

Flexible Endoscopic Treatment of Esophageal Diverticulum: A Case Report

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Case report

Keywords: Esophageal diverticulum, Endoscopy, Metal stent, Surgery

Posted Date: September 17th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-824367/v1>

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Abstract

Background

In the past, surgical resection was the only treatment available for esophageal diverticulum. Minimally invasive endoscopic treatment of esophageal diverticulum has become more and more popular in recent years. We reported a case of transoral endoscopic resection of esophageal diverticulum and crestectomy, which had a similar effect to surgery and retained the physiological function of the esophagus. It has the advantages of short procedure time, short hospital stay, and good long-term prognosis.

Case presentation

A 67-year-old gentleman presented with persistent dysphagia and repeated nausea and vomiting for 2 years. Combined with chest CT, barium esophagography and esophagogastroduodenoscopy, the diagnosis was a mid-esophageal diverticulum. After discussion and communication, the patient underwent oral endoscopic esophageal diverticulectomy. During the operation, the weak area of the bottom muscle layer of the diverticulum was completely removed, and the crest of the diverticulum was cut off, and the kiss suture was performed with titanium clips to reduce tension. After the operation, the right pleural effusion occurred and the lung infection was aggravated, and the right pleural drainage tube was placed to relieve the symptoms. An 18*100mm fully covered metal stent was placed under a gastroscope. Place the duodenal nutrition tube and the gastric tube drainage tube for vacuum suction. After a long period of fasting, enteral nutrition support, adequate postoperative drainage treatment and antibiotic treatment eventually I resulted in full recovery without recurrence.

Conclusion

The selection of treatment for esophageal diverticulum needs to refer to many factors. For the middle esophageal diverticulum, especially those with large diverticulum sac and small mouth, and those who have indications for surgery, in addition to selective surgery and conventional endoscopic surgery, you can also try endoscopic diverticulectomy and crestectomy.

Background

Esophageal diverticulum is a type of gastrointestinal diverticulum, which is relatively rare. The prevalence of esophageal diverticulum is about 4%^[1]. Most esophageal diverticula have no obvious clinical symptoms, and most esophageal diverticula are found accidentally. In general, clinical intervention is required for obvious symptomatic esophageal diverticulum to alleviate pain and improve quality. For those with obvious symptoms or esophageal diverticulum > 1 cm, surgery is the main therapeutic option^[2]. With the rapid development of endoscopy technology, endoscopy is not only a diagnostic method for esophageal diverticulum, but also one of the treatment methods.

Case Presentation

A 67-year-old gentleman presented with persistent dysphagia and repeated nausea and vomiting for 2 years. Half a month ago, He complained of repeated cough and sputum, fever up to 40°C. He was admitted to the respiratory department considering lung infection. A chest Computed Tomography(CT)examination revealed a lung infection (Fig. 1A), and the esophageal diverticulum may contain food debris (Fig. 1). It was about 26mmX34mm.Gastroscopy showed that there were a lot of food residues in the esophagus cavity. The patient was discharged automatically after 1 week of anti-infective treatment. Difficulty in swallowing worsened 1 week ago and was admitted to the Department of Gastroenterology.

Preoperative examinations include chest spiral CT scan, barium esophagography and esophagogastroduodenoscopy (EGD).A CT scan showed that a circular esophageal diverticulum below the tracheal bifurcation, communicating with the esophageal cavity,excluding malignant tumors and external compression (Fig. 2).Barium esophagography showed that barium entered and accumulated in the middle esophageal diverticulum(Fig. 3).EGD showed a mid-esophageal diverticulum(Fig. 4).The lesion was diagnosed as a mid-esophageal diverticulum. After discussion and communication, the patient underwent oral endoscopic esophageal diverticulectomy. The operation was approved by the hospital ethics committee, and the informed consent of the patients and their families was obtained. After marking the oral side 5cm above the diverticulum, perform submucosal injection to lift the mucosa and use the HOOK knife to enter the submucosa from the mucosal layer. A circular incision was made along the submucosa to establish a submucosal tunnel to the diverticulum to separate the bottom of the diverticulum and the diverticulum ring completely. The diverticulum spinal muscle layer was cut evenly at 6 locations, but the esophageal mucosa was retained. Back into the esophageal cavity, two titanium clips and nylon cords were sutured in the middle of the diverticulum wound, and then ten titanium clips were used to clip them completely(Fig. 5). Place negative pressure nasogastric tube. Routine use of antibiotics to prevent infection after surgery. The patient developed chest tightness and chest pain two days later. Re-examination of chest CT showed that the right pleural effusion and lung infection(Fig. 6). Gave right thoracic drainage tube to relieve symptoms. Gastroscopy again revealed that the suture was partially split and 4 titanium clips fell off. An 18*100mm fully covered metal stent was placed along the guide wire and the stent adhered well(Fig. 7). Placed Endoscopic of jejunal nutrition tube and gastric tube drainage tube for negative pressure suction. Chest tightness and chest pain disappeared completely after 5 days. Chest CT examination showed that pleural effusion and lung infection were significantly reduced (Fig. 8A). The patient was discharged on the 10th day after surgery. Nutritional support through duodenal nutrition tube outside the hospital. Then began a liquid diet. One month after the operation, the patient was no obvious discomfort. The patient returned to the hospital for reexamination of chest CT pleural effusion and lung infections were reduced (Fig. 8B). There was no extravasation of lipiodol in lipiodol contrast examination (Fig. 9A). The metal stent was removed (Fig. 8C and 9C). There was no cavity and no fistula in the esophagus. The duodenal nutrition tube was implanted and continues to be given a liquid diet for 1 month (Fig. 10A). 2 months later, there was no obvious trace of extravasation of lipiodol (Fig. 9B). There was no cavity in the operation area and no fistula in the esophagus(Fig. 10B). After half a year, gastroscopy showed postoperative scar, no stenosis, no diverticulum, no fistula, basically smooth wall

