

# Endoscopic Management of Double Esophageal Perforation by Ingested Foreign Body Using Over-the-Scope Clip: A Case Report

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## Abstract

### Keywords

- esophageal foreign body
- endoprosthesis
- endoscopy
- esophageal perforation

Esophageal perforation is a life-threatening condition with a high mortality rate. First described around 300 years ago, management of this fatal condition has emerged from surgical to endoscopic modalities with much less morbidity and mortality when instituted early. We present this case of 55-year-old male, with double esophageal perforation by meat bone, perforating lower esophageal wall, leading to localized hydropneumothorax on right side with mild bilateral pleural effusion managed endoscopically with Over-the-Scope-Clip. Endoscopic management of esophageal perforation has been well mentioned in literature, without any mention of such management in case of double esophageal perforation. Surgery with or without endoscopy remains the main stay of management of such cases.

## Introduction

Esophageal perforation (EP) though rare, is a potentially life-threatening event. In 1724, Hermann Boerhaave reported the first case of spontaneous esophageal rupture after repeated episodes of vomiting.<sup>1</sup> The first attempt at surgical repair was done by Barrett and Olson in 1947.<sup>2,3</sup> With the development of endoscopic technology during the last two decades, endoscopic clips and self-expanding stents have been used successfully and widely in the treatment of esophageal perforations.<sup>4,5</sup> Esophageal injury was first closed endoscopically with the placement of clips in 1995.<sup>6</sup> To date, the method has been successful, especially in the treatment of small (<2 cm) injuries. EP is most commonly iatrogenic following instrumentation, followed by spontaneous or caused by foreign body ingestion, thoracic trauma, or malignant growth. A total of 80% of cervical perforations and for 9 to 35% of all esophageal perforations are secondary to ingested foreign bodies.<sup>7</sup>

With a rise in interventional endoscopic techniques, notably natural orifice transluminal endoscopic surgery (NOTES), endoscopic submucosal dissection (ESD), peroral endoscopic myotomy (POEM), and endoscopic full-thickness resection

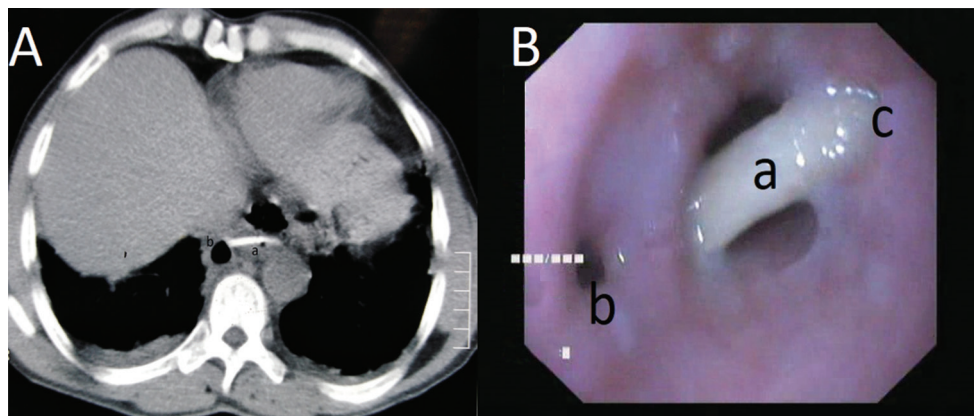
(EFTR) for the management of various benign and malignant conditions of the gastrointestinal (GI) tract, all have contributed to the rising incidence of iatrogenic GI tract disruptions. Foreign body impacting at narrowed portion can lead to its extraluminal migration perforating nearby organs, trachea or aorta, often with fatal consequences, or mediastinitis which spreads easily as the esophagus is surrounded by loose stromal connective tissue.<sup>8</sup>

Diagnosis of EP requires radiologic and endoscopic examination. Conventional radiology can show various complications like pneumothorax, pneumoperitoneum, pneumomediastinum, subcutaneous emphysema. A computed tomography (CT) scan can help in confirming the diagnosis. Endoscopy with a sensitivity and specificity of 100 and 83%, respectively, can be diagnostic and therapeutic at the same setting, enabling the extraction of the foreign body. Repair of perforation can be considered endoscopically using endoprosthesis, endoscopic clipping, or gluing. If endoscopy fails surgical intervention for foreign body removal and perforation, closure is to be considered. However, the choice of an appropriate treatment depends on the type of perforation, the performance status of the patient, and the availability of resources.

