Combined laparoscopic-thoracoscopic esophagectomy and intrathoracic esophagogastric anastomsis

Meiqing Xu, Changqing Liu, Mingfa Guo, Xiangxiang Sun, Xiaohui Sun, Jing Luo, Jieyong Tian, Xianliang Jiang

Department of Thoracic Surgery, the Affiliated Provincial Hospital of Anhui Medical University, Hefei 230001, China

ABSTRACT We retrospectively analyzed the clinical data of 112 patients who underwent esophagectomy for esophageal carcinoma and gastro-esophageal anastomosis in right thoracic cavity from October 2011 to June 2013. First, the gastric tube was created with the aid of linear stapling device by removing the stomach and dissecting lymph nodes under laparoscopy and making a 3-4 cm incision through the subxiphoid area in the upper abdomen. Second, the thoracic esophagus and lymph nodes were dissected during thoracoscopic procedure. Gastric tube was inserted into the chest cavity and placed in the posterior mediastinum. The thoracic gastro-esophageal anastomosis was stapled with a circular stapler. Combined laparoscopic-thoracoscopic esophagectomy and intrathoracic esophagogastric anastomosis is technically feasible and safe, with minimized trauma, less operative blood loss and quick recovery.

KEYWORDS Laparoscopic; thoracoscopic; esophagectomy; esophagogastric anastomosis; esophageal carcinoma

J Thorac Dis 2013;5(6):895-897. doi: 10.3978/j.issn.2072-1439.2013.12.11

Introduction

The minimally invasive esophagectomy (MIE) has got more and more utilization and development around the world since 1992. At the present time, McKoewn procedure is the usual procedure in MIE, including: thoracoscopic esophageal mobilization, laparoscopic gastric dissection, gastro-esophageal anastomosis in neck. This procedure is safe, easily mastered and can be used in all types of esophageal carcinoma. But the incidence of postoperative gastroesophageal cervical anastomotic leakage and stricture are significantly higher in the cervical anastomosis than intrathoracic esophagogastric anastomosis, and postoperative digestive function develop more disorders (1-3). Therefore in middle and low thoracic esophageal carcinoma, this procedure increases the rate of complications. We aimed to explore a method of combined laparoscopic-thoracoscopic esophagectomy and intrathoracic esophagogastric anastomosis to reduce these complications.

Corresponding to: Meiqing Xu, Professor, Master Supervisor, Department of Clinical Medicine, Anhui Medical University; Associate Executive Director, Chief Physician. Department of Thoracic Surgery, the Affiliated Provincial Hospital of Anhui Medical University, Hefei 230001, China. Email: xmqahslyy@163.com.

Submitted Oct 24, 2013. Accepted for publication Dec 09, 2013.
Available at www.jthoracdis.com

ISSN: 2072-1439

Patients and material

From October 2011 to June 2013, 112 patients underwent combined laparoscopic-thoracoscopic esophagectomy and intrathoracic esophagogastric anastomosis in our department. The ages of the patients ranged from 26 to 78 years (mean, 62±8 years), 78 (69.1%) patients were male and 34 (30.9%) were female. The tumor was located in the midde thoracic esophagus in 83 cases and the lower thoracic esphagus in 29 cases. Pretreatment (clinical) stages were: 24 patients in stage I, 66 patients in stage II and 22 patients in stage III.

Preoperative diagnosis was confirmed by pathologic review of fresh endoscopic biopsy specimens. All patients had detailed preoperative risk assessments based on liver, renal, cardiac and pulmonary function, electrocardiogram, blood pressure and diabetes mellitus.

All patients also underwent chest and upper abdomen computed tomography (CT) for detecting regional and distant metastases before the surgery to comprehensively evaluate the general condition and their tolerance to surgery.

Surgical procedures

The patient was under general anesthesia with double-lumen endotracheal intubation (Video 1). The patient was placed in supine position during the removing of stomach in the laparoscopic procedure. Five abdomen ports for the laparoscopic devices were inserted through the subxiphoid area in upper

Video 1. Combined laparoscopic-thoracoscopic esophagectomy and intrathoracic esophagogastric anastomosis.