and no recurrence of diverticulum (Fig. 10C). There was no esophageal fistula, no recurrence of diverticulum, and no esophageal stenosis after 1 year of reexamination (Fig. 10D). The long-term effect after endoscopic treatment was basically satisfactory. After a 2-year follow-up, the patient had a smooth diet. The patient's clinical symptoms disappeared and the quality of life improved.

Discussion

Esophageal diverticula can be divided into true and false diverticula. True diverticulum includes mucosa, submucosa and muscle layer, while false diverticulum only includes mucosa and submucosa. According to the mechanism of occurrence, esophageal diverticulum can be divided into pulsion and traction.

Traction diverticulum(TD) is a true diverticulum, which is usually caused by mediastinal inflammation^[3]. The middle esophageal diverticulum is a true diverticulum and a traction diverticulum, which usually has a wide base.

Most esophageal diverticula are asymptomatic. However, the development of the disease to a certain degree of esophageal diverticulum can affect the quality of life of patients, and there are risks such as aspiration and suffocation and Oral drug retention in it affects the effect of the drug, and it may become cancerous^[4]. Therefore, intervention measures should be taken after the esophageal diverticulum has obvious clinical symptoms^[5]. It has been reported that surgery is recommended for patients with clinical manifestations such as severe dysphagia, aspiration pneumonia ^[6]. It has been thought that the treatment of esophageal diverticulum needs to be performed under thoracoscopy or laparoscopy. Since esophageal diverticulum is more common in the elderly, patients usually have underlying diseases or cannot tolerate surgical operations. Therefore, more and more scholars have proposed the use of endoscopic minimally invasive treatment of esophageal diverticulum to improve the feasibility and safety of surgery and reduce surgical complications and some adverse events^[7].

The focus of the treatment of esophageal diverticulum is to cut off the diverticulum spine under the mucosa, but this operation has a high probability of repeated symptoms. The cause of diverticulum is often abnormal or absent esophageal muscle layer, which cannot repair itself. Therefore, complete surgical resection can achieve better therapeutic effect. In this paper, a case of esophageal diverticulum underwent endoscopic resection of the weak area of the bottom muscle layer of the diverticulum, and the circumferential muscle of the diverticulum was cut off. Two titanium clips and nylon rope were sutured in the middle of the diverticulum wound, and then the wound was completely closed with the titanium clip. It had a similar effect as surgery and preserved the physiological function of the esophagus. The complications of pleural effusion were related to the limitation of endoscopic suture methods. The treatment goal was achieved by combining the treatment with a fully covered metal stent. In addition, Long-term chronic stimulation of esophageal diverticulum mucosa can induce tumor formation. Therefore, the possibility of developing into cancer of esophageal diverticulum is reduced to some extent.

The choice of treatment for esophageal diverticulum is mainly determined by comprehensive factors such as the anatomical structure of the diverticulum, the size of the diverticulum, the general condition of

the patient, the patient's wishes, and the local medical level^[8]. We believe that the reason for the success of this operation is mainly related to the following factors. First, the weakened area of the muscular layer at the bottom of the diverticulum is removed, which provides sufficient operating space for subsequent operations^[9]. It facilitates the flow of food from the diverticula into the esophageal cavity and avoids the discomfort caused by repeated food stimulation for a long time. Ultimately, the probability of recurrence of esophageal diverticulum decreases. Second, the use of titanium clips, kiss sutures and metal stents. It can reduce the tension of the kiss suture, which is stronger than direct suture. Due to the excessive tension, the titanium clip fell off and was later covered with a self-expanding fully covered metal stent^[10], which eventually formed a tight scar to connect the wound, thereby changing the residual condition of the weakened esophageal muscle layer of the traditional endoscopic treatment. The implantation of a recyclable full-membrane esophageal stent prevents food and secretions from irritating the surgical wound, which is conducive to shortening its healing time. Third, long-term fasting and enteral nutrition support. According to some scholars^[11], the time to start eating after esophageal diverticulum resection should be greater than 5 days, because this is the time required for the formation of granulation tissue. Under tolerable conditions, most patients can carry out enteral nutrition through nasogastric tube. In this case report, the patient had good compliance and half a month of enteral nutrition, which was an important factor in the success of this operation. Third, rational use of antibiotics.

