

Endoscopic closure of an iatrogenic rupture of upper esophagus (Lannier's triangle) with the use of endoclips – case report and review of the literature

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Abstract

We present a case report regarding a 74-year-old male with iatrogenic esophageal perforation, after an attempt to remove a food bolus impaction at Lannier's triangle (proximal esophagus). The perforation was treated endoscopically (flexible EGD) by clip application in two sessions, with excellent outcome.

Esophageal perforations occur rarely, usually following a medical procedure. The clinical manifestations are often insidious with potentially catastrophic complications. Although the majority of cases have been treated conservatively and/or operatively over the years, there is a rising tendency for non-operative endoscopic interventions due to the high morbidity and mortality rates seen even in specialized units. For this reason self-expandable stents, endoclips, tissue sealants and suturing devices have been used. A high degree of clinical suspicion is essential for successful management of esophageal perforations, as is early decision to intervene and respect for basic surgical principles such as prevention and limitation of extraesophageal contamination, prevention of reflux of gastric contents and restoration of gastrointestinal tract integrity.

The published reports on the use of endoclips for repairing perforations of the proximal esophagus are rare. To our knowledge, this is the first case report regarding the endoscopic application of endoclips for the successful closure of an iatrogenic perforation at Lannier's triangle.

Keywords upper esophageal perforation, Lannier's triangle, endoscopic treatment, endoclip application

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Case report

A male patient 74 years of age, presented at the emergency room (ER) of AHEPA University Hospital of Thessaloniki,

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claiming acute food bolus impaction. His symptoms were cervical and retrosternal pain, upper dysphagia, and salivation. His vital signs were BP=140/80 mmHg, HR=90/min, saO₂=96%, T=36.7°C, RR=24/min. His medical history included impaired heart function (ejection fraction estimated by cardiac echography=40%), chronic obstructive pulmonary disease, cerebral stroke (left-sided paresis) and osteoporosis. He was referred to the laryngologists of the ER and was admitted to their department.

The same day and under general anesthesia the laryngologists removed with a rigid instrument a piece of dried plum that was impacted at the upper esophageal sphincter (UES). During the procedure the esophageal wall was damaged.

Abbreviations: ER, Emergency Room; BP, Blood Pressure; HR, Heart Rate; T, Temperature; RR, Respiratory Rate; COPD, Chronic Obstructive Pulmonary Disease; UES, Upper Esophageal Sphincter; EGD: Esophago-Gastro-Duodenoscopy; CT, Computerized Tomography; TH: Thoracic

A cervical-thoracic CT scan was immediately performed which documented free air at the cervical region as well as in the upper mediastinum [Fig. 1]. A nasogastric-tube was placed and broad-spectrum antibiotics was initiated intravenously.

The next morning, a consultation by the gastroenterologists was requested. The patient had normal vital signs and no significant symptoms. A flexible EGD was performed to directly assess the extent of the damage. The EGD revealed rupture of the esophageal posterior wall right below the UES, an area corresponding to the anatomical site of Lannier's triangle [Fig. 2].

The patient's management was: endoscopic stitching with placement of four clips (Long-Clip, Olympus), nasogastric tube for gastric content drainage, IV administration of broad-spectrum antibiotics, proton-pump inhibitors and total parenteral nutrition.

A fluoroscopy with gastrographin meal at day 5 showed leakage from the upper esophagus (TH1 vertebra) to the mediastinum [Fig. 3]. The patient's condition remained stable (no fever or signs of discomfort or inflammation).

A second endoscopic assessment was required which depicted approximation of the edges of the rupture by 4/5 and the fall of the original clips. Another attempt at endoscopic stitching was made with the use of three endoclips without previous ablation of the margins of the stoma [Fig. 4].

Seven days later, fluoroscopy after gastrographin meal showed no leakage at all [Fig. 5].

Discussion

Esophageal perforation is a rare and serious event with potentially catastrophic complications that could result in rapid deterioration and death.

