Japanese Journal of Gastroenterology and Hepatology

Case Report ISSN: 2435-1210 | Volume 8

# How To Approach Difficult Esophageal Intubation: a Case Report and Literary Review

**Cecilia Binda[1], Chiara Coluccio[1], Valentina Paci[1,3], Carlo Fabbri[1] and Ruggero Massimo Corso[2]**

[1]Gastroenterology and Digestive Endoscopy Unit, "G.B. Morgagni-L. Pierantoni" Hospital, Forlì, Italy

[2]Anesthesia and Intensive Care Unit, "G.B. Morgagni-L. Pierantoni" Hospital, Forlì, Italy

[3]S.Orsola-Malpighi Hospital, Alma Mater Studiorum University of Bologna

***Corresponding author:**

Chiara Coluccio,
Gastroenterology and Digestive Endoscopy Unit, Forlì-Cesena Hospitals, Via Carlo Forlanini 34, 47121, Forlì, AUSL Romagna, Italy,
E-mail: chiara.coluccio@auslromagna.it

Received: 25 Mar 2022
Accepted: 08 Apr 2022
Published: 14 Apr 2022
J Short Name: JJGH



**Citation:**

Chiara Coluccio, How To Approach Difficult Esophageal Intubation: a Case Report and Literary Review.
J Gstro Hepato.. V8(13): 1-5

**Keywords**:

Difficult esophageal intubation; Airtraq laryngoscope; Retrograde cholangio-pancreatography

## 1. Abstract

Certain clinical conditions may make esophageal intubation difficult, and sometimes impossible, in particular when using a side-viewing duodenoscope. To date, evidences on this topic are limited to case reports or small case series, therefore there is not a standardized management of this situation. In this report we describe a case of difficult esophageal intubation during an endoscopic retrograde cholangio-pancreatography (ERCP) and we performed a literary review on this topic. As reported in our case and as emerged from literature, this condition may be overcome with a close collaboration among different figures, such as endoscopist and anesthesiologist. At the moment, whether general anesthesia or sedation are different for the purposes of intubation difficulty is controversial, probably much more important is to implement a strategy that goes from the prediction of the difficulty to its management with different patient tailored techniques.

## 2. Introduction

A difficult esophageal intubation is defined as a clinical condition in which a trained endoscopist experiences difficulty in inserting the gastroscope into the esophagus. It is difficult to determine the real incidence of this event although a failure intubation rate for oral gastroscopy of 0,95% has been reported [1]. In such a situation, blind intubation or repeated attempts at intubation greatly increase the risk of perforation, particularly when using a side-viewing endoscope. Therefore, if resistance or difficulties are encountered during intubation, it is recommended to suspend the procedure and try to understand the cause of the obstruction, using a forward-viewing gastroscope [2]. There are several clinical conditions that predispose to a difficult esophageal intubation: the most frequent one is the presence of a Zenker's diverticulum, also known as pharyngeal pouch, a relatively rare condition (the estimated incidence is 2/100 000 people/year), which occurs more commonly in males, starting from the seventh decade of life [3]. Other clinical conditions that may make it difficult for the endoscopist to pass through the upper esophageal sphincter include esophageal motor disorders, caused by neurological problems that do not allow normal relaxation of the upper esophageal sphincter (e.g., stroke or Parkinson's disease), and alterations of the cervical spine (severe arthrosis, deformities), which result in abnormal neck stiffness.[4] Moreover, the use of duodenoscopes and linear echoendoscopes could be troublesome because both the side-viewing and the wider diameter of the distal tip [4,5] In fact, one of the most feared complication of endoscopic ultrasonography (EUS) is cervical perforation during intubation, which is reported in 0.003% of EUS examinations and seems to be related by several risk factors, namely the limited experience of the operator, history of difficult intubation at a previous upper endoscopy, advanced patient age (> 65 years), repeated attempts to pass through the cervical esophagus and finally presence of esophageal stenosis [6,7] To avoid the risks associated with the difficult intubation, the endoscopist must foresee it and have a strategy that includes several alternative techniques in addition to the standard [8]. In this report we describe a case of difficult esophageal intubation during an endoscopic retrograde cholangio-pancreatography (ERCP) and we performed a literary review on this topic.