The selection of treatment for esophageal diverticulum needs to refer to many factors. For the middle esophageal diverticulum, especially those with large diverticulum sacs and small mouths, they can be located by esophageal barium meal X-ray and gastroscopy. If it is clear that the diverticulum sacs are large and the mouth is small, you can try endoscopic diverticulectomy and crestectomy. It has no esophageal stricture and postoperative recurrence. This can not only reduce surgical trauma, but also reduce the symptoms of patients and improve the quality of life. It is a bold attempt and breakthrough in the treatment of the original diverticulectomy. The feasibility, effectiveness and safety of this surgical method require more practical experience and accumulation of cases. This may provide a new idea and reference for the treatment of esophageal diverticulum, and it also provides more choices for patients.

Conclusion

The selection of treatment for esophageal diverticulum needs to refer to many factors. For the middle esophageal diverticulum, especially those with large diverticulum sac and small mouth, and those who have indications for surgery, in addition to selective surgery and conventional endoscopic surgery, you can also try endoscopic diverticulectomy and crestectomy.

Abbreviations

CT Computed Tomography

EGD esophagogastroduodenoscopy

Declarations

Acknowledgements

Not applicable.

Authors' contributions

SMZ performed the operation QZ wrote this article. All authors read and approved the final manuscript.

Funding

None.

Availability of data and materials

As this paper is a case report, all data generated or analysed are included in this article.

Ethics approval and consent to participate

This study was approved by the Ethics Committee of the Second Affiliated Hospital of Xuzhou Medical University, Jiangsu, China. Written informed consent was obtained from the patient reported in this study.

Consent for publication

Written informed consent for publication of the clinical details and/or clinical images was provided by the patient.

Competing interests

The authors have no conflicts of interest to declare in this work.

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Figures

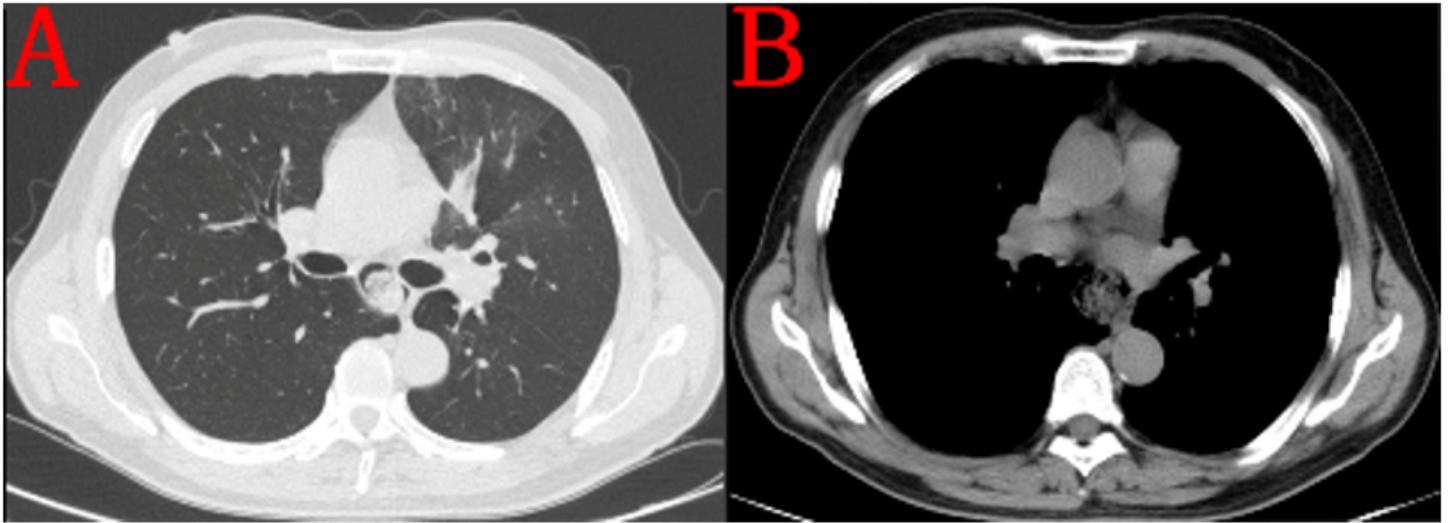


Figure 1

Chest CT examination revealed lung infection (A) and food residue in the esophageal diverticulum (B). It was about 26mmX34mm.

