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## CLINICAL CASE REPORT

# Combined Antegrade and Retrograde Endoscopy (CARE) with Pharyngo-esophageal Puncture (PEP) for Complete Esophageal Introital Obstruction <sup>☆</sup>



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### KEYWORDS

Esophageal introitus;  
Pharyngoesophageal  
dysphagia;  
Obstruction;  
Combined antegrade  
and retrograde endo-  
scopy (CARE);  
Pharyngo-esophageal  
puncture (PEP);  
Video

### Abstract

**Background:** Esophageal introital stenosis is common in patients who receive radiation therapy for laryngeal and hypopharyngeal cancers. Infrequently, complete obstruction develops within the esophageal introitus.

**Patient and methods:** In this video manuscript, we present a case of complete introital obstruction in which flexible endoscopic therapy was successfully by performing combined antegrade and retrograde endoscopy (CARE) and pharyngo-esophageal puncture using guide wire (PEP-guide wire), in combination with balloon dilation.

**Results:** Esophageal lumen patency was re-established with “CARE PEP-guide wire” method without complications.

**Conclusions:** In patients with complete esophageal introital obstruction, CARE PEP based approach can potentially re-establish the esophageal introital patency.

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### Video related to this article

Video related to this article can be found online at <http://dx.doi.org/10.1016/j.vjgien.2014.08.002>.

## 1. Background

- Esophageal introital stenosis is common in patients who receive radiation therapy for laryngeal and hypopharyngeal cancers.
- Infrequently, complete obstruction develops within the esophageal introitus.

## 2. Aim of the study

- To demonstrate combined antegrade and retrograde endoscopy (CARE) and pharyngo-esophageal puncture using guide wire (PEP-guide wire) in managing complete esophageal introital obstruction.

## 3. Patient and methods

- A 73-year-old woman underwent neck radiation therapy 12 months ago for tonsillar squamous carcinoma and enjoyed complete oncological response.
- A 20 French percutaneous endoscopic gastrostomy (PEG) tube was placed prior to radiation therapy for enteral feeding.
- She presented with complete pharyngoesophageal dysphagia with inability to swallow the saliva.
- Barium swallow study showed complete esophageal introital obstruction.

- Although the patient had a functioning PEG tube for enteral feeding, she wished to swallow her own saliva and did not have to split all the times.
- After an office consult, she consented with CARE PEP and endoscopic balloon dilation.

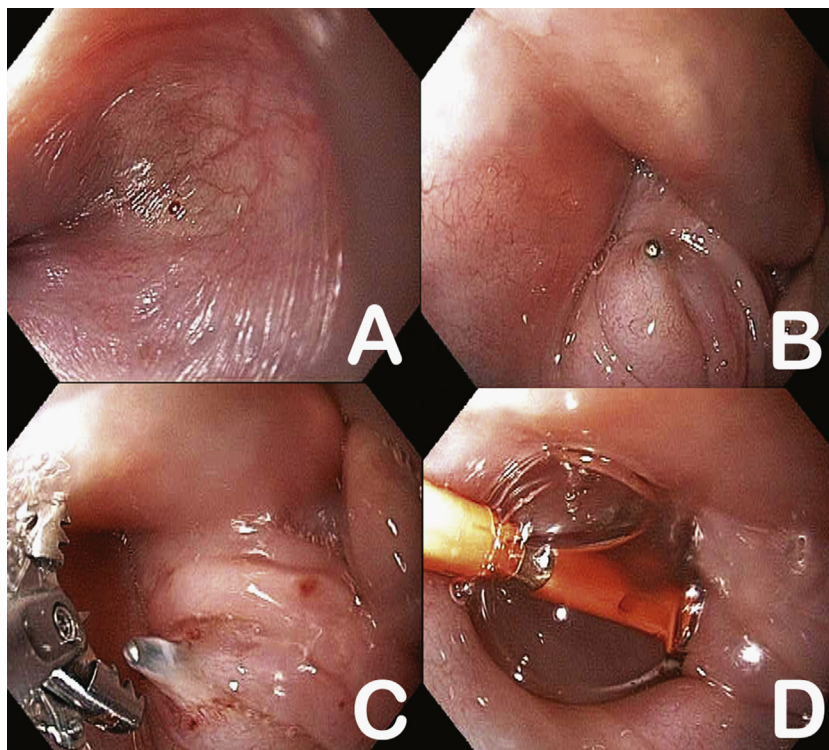
## 4. Study materials, endoscopic equipment and devices