## 3. Case Report

A 90-year-old woman was admitted to our Unit for acute cholangitis due to recurrent choledocholithiasis. The patient had an history of recurrent acute biliary pancreatitis with two failed attempts of ERCP in 2004, due to an impossible intubation related to a cervical deformity resulting in a severe limitation of neck mobility and dysphagia. Therefore, on that occasion, the patient underwent open cholecystectomy and a concomitant choledochotomy, with removal of the stones from the main bile duct. Given the high perioperative risk linked to age and comorbidities, in agreement with the consultant anesthetist, this time it was decided to try an endoscopic approach using an alternative intubation technique. In endoscopic suite Baseline assessments of the Modified Observer's Assessment of Alertness/Sedation Scale (MOAA/S), and measurements of heart rate (HR), non-invasive blood pressure (NIBP), respiratory rate (RR), and oxygen saturation (SpO2) were recorded. During sedation 2 L/min of oxygen was administered by nasal cannula, and HR, SpO2, RR, electrocardiogram (ECG), NIBP, end-tidal carbon dioxide (etCO2) and sedation level measured by the MOAAS/S are collected at 5-minute intervals. The procedural sedation was achieved by a propofol TCI system (Propofol 1% MCT Fresenius) under anesthetist supervision. A first intubation was performed by a combination of a standard gastroscope (EG-450WR5 Fujinon, diam. 9.3 mm) with the Airtraq video-laryngoscope (Prodol Ltd, Vizcaya, Spain). This is a device designed to allow tracheal intubation after failed direct laryngoscopy; it has an optical system and a guiding channel for a tracheal tube (Figure 1). Owing to the special design of the optical components and the curvature of the rigid blade, the Airtraq obtains views of the glottis without the need for alignment of the oral–pharyngeal–tracheal axes [9]. After placing the Airtraq, a standard gastroscope was inserted into the channel in place of the tracheal tube and, under optical control, it was possible to direct it through the upper esophageal sphincter. After achieving duodenal intubation, a guide-wire was inserted via the working channel into the duodenal lumen and the gastroscope was withdrawn over the wire. Therefore the patient was positioned in left lateral decubitus and the duodenoscope with a cannulating catheter was advanced into the esophagus over the guide-wire previously placed. In this way, a successful esophageal intubation was achieved with the duodenoscope and ERCP was safely performed. The procedure was successfully completed without complications. In the following days, after the improvement of clinical conditions and laboratory tests, the patient was transferred to a long-term care facility.

**Figure 1:** The Airtraq optical laryngoscope

## 4. Discussion

Over the years evidences on difficult intubation are sparse and usually limited to case reports or small series of patients. Therefore, we performed a non-systematic literature review in order to evaluate the state of art in this topic (Table 1) and propose an operational flowchart to deal with similar cases (Figure 2). A possible approach is the use of an overtube. Dickey and Porter described the use of this device in a patient with Zenker's diverticulum with lead to a successful intubation and performance of an ERCP using a duodenoscope [10]. Other possible modalities are represented by the use of a catheter[4] or a guide-wire [11], inserted into the esophagus with the aid of patient's swallowing, in order to safely advanced the endoscope over the catheter or the guide-wire previously placed. This method does not require the use of an extra device such as an overtube, but the disadvantage is that the patient has to cooperate by swallowing the catheter or the guide-wire, so it cannot be performed in deeply sedated patients.

Another technique, which does not require the patient cooperation, consists in the use of a guide-wire, which is released into the stomach through a forward-viewing gastroscope, possibly slim or ultraslim in diameter; then the instrument is replaced by a side-viewing duodenoscope, in which a cannulating catheter had been previously inserted. In this way, over the guide-wire, the duodenoscope can be advanced until it reaches the stomach [2]. However, even this method has a

fundamental requirement, which is the possibility to intubate the esophagus with a forward-viewing gastroscope. In cases where this is not feasible, it is necessary to use additional devices to overcome this difficulty, such as the Airtraq laryngoscope. Another case of use of the Airtraq for a difficult intubation has been described in a patient who had to undergo elective endoscopic band ligation of esophageal varices [12]. This instrument has the advantage of allowing to monitor the insertion of endoscope through the upper esophageal sphincter and, if there is difficulty or resistance in advancing, to identify the cause. A new device that might be useful in this context is the LMA®GastroTM Airway Laryngeal Mask (Teleflex Medical, Athlone, Ireland). The innovation of this laryngeal mask is the presence of a dedicated channel for the introduction of the endoscope, which runs parallel to a separate airway channel. This device appears safe and effective for clinical use in upper gastrointestinal endoscopy, also in high risk procedures [13]. A prospective observational study of 292 patients reported an esophageal intubation rate of 99% with the LMA®GastroTM Airway [14]. Another similar supraglottic device is the Gastro-Laryngeal Tube (VBM Medizintechnik GmbH, Sulz am Neckar, Germany), which is a modified laryngeal tube, designed for obtaining and maintaining control of airway patency during gastrointestinal endoscopic procedures; even this device provides a dedicated channel for the insertion of the endoscope. The endoscopic channel has an internal diameter of 16 mm and enables the insertion and use of an endoscope with a maximum external diameter of 13.8 mm. It is coated with a special polymer to minimize friction caused by the insertion and movement of the endoscope [15]. In a study of 22 patients, interventional endoscopic biliopancreatic procedures were performed successfully in all patients through the endoscopic channel of the Gastro-Laryngeal Tube and the maneuverability of the endoscope was considered good in all patients. Therefore, the Gastro-Laryngeal Tube proved safe and effective for airway management in patients undergoing anesthesia for interventional endoscopic biliopancreatic procedures, with the advantage of an easier esophageal intubation [16]. Currently, there are no reported cases of use of these supraglottic devices in situations of difficult esophageal intubation, but they could represent an alternative approach to this condition, thanks to their advantage of securing airways minimizing cardiorespiratory complications [14,17].