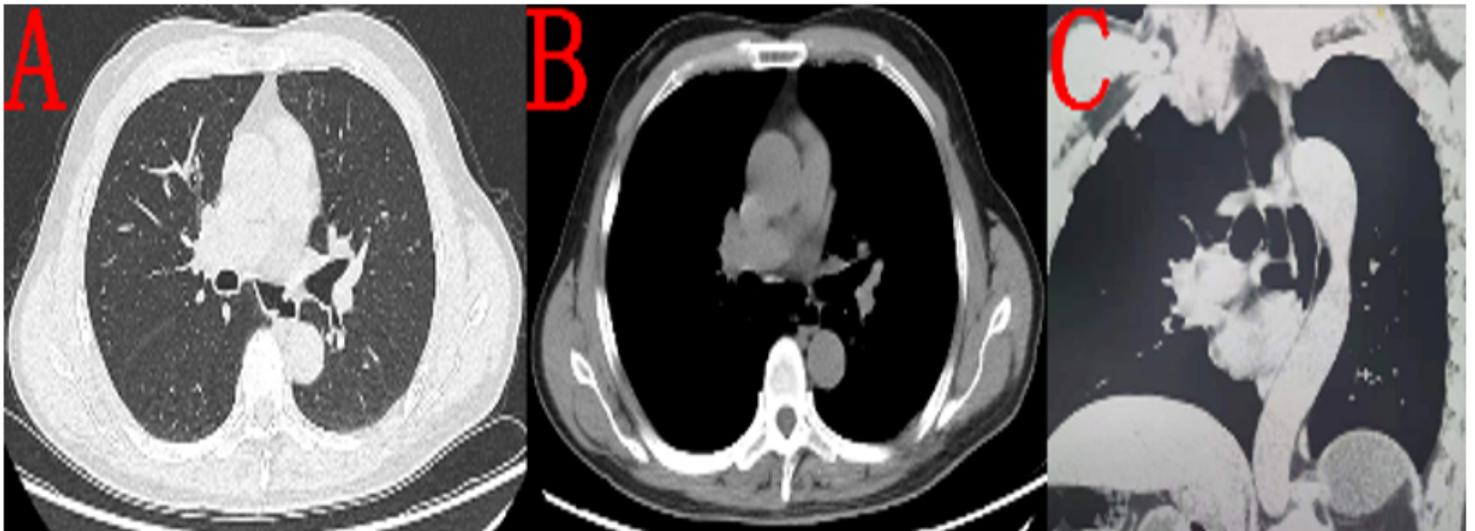


Figure 2

View of preoperative CT scan. The esophageal diverticulum can be seen on CT of the lung window, mediastinal window, and chest CT of the coronal position. It was no external pressure and communicates with the esophagus.

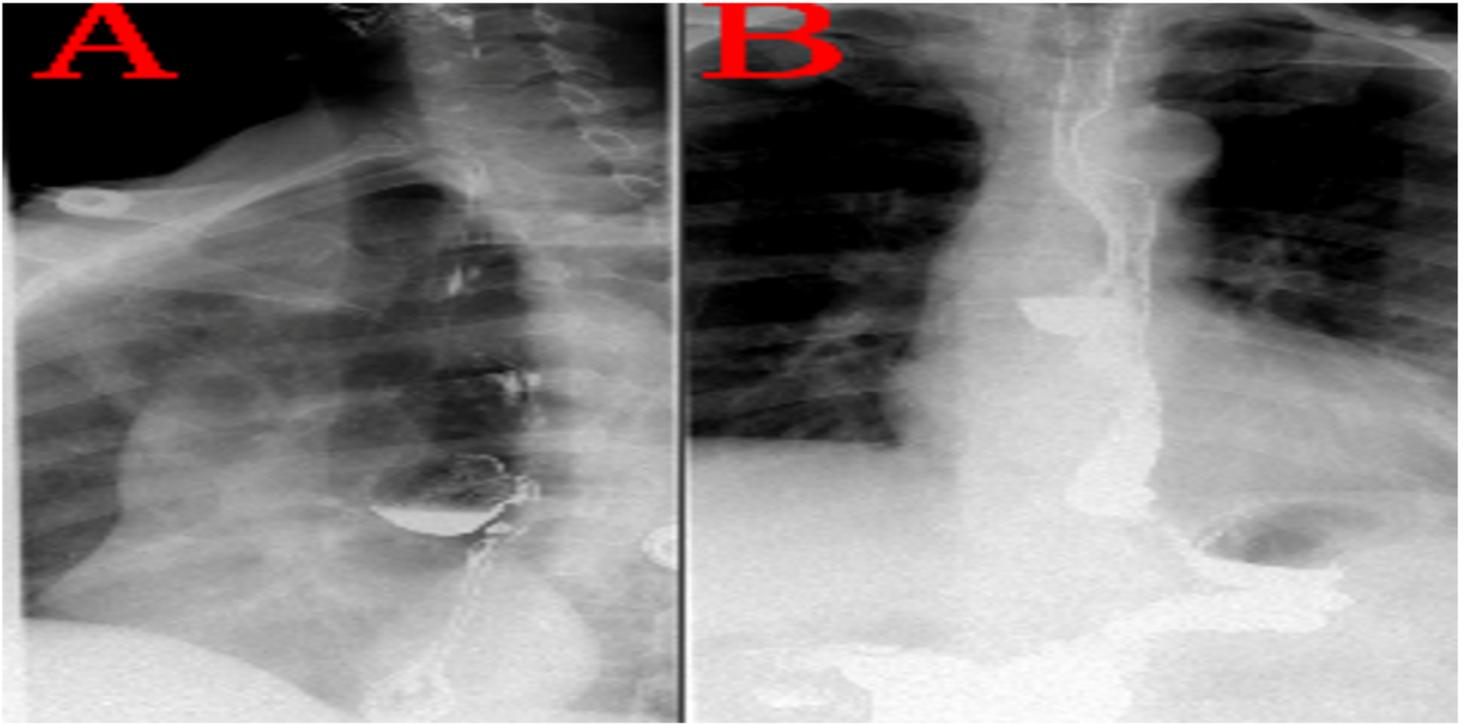


Figure 3

Barium esophagography showed that there was a round capsular shadow in the middle part of the esophagus, which was connected to the esophagus. The capsular neck was small and the capsular bag was larger. This part of the barium enters the capsular bag.