The most common causes of esophageal perforation



Figure 1 Esophageal rupture documented by cervical CT scan

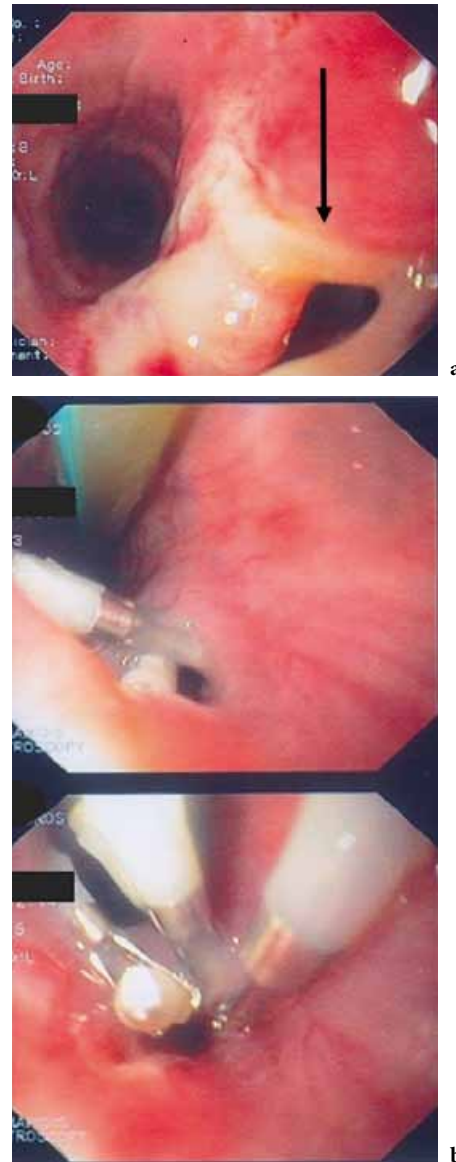


Figure 2 a. The rupture site via flexible EGD, b. First endoscopic intervention, with the use of endoclips

are iatrogenic-instrumentation (i.e. tracheal intubation, rigid laryngoscopy, EGD, EUS, bougie dilation, placement of nasogastric tube) (59%), spontaneous perforation or Boerhaave's syndrome (15%), foreign-body ingestion (12%), trauma (9%), operative injury (2%), tumor (1%) and other causes (2%) [1].

The majority of cases involve the middle and distal esophagus. The cervical esophagus is the site of rupture in only 20%, but the incidence rises in cases of trauma and foreign body ingestion [7,9,10].

Lannier's triangle represents an anatomical region at the posterior wall of proximal upper esophagus. Its upper limit (triangle's base) is defined by cricopharyngeal muscle. In posterior, its surface osculates with the 6th cervical vertebra.

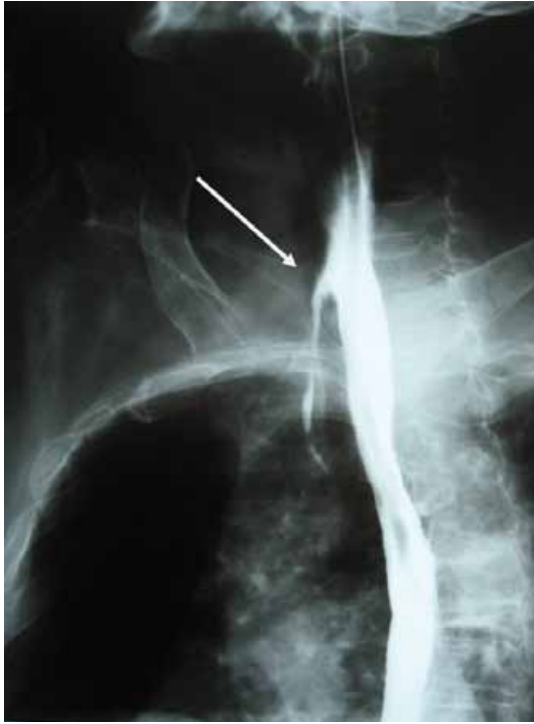


Figure 3 Esophagogram with gastrographin meal at day 5 revealed leakage from the upper esophagus

