EVALUATION OF STAPLING TECHNIQUE IN SURGICAL TREATMENT OF ESOPHAGEAL AND CARDIAC CANCER

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ABSTRACT

Objective: To investigate an effective method to prevent anastomotic leakage and stenosis, evaluating the role of stapling technique in surgical treatment of esophageal and cardiac cancer. Methods: The stapling technique was used in end-to-side esophagogastromosis in surgical treatment of esophageal and cardiac cancer. Results: 128 patients were so treated. One patient died of superior mesenteric artery embolism, and the operative mortality was 0.78%. No anastomotic leakage or stenosis was found in this series. The other complications included postoperative thoracic cavity bleeding in 1 (0.78%), myocardial infarction in 2 (1.56%), stress ulcer of stomach in 1 (0.78%), and gastroparsis in 4 (3.12%). The overall morbidity rate was 4.7%. Conclusion: Using stapler to perform end-to-side esophagogastromosis has the advantages of being simple and safe, cutting short the operation time, and preventing leakage and stenosis. It is an ideal technique in the treatment of esophageal and cardiac cancer.

Key words: Esophageal cancer, cardiac cancer, Surgery, Anastomosis, Stapler

Esophageal and cardiac cancer are the very common diseases in China. The mortality of the esophageal cancer is 23.40/100000, and is the 23.53% of the mortality of all cancers. Over 80% patients are beyond 50 years old. The highest mortality is seen in 50–69 years old, and this mortality is over 60% of the total. Unsatisfactory resectional rate and more complications make the survival rate lower. Anastomotic leakage and stenosis are the most dangerous complications. From June, 1986 to October, 1998, we used the stapling technique treating 128 patients with esophageal and cardiac cancer. These results are reported as follows.

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MATERIALS AND METHODS

General Data

From June 1986 to October 1998, we used staplers to treat 128 patients with esophageal and cardiac cancer. When the tumor was radically resected, an end-to-side esophagogastrostomy procedure was done by using the stapler φ 29 (made in Shanghai, China) or PROXIMATE circular stapler CDH25 (Johnson & Johnson Medical, China Ltd.). Of the 128 patients 41 had middle third esophageal lesions, 35 had lower third of esophageal lesions and 52 had cardiac lesions. 82 in male and 46 in female, the age from 33 to 82 years old, and the median age was 55.6 years. The pathological classification included 4, 40, 21, 58 and 5 cases with stage I, IIa, IIb, III and IV respectively. 67 of the anastomosis were above the aortic arch and 61 were below the lower part of it. 7 (5.5%) of all had to be done by prosthesis because of the anastomosis were not perfect, no complications were in these 7 patients after their operations. Preoperative blood transfusion was from 0–800 ml, the average was 206ml, and 40 patients were not transfused in/or after operation.

Operative Technique

For resection of esophageal carcinoma cases, a left posterolateral thoracic incision was performed in all of these patients. The thoracic esophagus was explored to

determine if the tumor could be resectable. Mobilized the stomach at the cardia and the lesser and greater curvatures of the stomach, removed the regional lymph nodes of esophagus and stomach, preserved the right gastro-epiploic artery arcate along the greater curvature of stomach to ensure gastric vascularity. The duodenum was mobilized by a Kocher maneuver, then transected the esophagus, clamped the cardia with the bowel clamp in order to insert the circular stapler in through the cardia. Made a purse-string suture around the esophagus above the tumor beyond 5 cm by using the purse-string device (EH40) or by hand suture with 7# silk thread. A vertical incision was done at lower of the purse-string suture, inserted the anvil of the circular stapler into the esophagus, and tied the purse string onto the anvil shaft, transected the esophagus 0.5 cm below the ligature and removed the diseased segment. Pulled the stomach into thoracic cavity, inserted the stapler through the cardia. Punctured the trocar of the stapler through the fundus of the stomach by turning the adjusting knob counter-clockwise until the orange typing area on the trocar was visible. Attached the anvil onto the trocar until a sound of "click" was heard. Approximated the anvil and the stapler house by turning the adjusting anvil and the stapler house by turning the adjusting knob clockwise again until the orange indicator showed up into the green range of the gap-setting scale. Made sure that the stomach and esophagus were not twisted, released the safety, fired the instrument and simultaneously a sound of "click" was heard and an instant reduction of trigger pressure was felt. Examined the integrity of the two tissue rings, which should be intact including all tissue layers. Checked the anastomosis gently as usual. Few of them needed to add the additional stitches out of the stapler lines as we found the anstomosis was not perfect. Sutured the stomach fundus to the chest wall in order to reduce the tension at the anastomosis. Stapled the cardia with linear stapler.

All the cardiac cancer cases were operated using abdominothoracic incision except one early stage case. An exploratory laparotomy made sure that the tumor was removable and the incision was prolonged into the left thoracic cavity along the eight and nine intercostal spaces.

The peristalsis resumed 2–3 days after the operation, and stopped the gastrointestinal decompression, the liquid diet to full diet was gradually given from 4 to10 days after operation.

