphragm, which essentially reduced morbidity to a laparotomy. NTE is more proper even in older patients

with restricted cardiopulmonary function.<sup>5</sup>

Besides a tear in the pleura, the most frequent intraoperative complication is an injury to the left recurrent laryngeal nerve (LRLN). There was not this complication in this group. One was postulated to traumatize the LRLN where it loops beneath the aortic arch in the chest. On the other hand, meticulous avoidance of any retractor against the trachoesophageal groove during the cervical portions of the operation must be avoided and dissection through the hiatus must be inside the Vagus Nerve trunks.

Cervical anastomoses consistently have higher leak rates.<sup>5</sup> There was one case in all patients. Treatment consists of opening the cervical incision and establishing adequate drainage. It is an important that not all anastomoses constructed through a cervical approach actually remain in the neck after operation. So many surgeons recommended that the divided gastric fundus has been secured in the cervical prevertebral fascia. In fact, the gastric fundus is the usual site of esophago-gastrostomy and it has the most precarious tissue perfusion after stomach mobilization.<sup>6</sup> Care must be taken to ensure the gastric fundal oxygenation, venous drainage, arterial supply and to orient the stomach correctly when transposing it into the post-mediastinum. So with proper mobilization, the stomach should reach to the neck without significant tension. However, mediastinitis may complicate NTE, inadvertent esophageal disruption must be avoid during NTE. Once again, it is necessary for preventing this complication to reduce excessive tension and do duodenal Kocherization as well as protect anastomoses from undesirable gastric distension. For all that, operative technique also has important role in preventing anastomotic leakage. In summary, ischemia of the gastric fundus and errors in surgical technique are major etiologic factors for cervical anastomotic leaks.

For esophageal carcinoma, several studies have

demonstrated that CT provides accurate detection of both extraesophageal tumor spread and lymphatic metastases.<sup>7</sup> Two out 18 (the upper third tumors) had CT and bronchoscopy which is desirable that it may be increased resectability and safety. All tumors were evaluated with regard to length, diameter, invasion of the aorta or tracheobronchial tree, local and distant lymphadenopathy. For this reason, preoperative CT scanning should be considered mandatory. Nevertheless, CT specificity or sensitivity for loss of the periesophageal fat plane of the esophageal carcinoma must be further investigated.

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