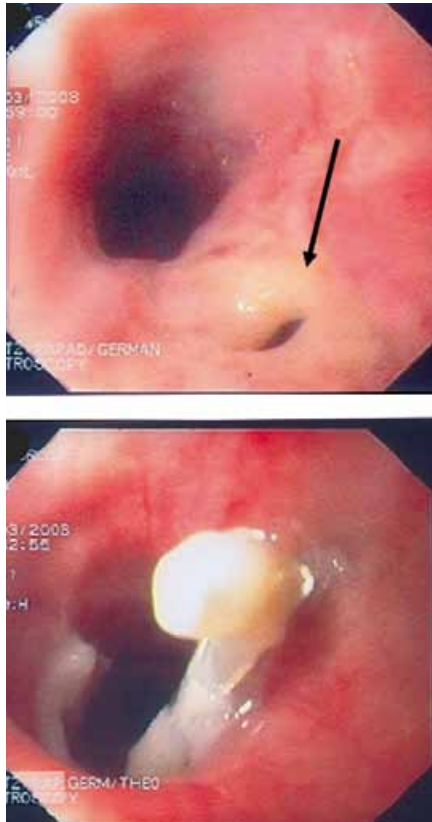


Figure 4 Second endoscopic intervention, once again with endoclips

At this site and in contrast with the rest of the esophagus, the wall consists of only one muscle layer (circumferential). Thus, Lannier's triangle is known to be a vulnerable site prone to trauma and perforation during several medical procedures, including use of rigid instrument with head hyperextension for foreign body disimpaction, especially in case of pressure of the rigid scope over a cervical vertebra bone spike [3,15].

The symptoms and signs of esophageal perforations vary according to the esophagus section involved, etiology and the time interval until patient's presentation. Patient may be completely asymptomatic or may present with pneumothorax, pneumomediastinum, mediastinitis, peritonitis, empyema, sepsis. In the case of cervical esophagus, primary clinical manifestations include neck pain, dysphagia, subcutaneous emphysema with cervical crepitus, bloody regurgitation, dysphonia. In severe or in neglected cases patients may present with chest or back pain, tachycardia, pleural effusion, fever, leucocytosis, shock or sepsis [1,13], so early diagnosis is considered of high importance.

Diagnosis of cervical esophageal perforation is established by combining endoscopic and radiologic examinations such as flexible EGD, cervical lateral X-Rays, esophagogram with water-soluble contrast solution and cervical-thoracic CT scan.

Until recently, the majority of cases of esophageal perforation were treated conservatively and eventually operatively, especially in case of extended injury or patient's rapid deterioration. The classical surgical treatment modalities included suture, esophagectomy, or cervical exclusion [12,14], with mortality rates ranging from 20-32% even in specialized tertiary units [2-4].

A trend that has emerged in the last few years is to treat

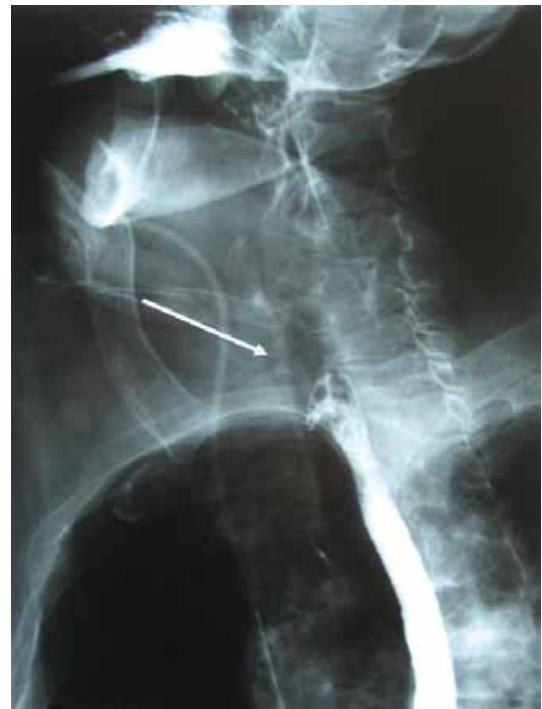


Figure 5 Esophagogram at day 12 confirmed the successful result

selected patients endoscopically, via flexible EGD [12]. Several parameters are taken into consideration regarding patient selection and individual approach. These reflect perforation characteristics and patient's characteristics including time interval (acute vs. chronic), size and localization, etiology, presence of tumor, evidence of sepsis, age and co-morbid conditions. However, the most essential elements of successful management of esophageal perforations remain a high degree of suspicion and early decision to intervene [3,4,11,13,14]. The endoscopist must respect basic surgical principles such as prevention and limitation of extraesophageal contamination and sepsis, prevention of reflux of gastric contents, as well as restoration of gastrointestinal tract integrity. For this reason endoclips, tissue sealants, endoscopic suturing devices, surgical strips and self-expandable stents (semi or fully-covered, metal or plastic) have been used [1,2,12].

In our case, the clip application was selected for several reasons. Firstly, the patient's general status could not promise the successful outcome of major surgery, especially if there was further deterioration after non-response to conservative treatment. Secondly, he was referred promptly to our unit (in the first 24h) and in relatively good condition (without evidence of sepsis or any other complications). Thirdly, the damage itself (site, extent, morphology) along with the benign nature of the underlying esophageal mucosa, dictated the use of this method vs. any other endoscopic intervention (stent, tissue adhesives).

