

Use of Sengstaken–Blakemore tube in a different indication: A case report

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ABSTRACT

Tracheostomy has become a common procedure in today's intensive care units. On the other hand, tracheostomy has some life-threatening complications. In here, we presented that an interesting case of a tracheoesophageal fistula, rare complication of surgical tracheostomy, caused by posterior tracheal membrane laceration than has progressed to form a single passage. This passage progressively led both air trapping in gastrointestinal tract due to required mechanical ventilatory support and reflux of gastrointestinal content into tracheobronchial tree. Conventional measures were not beneficial, nor immediate surgical repair was feasible due to unstable condition of the patient. Then, a Sengstaken–Blackmore tube was introduced and overwhelmed the condition.

Keywords: Sengstaken-Blackmore tube; tracheal laceration; tracheoesophageal fistula; tracheostomy.

INTRODUCTION

Tracheostomy has become a common procedure in today's intensive care units (ICUs) to reduce sedation needs, minimize physiological dead space, facilitate bronchoalveolar clearance, improve weaning process, and help patient compliance.^[1,2] Percutaneous tracheostomy (PT) is the preferred option in ICU; on the other hand, open surgical tracheostomy (OST) technique is preferred in patients with suspected difficult airway.^[3] OST complications are categorized as early and late ones as for PT. Laceration of the membranous part of the trachea in OST is a very rare early complication that can lead to respiratory failure, mediastinal emphysema, mediastinitis, and tension pneumothorax. An urgent surgical repair is required in those life-threatening situations,^[4-7] whereas surgical repair may need to be postponed due to unstable condition and comorbidities of ICU patients.

In here, we presented that an interesting case of a tracheoesophageal fistula (TEF), a rare complication of OST, caused by

posterior tracheal membrane laceration than has progressed to form a single passage. Conventional measures were not beneficial, nor urgent surgical repair was feasible due to unstable condition of the patient. Then, a Sengstaken–Blackmore tube (SBt) was introduced and overwhelmed the condition.

CASE REPORT

A 82-year-old female patient was admitted to emergency department (ED) due to cognitive regression, deterioration, decreased oral intake, and fever within a week. Hypertension, chronic atrial fibrillation, and bilateral salpingo-oophorectomy and total abdominal hysterectomy operation were presented in her medical history as learned from her relatives. Mobility has decreased over time after clavicle fracture due to a fall (8 years ago), and she has been in bed-dependent state for 3 years. Until recently, she was conscious and interactive with her relatives. ED first approach: GCS was 8, SaO₂ was 92–95% with 4 L/min nasal O₂, ABP was 90/60 mmHg, pulse

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was 120–136 bpm, and respiratory rate was 25–35/min. ED transthoracic echocardiogram findings were considered as normal. In contrast-enhanced thoracoabdominal computed tomography (CT), there were no signs of active consolidation or pulmonary thromboembolism, colonic loops were distended with feces and air, and more prominent in the rectum and sigmoid, and no indicative finding for need of a urgent surgery. Although a clear infective focus was not detected, sepsis could not be ruled out. During ED follow-up, patient breathing pattern has deteriorated and was intubated, which also required vasopressor support; thus, she was transferred and admitted to ICU.

A detailed examination was performed in ICU that a perianal abscess due to perianal fistula was detected, which was considered as the main cause of the patient's septic and deteriorated condition, and the abscess was drained. Through ICU

follow-up, in intubated and invasive mechanical ventilatory support, laboratory assays such as biochemistry, electrolyte, hemogram, and arterial blood gas levels were stabilized within acceptable limits or were intervened as required. Sedation with dexmedetomidine/propofol and analgesia with fentanyl/morphine infusions were administered in intermittent and repetitive periods. Ventilatory weaning could not be achieved by 28 days despite daily sedation/analgesia intervals and spontaneous breathing trials that were prolonged ventilation; thus, tracheostomy was considered. In evaluation, the patient had a short thyromental distance and short neck, and limited neck extension, suggesting difficult airway. Thus, the patient was evaluated by ENT and performed OST in operating theater. No intraoperative or early post-operative complications were noted. On the 2nd day of follow-up, enteral feeding solution remnants were detected in tracheostomy aspirations, and a pulsative air filling was observed in nasogastric drainage bag. A bedside bronchoscopy performed, and it was observed that trachea and esophagus were joined and formed a single passage lumen from the tracheostomy level to the carina, possibly was due to tracheal laceration and fistulation (Fig. 1). Contrast-enhanced cervical and thorax CT imaging were proceeded for verification that showed a wide commission of posterior wall of trachea and esophagus (Fig. 2).