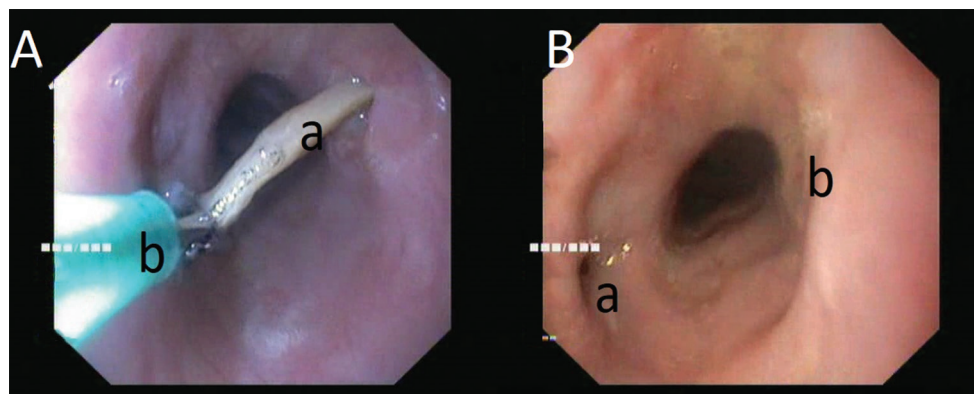
## Case Report

A 55-year-old male patient presented with complaints of sudden onset dysphagia with odynophagia for 2 days before presenting to emergency department of our hospital. Symptoms started soon after his night meal in which he had chicken which was swallowed improperly. No history of fever, cough or shortness of breath was there and he was hemodynamically stable. There was no history of alcohol intoxication or substance abuse. Before coming to our center, he visited a nearby hospital where chest radiography along with CT thorax with abdomen was done. CT examination was suggestive of linear hyperdense (density, 243–296 HU) lesion of size 3.1 cm in lower esophagus with localized pocket of air fluid level of 1.8 cm thickness and 7 cm in craniocaudal extent on right side; along with mild bilateral pleural effusion (►Fig. 1A). However, in view of nonavailability of endoscope he was referred to our hospital. On examination, there was local tenderness in subxiphoid and epigastric region. His routine investigations were normal. Patient was started on intravenous antibiotics. Upper GI endoscopy (UGIE) was performed which was suggestive of foreign body, most probably chicken bone in lower esophagus which was impacted in one wall of the esophagus with free perforation seen on the opposite wall (►Fig. 1B). The bone was held carefully with Olympus Rat Tooth Alligator

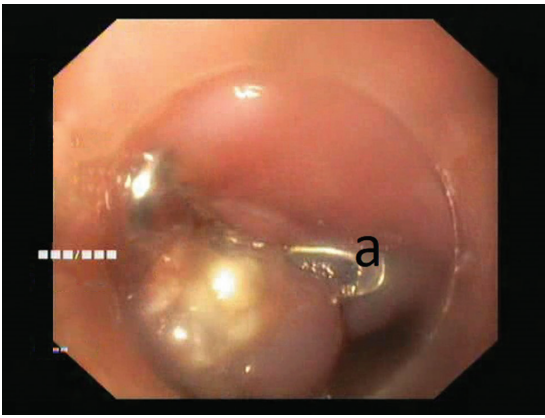
Jaw Grasping Forceps and was gently removed (►Fig. 2A). Post removal, endoscopy revealed presence of two fistulous tracks in both lateral walls of esophagus of size  $1.5 \times 0.5$  cm in one side and  $1 \times 0.5$  cm on the other side (►Fig. 2B). The edges of the large fistula were ablated with argon plasma coagulation. Over-the-Scope-Clip (OTSC, Ovesco Endoscopy GmbH, Tubingen, Germany) was used to seal off the perforation. The target area was approached perpendicularly, facing the lesion, and the two wound edges were sucked into the cap resulting in a full-thickness clip apposition (►Fig. 3). The other fistula could not be approached in the same setting because of marked surrounding edema and putting a second clip in the same setting, might lead to mark esophageal luminal compromise. Under endoscopic guidance, guidewire was passed to antrum and nasojejunal tube was inserted for feeding. Intravenous antibiotics was continued for 7 days. Patient was discharged in hemodynamically stable condition without any fresh complaints. Repeat UGIE was considered after 3 months. Edema around the fistula had substantially resolved by that time and repeat procedure using Over-the-Scope Clip (OTSC, Ovesco Endoscopy GmbH, Tubingen, Germany) was considered for the second fistula (►Fig. 4). Similar to previous procedure, argon plasma coagulation was considered to ablate the edges first followed by application of the clip. Patient tolerated procedure well.