**Table 1:** Table of reported cases of difficult esophageal intubation.

| | | Characteristics of patients (Sex, Age) | Cause of difficult esophageal intubation | Intubation technique | Procedure | Indication |
|---|---|---|---|---|---|---|
| **Tsang TK et al, 1992 [4]** | Case series (7 patients) | 52 yr | Zenker's diverticulum | Catheter-guided technique (with the aid of patient's swallowing) | ERCP[a)] | Cholangitis |
| | | 70 yr | Zenker's diverticulum | | PEG[b)] | Nutrition |
| | | 77 yr | Parkinson's disease | | EGDS[c)] | Upper GI bleeding |
| | | 85 yr | Cervical osteophyte | | EGDS | Upper GI bleeding |
| | | 73 yr | Zenker's diverticulum | | PEG | Nutrition |
| | | 76 yr | Zenker's diverticulum | | EGDS | Gastric mass |
| | | 88 yr | Stroke | | PEG | Nutrition |
| **Malik A et al, 1994 [11]** | Case report | N/A[d)] | Zenker's diverticulum | Guide-wire technique (with the aid of patient's swallowing) | EGDS | Upper GI bleeding |
| **Dickey W et al, 1995 [10]** | Case report | N/A | Zenker's diverticulum | Overtube | ERCP | Obstructive jaundice |
| **Wai CT et al, 2002 [2]** | Case report | Female, 71 yr | Zenker's diverticulum | Guide-wire and catheter-guided technique | ERCP | Cholangitis |
| **Corso RM et al, 2011 [12]** | Case report | Female, 69 yr | Severe cervical kyphosis | Airtraq laryngoscope | EGDS | EBL[e)] of esophageal varices |

ERCP, endoscopic retrograde cholangio-pancreatography; b) PEG, percutaneous endoscopic gastrostomy; c) EGDS, esophagogastroduodenoscopy; d) N/A, not available; e) EBL, endoscopic band ligation.