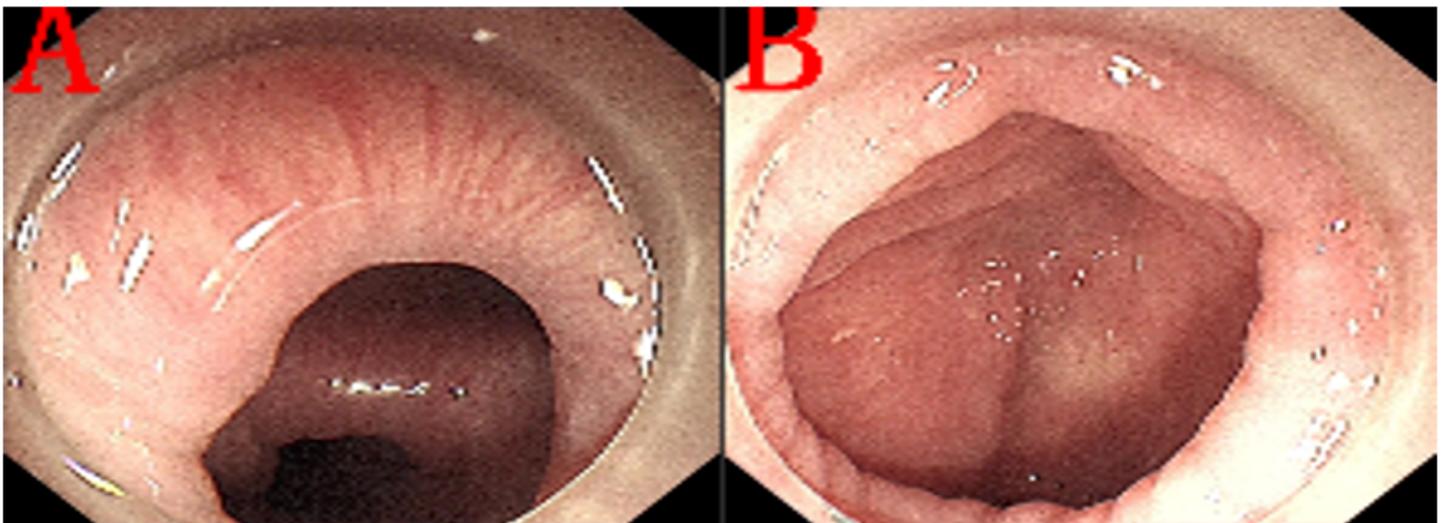


Figure 4

View of preoperative endoscopy. A. Esophageal diverticulum at 30 cm from the incisor. B. Internal observation of diverticulum.