Figure 1. Bronchoscopy view in which trachea and esophagus are observed as a single passage.

Since trachea and esophagus formed a single passage, we concluded that upper level enteral feeding was not feasible anymore due to probable complicative consequences. Thus, a mini laparotomy and tube jejunostomy were performed by a surgeon, while bedside anesthesia and appropriate sterile conditions were provided in ICU. However, air filling into GIS could not be prevented and retained due to ongoing positive pressure MV. Therefore, a reconstructive surgery was concluded, but patient condition was not suitable for an urgent major operation. We have mind-stormed for alternative solutions (1) to prevent air leak into GIS and (2) to gain time to stabilize patient for a major surgery, and finally decided to try a SBt application. After SBt was inserted and reached into stomach, gastric balloon was inflated with 75 ml of air and retracted slowly and placed at the gastroesophageal junction; then, esophagus balloon was inflated with 50 ml of air. The

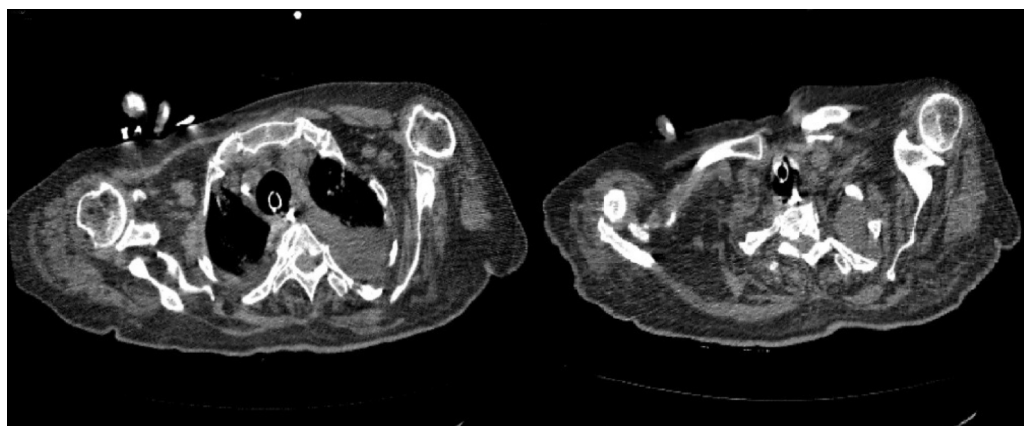


Figure 2. Large joint view between the posterior wall of the trachea and esophagus on thorax CT.

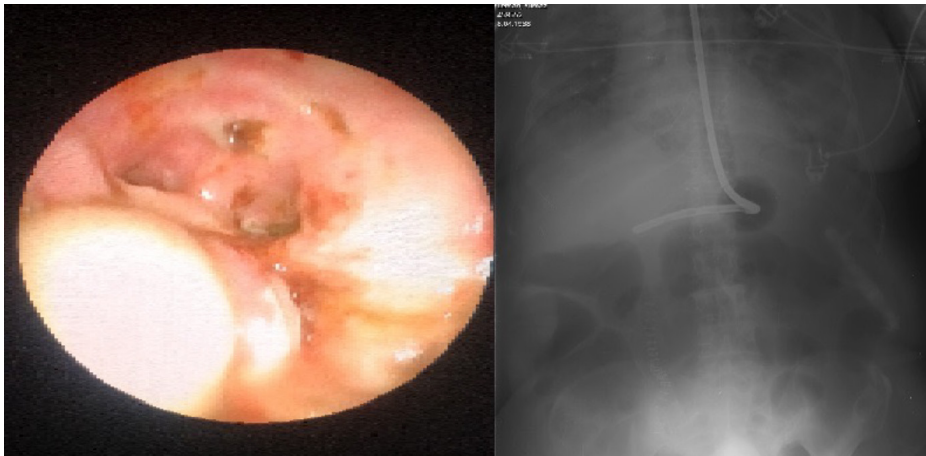


Figure 3. Bronchoscopy and posteroanterior chest radiography after Sengstaken–Blakemore tube.

position of SBt was confirmed by bronchoscopy and direct radiography (Fig. 3). Conventionally, SBt balloons can be kept in fully inflated for a maximum of 48 h to prevent necrosis in gastric and esophageal tissue after inserted. The esophageal balloon can be deflated temporarily at shorter intervals (8–12 h) before the gastric balloon is deflated. We predicted that the risk of necrosis would be minimal, since we inflated with less volume and pressures. After SBt placement, the patient adaptation to mechanical ventilation was improved, air leak into GIS and reflux of GIS content into tracheobronchial tree was prevented.