RESULTS

There were no failure cases in the treated overall 128 cases of esophageal and cardiac cancer with staplers. No anastomotic leakage and/or stenosis were found in this series. 7 of them the anastomoses were not perfect in the operation, but all recovered when some remedial measures were taken. 1 died of acute superior mesenteric artery embolism on the 13th day after operation, the operative mortality was 0.78%. Five kinds of complications were found in 8 cases (6.25%), such as bleeding in thoracic cavity, myocadiac infarction, gastric stress ulcer bleeding and gastroparesis postoperation were in 1, 2, 1 and 4 cases respectively. All of the above 8 cases were recovered when some conservative treatment was given.

All the patients with esophageal cancer could intake full diet after two weeks before discharged, but those with cardiac cancer had to finished the first adjuvant chemotherapy and discharged.

Overall 128 patients were followed up 1 to 10 years, there were 4 patients missed following up at the second year and considered as the death calculation. 122 patients survived over 1 year (95.3%). The 2, 3, and 5 year survival rate were 76.3%, 65.85, 27.3% respectively, 7 patients (5.5%) survived over 10 years.

DISCUSSION

Anastomotic leakage and stenosis are the greatest immediate danger in the postoperation of esophageal and cardiac cancer. The former always endangers the patient's life and is most likely to occur on the sixth to the eighth day afteroperation. A recent report in China[1] indicated that the incidence was 2.1%–11.6% and the surgical mortality ranged from 28.5%–71%. Logan[2] reported a 5-year survival rate of 20% with an operative mortality of 25% in 1963. Ragamim J, et al.[3] reported in 1993 that 5 of 8 patients (62.5%) who had anastomotic leakage died. The anastomotic stenosis was most likely to occur in the second month, reappearance of difficulty in swallowing was the main symptom. Shao, et al.[4] reported that the incidence of stenosis was 3.7%–5.9%. The incidences of above severe complications of anastomosis with stapler were lower than that of those with the traditional hand-sewn method. This suggests: (1) Using the stapler to perform esophagogastrostomy is simpler and safer than that of traditional hand-sewn method. This is because of the former could had less of the small blood vessels damaged than that of the latter, and could prevent necrosis in the anatomic area; (2) Stapler could make the diameter of the anastomotic stoma enlarged 0.5–1.0 cm than that of the hand suture; (3) The stapler could get more sufficient length of resection of the esophagus and help to reduce the probability of cancer recurrence; (4) The lower tissue reaction in stapling technique compared to the traditional method could reduce the proliferation of fibrous tissue and prevent the anastomotic stenosis.

Although stapling technique is advantageous to the esophgogastrostomy, but also 1.3%–2.4% and 1.9%–5.8% of the incidence of the anastomotic leakage

and stenosis were reported in China[5] recently, and a higher incidence of 16% was reported in Western countries.[6] There were no anastomotic leakage and stenosis in our series. Our experience is: (1) When mobilizing the stomach and resecting the lymph nodes, the right gastroepiploic artery arcade must be preserved intactly, and it is important to ensure the stomach from injured by operative instruments; (2) The remnant soft tissue surrounding the end of esophagus must be eliminated; (3) Made sure that the stomach and the esophagus were not twisted, and there was no other soft tissue or gauze between the anvil and the stapler before firing the instrument. Swinged the stapler gently and pulled stapler out of the stomach almost without any resistance when a sound of "click" was heard; and (4) Examined the integrity of two tissue rings, which should be intact including all tissue layers. If we found it was not perfect, a remedial measure must be taken. 7 of the cases occurred in our operation and no complication was found after operation.

The relationship between blood transfusion and the recurrence rate has been given serious attention in recent years. Lawrance RJ, et al.[7] indicated that preoperative blood transfusion has been increased tumor recurrence rate in a wide range of cancer, and their experimental data confirmed the association among allogeneic blood transfusion, immunosuppression and increased tumor growth. Beynon J, et al.[8] demonstrated that patients who loss significant amounts of blood during surgery or receive blood during or immediately after surgery are the most risk factors of developing a recurrence. Among our series of 128 patients, no blood transfusion was in 40 patients, only 1 patient had a 800 ml blood transfusion because of bleeding in thoracic cavity after the operation; the average transfusion was 206 ml. A careful operation and thorough hemostasis as well as correcting the liver dysfunction could avoid or reduce the amount of blood transfusion.

Surgical treatment of esophageal and cardiac cancer in China is at the leading level of the world. A 70%–95% of the resective rate and 25%–47% of 5-year survival rate were reported in recent years,[9] and the operative mortality was only 3%–5.5%. Shao, et al.[4] reported that they had a 90% survival rate of the early stage of the esophageal and cardiac carcinomas. One of the important causes of recurrence is positive findings of cytological examination at the end of the esophagus. The use of stapling technique could resect the esophageal lesion adequately, reduce the recurrence rate, and increase the survival rate of the patient with esophageal and cardiac cancer. A 86.5% of resective rate and 27.3% of 5-years survival rate were seen in our series. This may be associated with less number of the early stage cases and a few of the patients had a shorter period of following up.

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