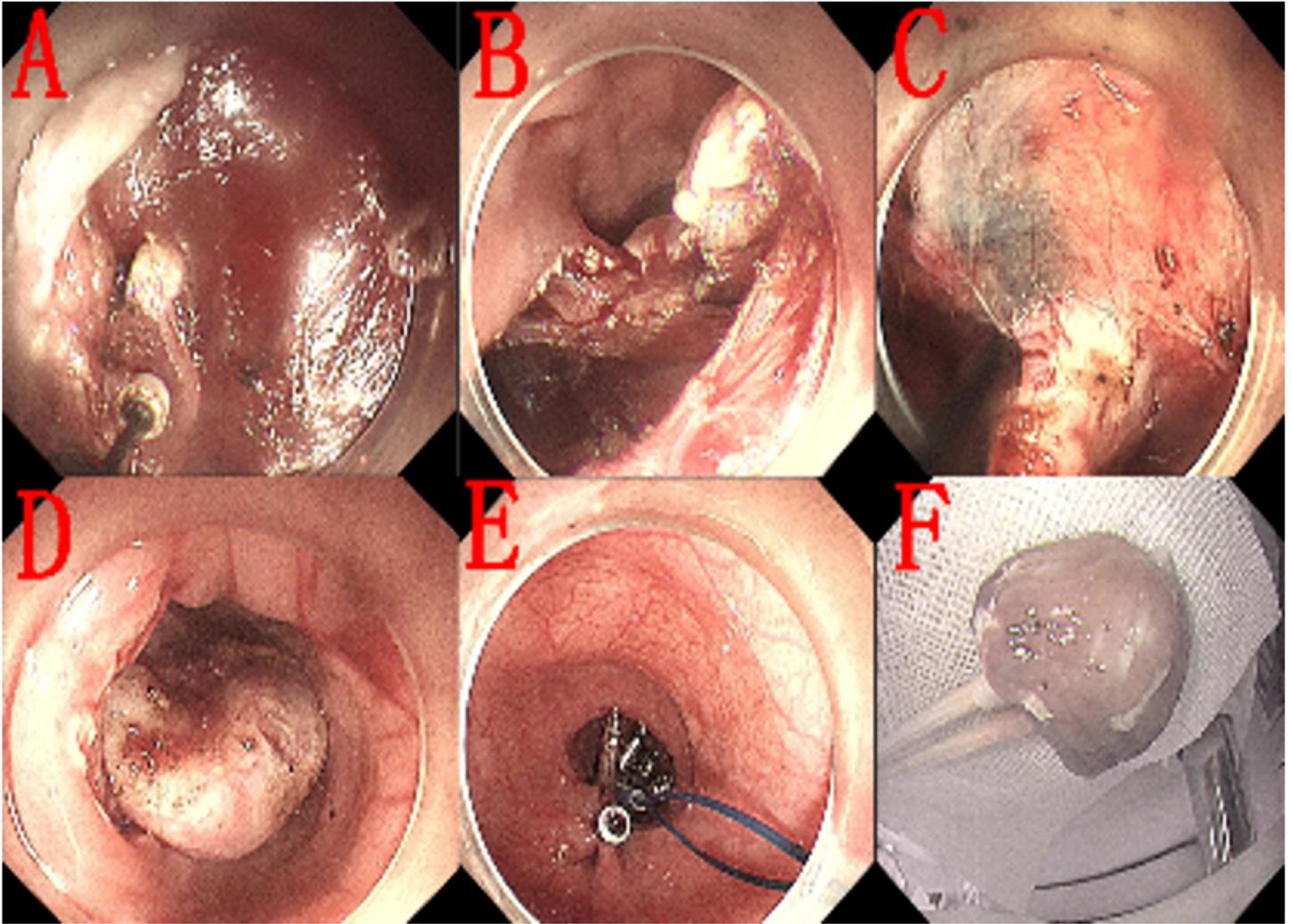


Figure 5

Operation procedure. A. Lift the mucosa under the transparent cap, and the HOOK knife entered the Submucosa from the mucosal layer 5cm above the diverticulum to create a submucosal tunnel. B. Completely separated the bottom of the diverticulum and the ring of the diverticulum. C. It was divided into 6 full-thickness sections to cut the muscular layer of the crista diverticulum. D. Pull the diverticulum back into the esophageal cavity, and completely removed the bottom of the diverticulum. E. Back into the esophageal cavity, two titanium clips and nylon cords were sutured in the middle of the diverticulum wound and the titanium clips were used to clamp them completely. F. Excised diverticulum.



Figure 6

Two days later, the patient developed dyspnea and chest tightness. Re-examination of chest CT showed that the lung infection was aggravated and pleural effusion appeared. The right thoracic drainage tube was inserted to strengthen anti-infective treatment.

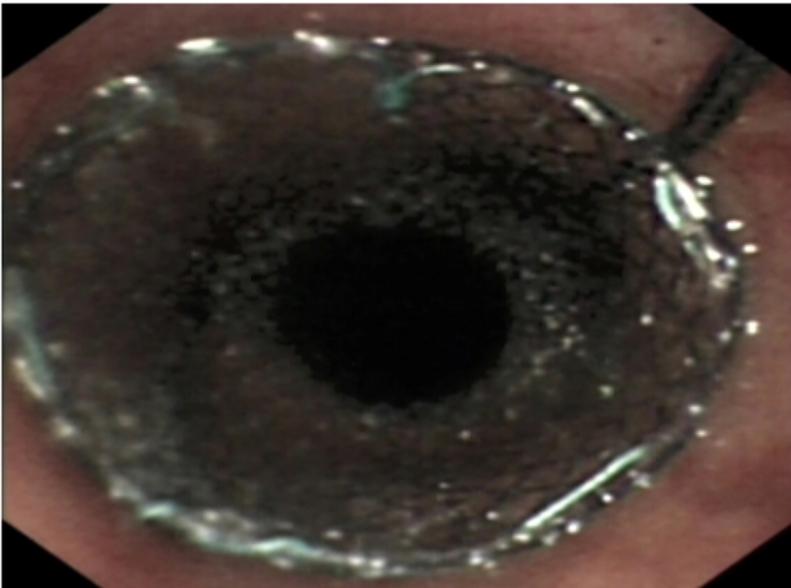


Figure 7

Gastroscopy revealed that part of the titanium clip had fallen off. An 18*100mm fully covered metal retrievable metal stent was placed, and the duodenal nutrition tube was placed.