- Diagnostic gastroscope (Olympus GIF-H180, Olympus America, Center Valley, PA).
- Ultrathin gastroscope (Olympus GIF-XP-160, Olympus America).
- ERCP 0.035" wire guide (VisiGlide<sup>®</sup>, Olympus America, Center Valley, PA).
- Wire guided balloon dilators (Hercules<sup>®</sup>, Cook Medical, Winston-Salem, NC).

## 5. Endoscopic procedure

### 5.1. Combined antegrade and retrograde endoscopy (CARE)

- The endoscopy room is equipped with two sets of endoscopic processor, light source and monitor. A diagnostic gastroscope is used for antegrade per-oral endoscopy and an ultra-slim gastroscope is used for retrograde endoscopy per PEG stoma.



**Figure 1** Antegrade endoscopic views of the proximal end of the complete obstruction within the esophageal introitus (A), the stiff end of the ERCP wire guide going through the obstruction during pharyngo-esophageal puncture procedure (B and C) and balloon dilation of the stenosis over the wire guide to 10 mm (D).

- The fluoroscopy unit is on standby in case trans-stenosis light illumination is not achieved and at the discretion of the endoscopists.
- Anesthesia consult is recommended for optimal sedation.
- The patient is placed in supine position.
- Prophylactic antibiotic is not prescribed unless there is significant false track formation with contrast extravasation.
- During CARE, there is no opening at both ends of the complete stenosis (Figures 1A and 2A)
- The distal ends of two endoscopes are aligned along the same axis for obtaining optimal trans-stenosis light illumination and for PEP (Figure 2B and C).

### 5.2. Pharyngo-esophageal puncture using guide wire (PEP-guide wire)

- An endoscopic retrograde cholangiopancreatography (ERCP) 0.035" wire guide is used for PEP. The wire have a hydrophilic flexible tip for atraumatic cannulation and a stiff end for puncture.
- Fluoroscopy is optional during PEP.
- With moderate pressure, the stiff end of the ERCP wire guide is used for puncturing the obstruction (Figures 1B, C and 2C).
- Retrograde PEP is preferred since the trans-stenosis light illumination is better and the axis of the retrograde endoscope is more favorable for PEP.

- After puncturing the stenosis with the stiff wire end, the wire guide is brought out of the patient's month and reloaded through the antegrade endoscope.

### 5.3. Dilatation and follow up

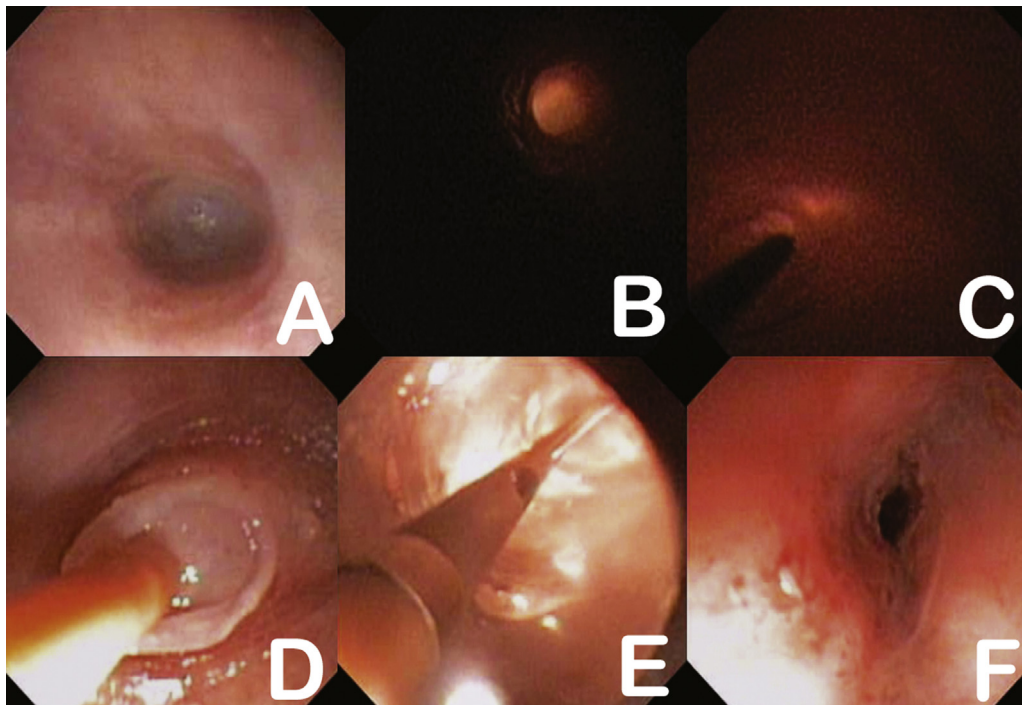
- Antegrade over-the-wire balloon dilatation is performed (Figures 1D and 2D, E).
- For PES less than 1-2 cm in length, we usually dilate the stenosis to 10-15 mm during the first session.
- Post-dilatation endoscopic examination of the introitus reveals no significant tears (Figure 2F) and the length of obstruction is about 1.5-2 cm in this case.
- Clear liquid diet is started within 6 h without post-procedural contrast study.
- Follow up endoscopic dilations are performed every 2-4 weeks until a durable luminal patency is achieved and we typically use balloon sizes of 12-20 mm depending on the baseline internal diameters within the introitus (Figure 3)

