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Digital subtraction angiography-guided esophagography, intraluminal drainage, and endoscopic clipping—complex managements for intrathoracic esophagogastric anastomotic leak

Kai Xu, MD,¹ Shaomu Chen, MD,¹ Wen Bian, MD, Hongya Xie, MD, Haitao Ma, MD, and Bin Ni, MD*

The Department of Cardiothoracic Surgery, The First Affiliated Hospital of Soochow University, Soochow University, Suzhou, Jiangsu, China

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ABSTRACT

Background: Intrathoracic esophagogastric anastomotic leak is a critical complication after esophagectomy. Recently, novel complex diagnostic and therapeutic managements for intrathoracic esophagogastric anastomotic leak have been performed at our institution.

Materials and methods: Sixty-seven consecutive patients with intrathoracic esophagogastric anastomotic leak after esophagectomy from January 2009 to May 2015 at our institution were reviewed. Thirty-nine patients received conventional managements (conventional group), in which they were diagnosed via contrast swallow when there was a suspicion of anastomotic leak and were subsequently treated with a metallic stent. Twenty-eight patients received complex managements (complex group), in which they were diagnosed using digital subtraction angiography, an intraluminal drainage tube was placed, and clips were subsequently performed under an endoscope. The outcomes of the two groups were retrospectively analyzed.

Results: There were no significant differences ($P > 0.05$) between the two groups in the preoperative general clinical data, whereas the postoperative data exhibited some differences. Compared with the conventional group, the confirmation time and recovery time are significantly decreased in the complex group ($P < 0.01$ and $P < 0.01$, respectively), and the incidence of severe complications is also lower ($P < 0.01$); however, there were no significant differences in the mortality rate between the two groups ($P > 0.05$).

Conclusions: Complex managements may represent a useful therapeutic option for post-operative esophagogastric anastomotic leak.

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* Corresponding author. The Department of Cardiothoracic Surgery, No.188, Shizi Street, Suzhou City 215006, Jiangsu Province, China. Tel.: +86 13913112174; fax: +86 051267780110.

E-mail address: 976472757@qq.com (B. Ni).

¹ These authors contributed equally to this article.

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Introduction

Intrathoracic esophagogastric anastomotic leak is one of the most lethal complications after esophagectomy because of esophageal carcinoma.¹ An incidence of 0.8%-5.0% has been reported, and the mortality rate is 11.0%-35.7%.^{2,3} Approximately 40% of postoperative deaths are related to esophagogastric anastomotic leak.⁴ The treatment for anastomotic leak is challenging and often requires reoperation or stent managements. With the development of interventional radiology and endoscopic therapy, we have implemented complex methods for the diagnosis and treatment of esophagogastric anastomotic leak. Digital subtraction angiography (DSA)-guided anastomotic radiography and intraluminal drainage were initially performed, followed by endoscopic clips placement when patients were sufficiently stable. The aim of this study is to compare the efficacy of new complex managements and conventional therapies for anastomotic leak after esophagectomy.

Material and methods

Patients

Esophagectomies were performed in 1952 patients for esophageal or esophagogastric junction cancer at our institution from January 2009 to May 2015. Of these patients, 67 patients were confirmed to develop intrathoracic anastomotic leak, and their clinical data were retrospectively assessed. Fifty-two cases underwent an Ivor-Lewis esophagectomy, and 15 cases underwent a Sweet esophagectomy. This study was reviewed and approved by the institutional review board of the First Affiliated Hospital of Soochow University. The patients were divided into two groups according to the different managements they received. Thirty-nine patients from January 2009 to November 2011 received conventional managements (conventional group), and 28 patients from April 2011 to May 2015 received complex managements (complex group). The general clinical data and the treatment outcomes, including the confirmation time (time from clinical sign emergence to anastomotic leak confirmation), the recovery time (time from leak confirmation to oral intake), the incidence of severe complications and death, were compared between the two groups. The data between the Ivor-Lewis and Sweet approaches were also analyzed.

Operation and postoperative care

For all patients, esophagectomy and esophagogastric anastomosis were performed. We used a circular mechanical stapler for anastomosis. A nasogastric decompression tube and thoracic and mediastinal drainage tubes were routinely placed during the procedure. A nasojejunal feeding tube was placed in the Sweet esophagectomy, and jejunostomy was performed during the Ivor-Lewis esophagectomy for enteral feeding.

All patients were extubated after the operation and were transferred to the intensive care unit. The same postoperative

care of the clinical pathway was performed during the hospital stay. All patients were treated with fasting, gastrointestinal decompression, parenteral nutrition, antacids, and prophylactic antibiotics. Enteral feeding was initiated via a nasojejunal tube or jejunostic tube on the third postoperative day. A chest X-ray was obtained on the second postoperative day to assess the lung re-expansion. If there was no fever, leukocytosis, atelectasis, purulent or cloudy pleural effusion, the chest tube was removed. The mediastinal drainage tube was not removed until oral feeding. All patients were followed for at least six months in the outpatient department.

Managements

The methods used to confirm anastomotic leak were as follows: (1) oral administration of methylene blue and observation of dyed drainage fluid; (2) X-ray contrast study; (3) endoscopic examination; and (4) esophagogram under DSA.

Conventional managements

On the seventh postoperative day, the oral administration of methylene blue was routinely implemented. However, if the patients had presentations of fever, leukocytosis, aberrant drainage, or dyspnea, the methylene blue was immediately administered. If the drainage was dyed by methylene blue, a contrast esophagogram was performed. When anastomotic leak was confirmed, therapeutic managements, such as fasting, gastrointestinal decompression, enteral nutrition, antacids, and broad spectrum antibiotics, were performed. When the patients became stable, a contrast esophagogram was performed every other week, and a metallic stent was placed at least 3 wk after anastomotic leak confirmation.

Complex managements

In addition to the managements previously described, once there was a clinical suspicion of anastomotic leak, a DSA-guided esophagogram was immediately performed. An angiographic catheter (COOK, HNBR4. 1-35-100-P-NS-VERT, Bloomington, IN) was inserted to approach the anastomosis, and the contrast agent was injected to identify the location of the leak (Fig. 1A). Once the leakage was identified, the catheter was placed into the defect cavity, and the contrast agent was injected again to investigate the shape and size of the cavity. If the leaking cavity was small (≤ 10 mm in diameter) and well contained, no further invasive treatment was administered, and conservative therapy was applied until the leak healed automatically; otherwise, an endoscopic clip was placed 2 wk later. If the defect cavity was wide, an intraluminal nasogastric tube (Flocare, CH10-130) or a pigtail tube (COOK, 4F) was inserted into the cavity (Fig. 1B and C). If the cavity was not contained, intrathoracic irrigation was established. An irrigating solution of diluted iodine solution (15-mL iodophor diluted with 500 mL normal saline) or metronidazole solution was continuously infused from the intraluminal tube and drained out from the chest tube (1000-1500 mL/d). If the cavity was contained, the drainage tube was connected to a suction device, and the defect cavity was irrigated via the injection of 20-150 mL of irrigating solution into the intraluminal tube every 8-12 h.

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