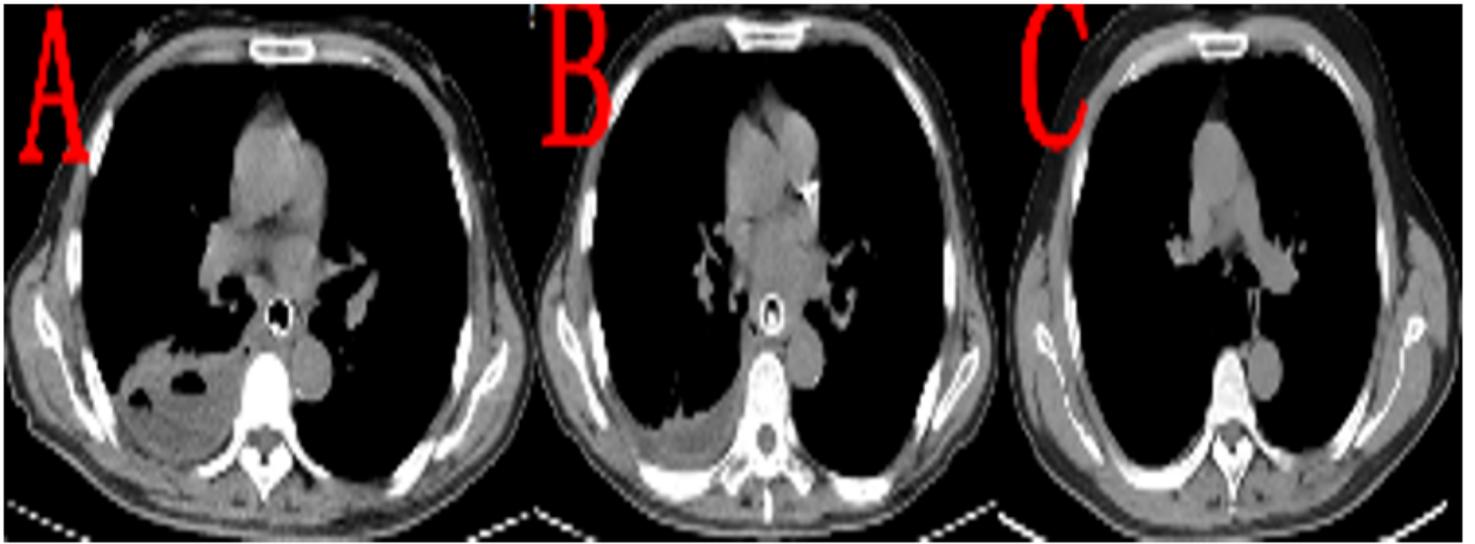


Figure 8

Reexamination of chest CT at 5 days (A) and 1 months after operation (B), pleural effusion and lung infection were significantly reduced compared to before. Esophageal stent removed (C) .

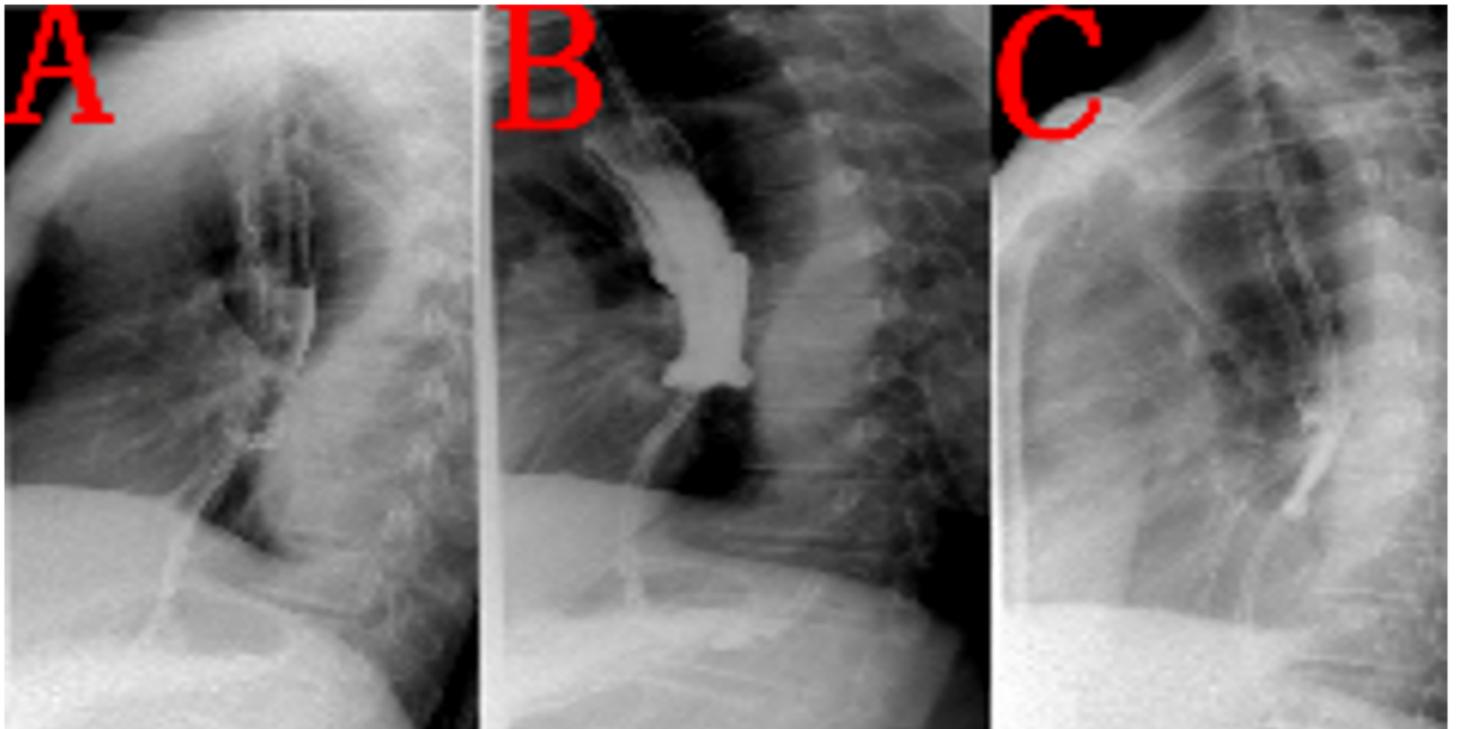


Figure 9

After 1 month (A) and 2 months later (B), re-examination of lipiodol imaging: the esophagus is unobstructed and there was no contrast agent leakage from the anastomosis; C Esophageal stent removed.