## 6. Results

- The patient is enjoying almost regular oral diet daily.

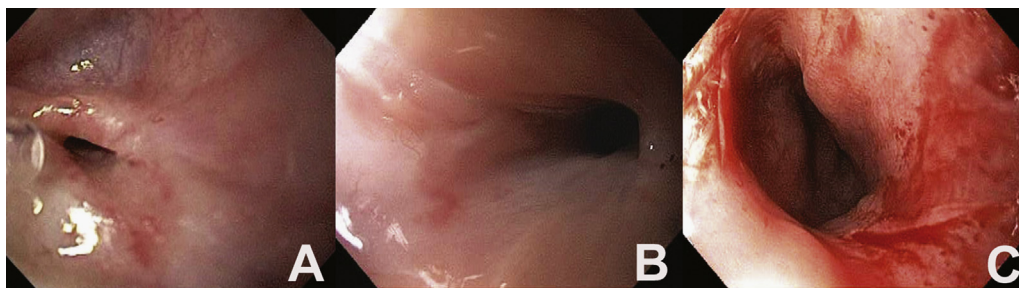
## 7. Discussion

Esophageal introital strictures are common in patients who receive radiotherapy for head and neck cancers [1,2].



**Figure 2** Retrograde endoscopic views of the distal end of the complete obstruction within the esophageal introitus (A), trans-obstruction light illumination during combined endoscopy (B), the stiff wire end during pharyngo-esophageal puncture (PEP) (C), the complete obstruction is being puncturing the balloon catheter over the established wire guide (D), balloon dilatation of the stenosis to 10 mm (E), and the endoscopic view of the treated obstruction (F). There is no significant tear or bleeding.





**Figure 3** Endoscopic image showing introital patency during subsequent antegrade endoscopy in 2 weeks (A), followed by balloon dilation to 15 mm; introital patency in 4 weeks (B), followed by balloon dilation to 18 mm (C).

Although antegrade endoscopy with ERCP wire guides can achieve stenosis cannulation in vast majority cases of introital stenosis, CARE PEP is required in patients with complete obstruction [2-10]. Endoscopists can translate ERCP techniques in the management of severe and complete introital stenosis [3]. In this case, the authors performed “CARE PEP-guide wire” as previously described [3]. The ERCP wire guide can be advanced through the accessory channel of any endoscope, whereas only certain endoscopes are able to accommodate the biopsy forceps and needle knife. In some reported cases of CARE, dilation of the gastrostomy stoma is needed if a diagnostic gastroscope is used in retrograde endoscopy in order to accommodate certain larger endoscopic devices such as an endoscopic ultrasound (EUS) needle [9]. Besides ERCP wire guides, other endoscopic devices have been used in PEP [4-10] as follows:

- CARE PEP-guide wire;
- CARE PEP-biopsy forceps;
- CARE PEP-needle knife;
- CARE PEP-EUS needle; and
- CARE PEP-combination.