A review of the international literature was made on the therapeutic use of endoclips in esophageal perforations. The data is limited, especially regarding the cervical region of the esophagus. A pooled analysis by Qadeer et al [2] reviewed 17 cases of perforations of various etiologies, all treated with endoclip application and all situated at middle or distal esophagus. As far as the upper esophagus is concerned, only two case reports were retrieved, one by Gerke et al [5] (perforation of the esophagus after insertion of an endoscope bearing a mucosectomy cap) and a second by Fischer et al [6] (perforation of the anterior esophagus during an urgent bedside tracheostomy), both treated by endoscopists with endoclips and with excellent results. No case was found referring to endoscopic closure of a perforation at Lannier's triangle with the use of endoclips.

Conclusion

Esophageal perforations occur rarely, usually following a medical procedure. The clinical manifestations are often insidious with potentially catastrophic complications. High suspicion, early detection and appropriate treatment are of value. Although the majority of cases have been treated

conservatively and/or operatively over the years, there is a rising tendency for non-operative endoscopic interventions due to the post-surgical high morbidity and mortality rates seen even in specialized tertiary units. The published reports on the use of endoclips for repairing perforations of the proximal esophagus are extremely rare.

To our knowledge, this is the first case report regarding the endoscopic application of endoclips for the successful closure of an iatrogenic perforation at Lannier's triangle.

References

1. Raju GS, Thompson C, Zwischenberger JB. Emerging endoscopic options in the management of esophageal leaks. *Gastrointest Endosc* 2005;**2**:278-286.
2. Qadeer MA, Dumot JA, Vargo JJ, Lopez AR, Rice TW. Endoscopic clips for closing esophageal perforations. *Gastrointest Endosc* 2007;**3**:605-611.
3. Jougon J, Delcambre F, MacBride T, Minniti A, Velly JF. La mortalite des perforations instrumentales de l'oesophage est elevee: experience de 54 cas traites. *Ann Chir* 2002;**127**:26-31.
4. Vogel SB, Rout WR, Martin TD, Abbitt PL. Esophageal perforation in adults: aggressive, conservative treatment lowers morbidity and mortality. *Ann Surg* 2005, **241**:1016-1021
5. Gerke H, Crowe GC, Iannettoni MD. Endoscopic Closure of cervical esophageal perforation caused by traumatic insertion of a mucosectomy cap. *Ann Thorac Surg* 2007;**84**:296-298.
6. Fischer A, Schrag HJ, Goos M, von Dobschuetz E, Hopt UT. Nonoperative treatment of four esophageal Perforations with Hemostatic Clips. *Dis Esophagus* 2007;**20**:444-44.
7. Hasan S, Jilaihawi AN, Prakash D. Conservative management of iatrogenic oesophageal perforations-a viable option. *Eur J Cardiothorac Surg* 2005;**28**:7-10.
8. Amir AI, van Dulleman H, Plukker JT. Selective approach in the treatment of esophageal perforations. *Scand J Gastroenterol* 2004;**39**:418-422.
9. Fernandez FF, Richter A, Freudenberg S, et al. Treatment of endoscopic esophageal perforation. *Surg Endosc* 1999;**13**:962-966.
10. Brinster CJ, Singhal S, Lee L, et al. Evolving Options in the Management of Esophageal Perforations. *Ann Thorac Surg* 2004;**77**:1475-1483.
11. Huber-Lang M, Henne-Bruns D, Schmitz B, Wuerl P. Esophageal perforation: principles of diagnosis and surgical management. *Surg Today* 2006;**36**:332-340.
12. Siersema PD. Treatment of esophageal perforations and anastomotic leaks: the endoscopist is stepping into the arena. *Gastrointest Endosc* 2005;**61**:897-900.
13. Hinojar AG, Diaz MAD, Pun YW, Hinojar AA. Management of hypopharyngeal and cervical oesophageal perforations. *Auris Nasus Larynx* 2003;**30**:175-182.
14. Rohatgi A, Papanikitas J, Sutcliffe R, Forshaw M, Mason R. The role of oesophageal diversion and exclusion in the management of oesophageal perforations. *Int J Surg* 2009;**7**:142-144
15. Jones WG, Ginsberg RJ. Esophageal perforation: a continuing challenge. *Ann Thorac Surg* 1992;**53**:534-543.