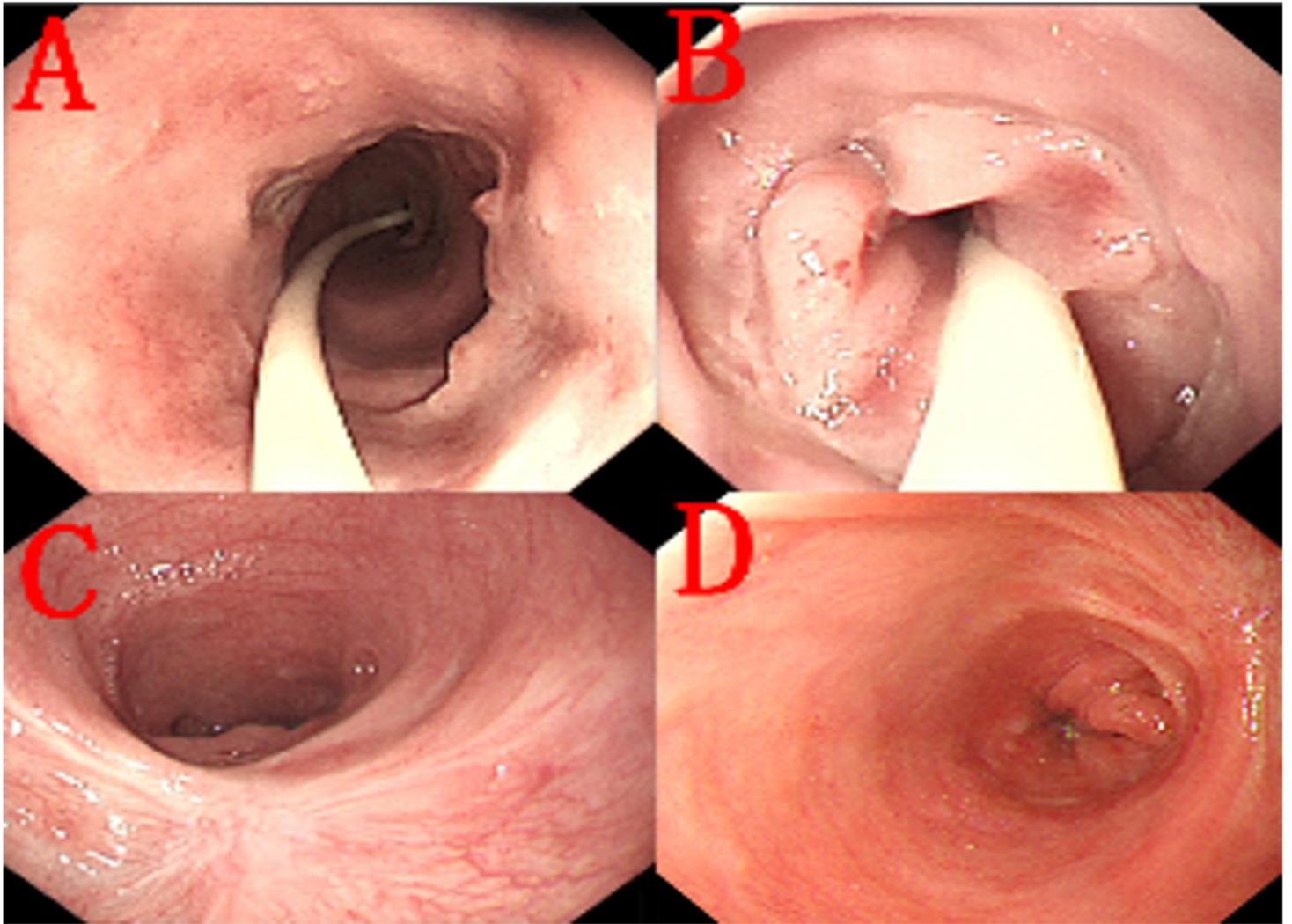


Figure 10

Postoperative review 1 month after endoscopy (A): The patient took the duodenal feeding tube for 1 month, removed the esophageal stent, and continued to receive nutrition tube nutrition therapy; 2 months after the operation (B): Seen under endoscopy The original fistula mucosal hyperplasia, smooth surface, no fistula, remove the nutrition tube; half a year after the operation (C): postoperative scars can be seen in the middle of the esophagus, no stenosis, the wall was basically smooth, no diverticula, no fistula; 1 year after the operation Reexamination endoscopy (D): Postoperative scars and a little mucosal hyperplasia can be seen in the middle of the esophagus, the surface is smooth, and there was no recurrence of diverticulum.