If trans-stenosis light illumination cannot be obtained during CARE, PEP can be very challenging or impossible. This generally occurs in patients with long obstruction (>2-3 cm). In one case report, successful PEP was performed after submucosal tunneling using pediatric biopsy forceps and needle knife [10]. The length of obstruction was 4 cm in this patient.

After successful PEP and dilation, some endoscopists routinely place a nasogastric tube or a metal esophageal stent crossed the treated obstruction to keep luminal patency. However, this practice has not shown to be superior to periodic dilatations after PEP. In one report, metal stent placement is associated with increased risk of local abscess formation [9]. After initial successful CARE PEP, these patients require periodic and repeat endoscopic dilations [8]. In one case series, the mean number of repeat dilatations was 7 [8]. The need for repeat dilation is not an indication of failure given the treatment alternatives [3].

## 8. Take-home messages

- Esophageal introital strictures are common in patients who receive radiotherapy for head and neck cancers.

- CARE PEP is required in patients with complete introital obstruction.
- Endoscopists can translate ERCP techniques in the management of severe and complete introital stenosis.
- After initial successful CARE PEP, these patients require periodic and repeat endoscopic dilations.

## 9. Voiceover script

A 73-year-old woman underwent neck radiation therapy 12 months ago for tonsillar squamous carcinoma and enjoyed complete oncological response. A 20 French percutaneous endoscopic gastrostomy (PEG) tube was placed prior to radiation therapy for enteral feeding. She presented with complete pharyngoesophageal dysphagia with inability to swallow her saliva. Barium swallow study showed complete esophageal introital obstruction. During antegrade endoscopy, there is no opening within the esophageal introitus. We proceeded with combined antegrade and retrograde endoscopy, i.e. CARE. After removing the old PEG tube, an ultrathin gastroscope is advanced through the PEG stoma into the stomach. We then advance the ultrathin gastroscope retrograde through the cardia into the esophagus. There is complete obstruction within the esophageal introitus. After turning off the light source of the ultrathin gastroscope, trans-stenosis light illumination is demonstrated. We then proceeded with pharyngo-esophageal puncture, i.e. PEP. With moderate pressure, the stiff end of the ERCP wire guide is being used to puncture the stenosis. On antegrade endoscopy, we can clearly see the wire end trying to puncture through the submucosal and mucosal plane. An endoscopic forceps is used to disrupt the mucosal surface, allowing the wire to come through. After puncturing the stenosis, the wire end is brought out of the patient mouth with aid of an endoscopic forceps. We then perform antegrade over-the-wire balloon dilation. A 10 mm balloon dilator is advanced through the punctured stenosis. The balloon is being inflated. This is the antegrade view of the inflated balloon dilator. After dilation, the retrograde endoscope advanced the treated obstruction into the hypopharynx. Post-dilatation endoscopic examination of the introitus reveals no significant tears and the length of the treated obstruction is about 1.5-2 cm in this case. In the end, a new PEG tube is replaced.

After CARE with PEP, we routinely schedule the patient for repeat upper endoscopy with further dilation in 2 weeks. This patient has been enjoying clear liquid diet since the

initial CARE with PEP. Introital patency is maintained. We are advancing a wire guided balloon dilator and dilate the stenosis to 15 mm. Small mucosal tears can be seen within the introitus after balloon dilation. This is the introital patency four weeks after CARE PEP. The patient has been enjoying full liquid diet and some soft diet since the last dilatation. During this endoscopy, we are dilating the stenosis to 18 mm. In patients with complete esophageal introital obstruction, CARE PEP can potentially re-establish the esophageal introital patency. Various endoscopic accessories can be used to perform PEP, including wire guide, biopsy forceps, needle knife, and endoscopic ultrasound needle.

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None.

### Conflict of interest

All authors have no conflict of interest or financial relationships to disclose. We have required no financial support for this publication.

### Human and animal rights

All authors certify that this work described in our article has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans (<http://www.wma.net/en/30publications/10policies/b3/index.html>) and Uniform Requirements for manuscripts submitted to Biomedical journals (<http://www.icmje.org>).

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