abdomen, with left and right midclavicula line below arcus costails, right midclavicula line 3-4 cm umbilical superior and 1 cm umbilical inferior. With gas insufflated into the peritoneal cavity, the stomach was divided at the origin of the left gastric artery and all lymph tissue around this vessel was included in the resection. The right gastric and right gastroepiploic arteries were mobilized. Through a 3-4 cm upper midline laparotomy incision through subxiphoid area, the stomach was pulled out and a 3-4 cm wide gastric tube was created with the aid of the Proximate 75 mm Linear Cutter with golden reloads (Ethicon Endo-Surgery, Cincinnati, Ohio, USA). The thoracic esophagus was dissected by a right thoracoscopic esophagectomy. The patients were placed in the left decubitus position and left lung ventilation was started. Three thoracic ports for the thoracoscopic devices were made in the fourth to the seventh intercostal spaces at the anterior, middle and posterior axillary lines. The main port was a 3-4 cm incision in the fourth intercostal space at the anterior axillary line. A 30-degree visual thoracoscope was inserted through the port placed in seventh intercostal space at the midaxillary line. The thoracic esophagus and mediastinal lymph nodes were dissected with the Harmonic SYNERGY (Ethicon Endo-Surgery, Cincinnati, Ohio, USA) and electric hook. The lymph nodes along the left and right recurrent laryngeal nerve were dissected with scissors to prevent heat injury to the nerves. After a total dissection of the thoracic esophgus, the gastric tube was pulled up in the posterior mediastinum. The chest anastomosis was stapled with the circular stapler CDH25 (Ethicon Endo-Surgery, Cincinnati, Ohio, USA) and placed in the apex of the right chest. The Echelon 60 mm Endo Cutter with golden reload (Ethicon Endo-Surgery, Cincinnati, Ohio, USA) was used to resect the remnant gastric tube, including the opening from the previously inserted circular stapling device.

Results

The overall conversion rate was 2.7%. The most frequent conversion was the esophageal tumor either too large or severe adhesion to adjacent tissue. The mean surgical time was 225.2±37.5 minutes and mean blood loss was 155.0±35.8 mL. The average number of dissected lymph nodes was 31.4±5.6. The median length of hospital stay was 10.2±6.7 days. Postoperative complications occurred in 10 (8.9%) patients. Major anastomotic leakage occurred in 4 (3.6%) patients who were cured with no surgery. Chylothorax occurred in 4 (3.6%) patients, of which 2 patients required surgery. Anastomotic bleeding occurred in 2 (1.8%) patients who needed urgent surgery. There was no mortality in postoperative 30 days.

Discussion

Thoracoscopic esophageatomy and laparoscopic gastric dissection are minimally invasive approaches used for the treatment of esophageal cancer. The majority of surgeons have shown that thoracoscopic esophagectomy and laparoscopic gastric dissection are feasible and esophagogastric anastomosis is safely performed in neck. The major shortcoming of the operation mode is the high incidence for anastomotic leakage of 7.69-18.49% (4,5) patients. But under the chest anastomose, the anastomotic leakage is decreased (3.6%) largely by this method for that the ischemic remnant of the gastric tube may be resected by a linear stapling device and meantime the anastomosis is created in no tenseness. The operation mode of intrathorocic esophagogastric anastomosis also reduces the cervical injury and pharyngeal function injury.

The specialties of operation mode of intrathoracic anastomosis is to resolve to install a purse string clamp device, insert a string needle, place a seat of stapler and a circular stapler through a 3-4 cm main ports in the fourth intercostal space at the anterior axillary line.

In conclusion, combined laparoscopic-thoracoscopic esophagectomy and intrathoracic esophagogastric anastomosis is technically feasible and safe, with minimized trauma, less operative blood loss and quick recovery. The anastomotic leakage is also decreased.

Acknowledgements

Disclosure: The authors declare no conflict of interest.

References

1. Luketich JD, Pennathur A, Awais O, et al. Outcomes after minimally invasive esophagectomy: review of over 1000 patients. Ann Surg 2012;256:95-103.

2. Nguyen NT, Hinojosa MW, Smith BR, et al. Minimally invasive esophagectomy: lessons learned from 104 operations. Ann Surg 2008;248:1081-91.
3. Hochwald SN, Ben-David K. Minimally invasive esophagectomy with cervical esophagogastric anastomosis. J Gastrointest Surg 2012;16:1775-81.
4. Chen BF, Kong M, Zhu CC, et al. McKeown minimally invase esophagectomy for the treatment of esophageal cancer: a report of 507 cases. Chin J Thorac Cardiovasc Surg 2013;29:334-8.
5. Zhang Ni, Xu QZ, Cai YX, et al. Operation mode and evolution of full thoracoscopic esophagectomy in treatment of esophageal carcinoma. Chin J Thorac Cardiovasc Surg 2013;29:323-5.

Cite this article as: Xu M, Liu C, Guo M, Sun X, Sun X, Luo J, Tian J, Jiang X. Combined laparoscopic-thoracoscopic esophagectomy and intrathoracic esophagogastric anastomsis. J Thorac Dis 2013;5(6):895-897. doi: 10.3978/j.issn.2072-1439.2013.12.11