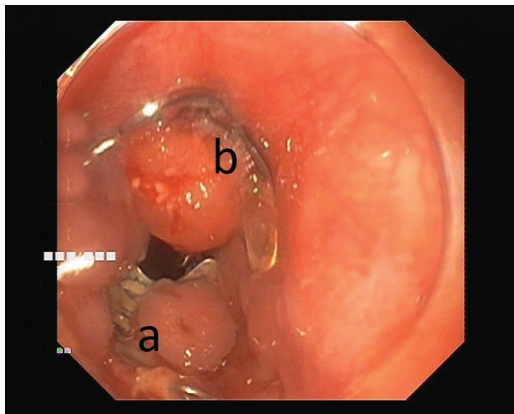
**Fig. 1** (A) CT scan showing impacted meat (chicken) bone (a) and localized air collection in right side (b). (B) Endoscopic view: impacted Meat (chicken) bone (a); and perforation sites in lateral walls of esophagus (b and c).



**Fig. 2** (A) Endoscopic removal of meat bone (a) with Olympus Rat Tooth Alligator Jaw Grasping Forceps (b). (B) Endoscopic view of (a) perforation sites and (b) below the esophageal fold in two opposite walls of esophagus.



**Fig. 3** Endoscopic Over-The-Scope Clip application in perforation site on right lateral wall of esophagus (a).



**Fig. 4** Endoscopic Over-The-Scope Clip application right lateral wall (a) left lateral wall (b) of esophagus.

## Discussion

To our knowledge, this remains the first case of double esophageal perforation with localized right hydropneumothorax, who presented after 24 hours, managed successfully with endoscopic procedure using OTSC. OTSC can provide full-thickness closure of open defects up to 2 to 3 cm. Three different clip tooth shapes are available which are suitable for different indications: (T) traumatic, for fistulas or perforations (A) atraumatic, to control bleeding, and (GC) gastrostomy closure. Multicenter prospective cohort study from Europe with iatrogenic perforations (colon being the most common site, followed by duodenal, gastric, and esophageal cases), has shown that 89% of patients had successful closures after OTSC application without any adverse events.<sup>9</sup> Single-center Swiss study has shown that OTSC used for fistulae and anastomotic leakage after GI surgery, primary technical success, defined as the adequate deployment of the OTSC on the target lesion, and clinical success, defined as resolution of the problem of 85 and 67%, respectively.<sup>10</sup> Multicentric study at Italy has shown that OTSC used in iatrogenic perforation during diagnostic or therapeutic endoscopy had technical success rate of 10% with clinical success of 90%.<sup>11</sup> German

study has shown that in a set of nonsurgical perforation and postoperative leak or perforation, successful closure using OTSC was obtained in 76.5% of patients, which had resulted in a significant shorter hospital stay.<sup>12</sup>

Multidisciplinary approach (surgeon, endoscopy specialist, and intensive care therapist) should be considered in management of esophageal perforations. Endoscopic closure of early, well-defined esophageal perforations represents a therapeutic alternative to surgical treatment thereby reducing morbidity and even mortality to a large extent.

## Financial Support

Nil.

## Conflict of Interest

None.

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