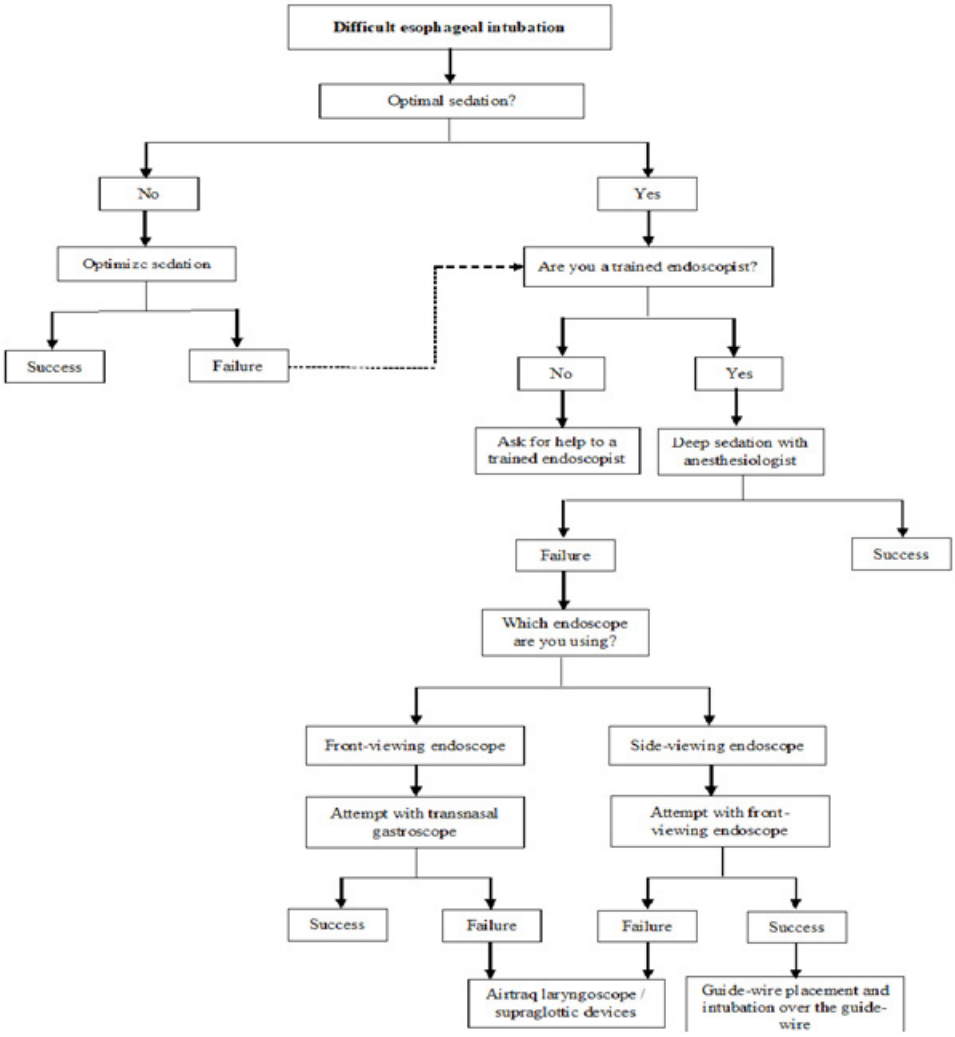


**Figure 2:** Flow-chart for difficult esophageal intubation

## References


1. Siau K, Li J, Fisher NC, Mulder CJJ, Ishaq S. Intubation failure during gastroscopy: incidence, predictors and follow-up findings. J Gastrointestin Liver Dis. 2017; 26: 339-344.
2. Wai CT, Yeoh KG, Ho KY. Esophageal Intubation with Duodenoscope in the Presence of Pharyngeal Pouch by a Guidewire and Catheter-Guided Technique. Surg Laparosc Endosc Percutan Tech. 2002; 12: 362-3.
3. Siddiq MA, Sood S, Strachan D. Pharyngeal pouch (Zenker's diverticulum). Postgrad Med J. 2001; 77: 506-11.
4. Tsang TK, Buto SK. Catheter-guided endoscopic intubation: a new technique for intubating a difficult esophagus. Gastrointest Endosc. 1992; 38:49-51.
5. O'Neill JR, O'Neill JS. Follow the Carrot: A Route Through the Difficult Esophagus or Duodenum. *Surg* Laparosc Endosc Percutan Tech. 2010; 20: 250-252.
6. Das A, Sivak MV Jr, Chak A. Cervical esophageal perforation during EUS: a national survey. Gastrointest Endosc. 2001; 53: 599-602.
7. Fabbri C, Luigiano C, Cennamo V. Complications of endoscopic ultrasonography. Minerva Gastroenterol Dietol. 2011; 57:159-66.
8. Tantai XX, Wang M, Guo XD, Wang JH, Ma SY. Overtube-assisted technique for insertion of linear endoscopic ultrasonography. Gastroenterol Rep (Oxf). 2019; 8: 158-160.
9. Lu Y, Jiang H, Zhu YS. Airtraq laryngoscope versus conventional Macintosh laryngoscope: a systematic review and meta-analysis. Anaesthesia. 2011; 66: 1160-7.
10. Dickey W, Porter KG. Duodenoscope intubation of the esophagus in the presence of pharyngeal pouch made possible by an overtube. Endoscopy. 1995; 27: 272-3.
11. Malik A, Chitnavis V, Epstein A. Use of a hydrophilic wire for esophageal intubation in Zenker's diverticulum. Gastrointest Endosc. 1994; 40: 523-4.
12. Corso RM, Cavargini E, Piraccini E, Ricci E. Airtraq laryngoscope for difficult intubation during endoscopic band ligation. Dig Liver Dis. 2011; 43: 581-2.
13. Aiello L, Corso RM, Bellantonio D, Maitan S. LMA Gastro Airway® Cuff Pilot for endoscopic retrograde cholangiopancreatography: a preliminary experience. Minerva Anestesiol. 2019; 85: 802-804.
14. Terblanche NCS, Middleton C, Choi-Lundberg DL, Skinner M. Efficacy of a new dual channel laryngeal mask airway, the LMA®Gas-

tro™ Airway, for upper gastrointestinal endoscopy: a prospective observational study. Br J Anaesth. 2018; 120: 353-360.

15. Gaitini LA, Lavi A, Stermer E, Charco Mora P, Pott LM, Vaida J. Gastro-Laryngeal Tube for endoscopic retrograde cholangiopancreatography: a preliminary report. *Anaesthesia.* 2010; 65: 1114 - 1118.
16. Fabbri C, Luigiano C, Cennamo V. The Gastro-Laryngeal Tube for interventional endoscopic biliopancreatic procedures in anesthetized patients. *Endoscopy.* 2012; 44: 1051-1054.
17. Leslie K, Allen ML, Hessian EC. Safety of sedation for gastrointestinal endoscopy in a group of university-affiliated hospitals: a prospective cohort study. *Br J Anaesth.* 2017; 118: 90-99.