DISCUSSION

In some cases, a prolonged intubation and MV are required in ICU patients. Failure to wean from MV is considered as one of the main indications of tracheostomy. In addition, tracheostomy can help to clean bronchial secretions, prevent ventilator-induced pneumonia, facilitate feeding and mobilization, and reduce required sedative doses.^[8–10] However, it is necessary to keep in mind that this is an invasive procedure and with probable complications.

Some PT techniques have been defined and performed successfully.^[11,12] In terms, OST is required in patients with stigmata of difficult airway. In our patient, a short neck and severe limitations of neck extension were required an OST.

The common complications during the OST procedure, regardless of the technique, and method used are bleeding, damage to tracheal structures, unsuccessful procedure, aspiration, air embolism, loss of airway, hypoxemia, and hypercapnia, etc. The early complications include bleeding, decannulation, pneumothorax, pneumomediastinum, subcutaneous emphysema, infection, unplanned decannulation, and dysphagia.^[13]

One of the rarest and most feared complication is injury to the posterior wall of the trachea and insertion of the cannula between esophagus and tracheal wall during the procedure.

^[14] If undiagnosed, damage can further expand with a positive pressure ventilation. As in our case, the lesion was started with a TEF, gradually widen to full thickness rupture, which was a life-threatening complication.

The PT technique is essentially a blind procedure, and more prone to complications such as punctures to posterior trachea and esophagus. Thus, it was surprisingly rare to occur in OST as in our case. Another common cause of TEF is prolonged endotracheal intubation.^[15] Regardless of the applied technique, one should always be alert for probable complications during and after the procedure.

A TEF due to procedural injury to posterior tracheal wall and resulting subsequent rupture is usually a late period complication. However, in our case, the applied positive pressure by MV has increased shearing forces and that complication was emerged in the early period. In these situations, the preferential treatment is urgent surgical reconstruction of fistula or stenting of the tracheal defect.^[16] In our case, the patient was consulted to thoracic surgeons that the defect was not suitable for stenting due to large size and anatomical location. An urgent surgical reconstruction operation was required, but the patient condition was evaluated as unstable and inconvenient to recover an urgent major surgery, due to presence of additional comorbidities and required high vasopressor support.

Therefore, we have tried an alternative solution with SBt. As our knowledge, there has been no report or declared indication for SBt usage in a such condition. The main accepted indication for using the SBt is esophageal varicose hemorrhages, a fatal complication of portal hypertension.^[17] In our case, SBt balloons were semi-inflated just sufficient to prevent air and fluid leakage but also provide adequate tissue perfusion, rather than a pressurized inflation as was required in case of variceal hemorrhages.

The case we presented here could offer a new rescue approach to complicated TEF cases. We purpose that SBt in-

sertion with half-inflated balloons could be considered (1) to prevent air leak into GIS in tern may lead intra-abdominal hypertension and undesired consequences, (2) to prevent GIS content reflux into tracheobronchial tree and aspiration pneumonia, and (3) to gain time to stabilize patient for a major surgery. We think that future controlled trials should be planned to evaluate feasibility of SBt in major and complicated TEF cases.

Informed Consent: A written informed consent was obtained from the patient's relative for publication of this case report. A written consent was obtained from the patient's relative for the Sengstaken–Blakemore procedure.

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OLGU SUNUMU - ÖZ

Sengstaken-Blakemore tüpünün farklı bir endikasyonda kullanımı: Olgu sunumu

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Trakeostomi günümüz yoğun bakımlarında sıklıkla uygulanan bir işlem haline gelmiştir. Bazı trakeostomi komplikasyonları hayatı tehdit eden durumlara neden olabilmektedir. Burada, açık cerrahi trakeostomi ilişkili nadir bir komplikasyon olan posterior trakeal membran laserasyonun yol açtığı trakea-özefagal fistülün genişleyerek tek pasaj haline geldiği, bir olgu sunuldu. Bu hastada konvansiyonel girişimler ile bir sonuç alınamadı, daha önce literatürde rastlanılmayan Sengstaken-Blackmore tüpü uygulanması ile komplikasyonların önüne geçilebildiği gösterildi.

Anahtar sözcükler: Sengstaken-Blackmore tüpü; trakeal laserasyon; trakeoözofageal fistül; trakeostomi.

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