

A case of unanticipated intraoperative bronchial injury during esophagectomy and its anaesthetic management

Akshay Maroti Junghare ¹, Akshay Shende ¹, Ravi Kotkar ¹, Anupriya Chaturvedi ¹ and Shivinder Singh ^{2,*}

¹ Department of anesthesia, GMC Nagpur, India.

² Department of Anesthesia & Intensive Care, Command Hospital, Chandimandir, India.

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Abstract

Single lung ventilation is often used for thoracoscopic surgeries mainly for proper surgical exposure. Double lumen tubes are often used for this purpose. In patients undergoing thoracoscopic esophagectomy there are chances of lower airway injury which can lead to respiratory complication. This case report aims to bring to light the inadvertent complications which may occur intraoperatively while the single lung ventilation is used during the procedure.

Keywords: Complication; Double lumen tube; Saturation; Single Lung Ventilation; Extubation

1. Introduction

Esophagus is a site for malignant and benign disease and may need intervention. Esophagectomy is a palliative and potentially curative treatment for oesophageal cancer and may occasionally be required for some benign obstructive lesions which do not respond to conservative therapy. It is a major surgical procedure and is associated with high morbidity and mortality rates (10%–15%)¹.

The approaches used for esophagectomy include - transthoracic approach, transhiatal approach, and minimally invasive surgery (laparoscopic/thoracoscopic or robotic esophagectomy). The incidence of respiratory complications has been reported to be between 18% and 26% for both the transthoracic and transhiatal esophagectomy approaches respectively.² Anaesthetic considerations include fluid restriction, early extubation, thoracic epidural analgesia, and vasopressor/inotrope infusions to support blood pressure³.

Double lumen tube is commonly used when esophagectomy is performed via transthoracic approach. One must be aware and vigilant about the complications that can occur during this approach. This case report describes the respiratory complication that arose from dissecting the oesophagus and its anaesthetic management.

2. Case report

A 52 year old male patient, chronic kharra chewer with no known comorbidities, a case of mid Ca Oesophagus with no metastasis was posted for Transthoracic Esophagectomy under laparoscopic guidance (Video Assisted Thoracic Surgery -VATS). The pre-aesthetic evaluation was done (ASA-2 grade) and General anaesthesia with one lung ventilation (OLV) was planned. An epidural catheter was put at the T6-T7 vertebrae level for intraoperative and postoperative analgesia. Under fiberoptic guidance a 37Fr left sided double lumen tube (DLT) was placed general anaesthesia was initiated. Anaesthesia was maintained using 100% O₂ and Sevoflurane at 2% concentration with the FiO₂ & PEEP being delivered to maintain oxygen saturation above 90%.

* Corresponding author: Shivinder Singh

Video Assisted right thoracoscopy was performed to approach the carina and the oesophagus, with the patient in left lateral position. Around 90 minutes of surgery after the gastric pull-up was done the surgeon was dissecting at the mid oesophagus level, there was accidental injury to the left bronchi the surgeon noticed a shiny blue structure protruding from the left bronchial tear (about 0.5 by 1cm). Anaesthesiologist were notified about the injury. Saturation was 97% and the set tidal volume was being delivered accurately. The injury was acknowledged and a decision was made to repair the tear intraoperatively.

The DLT had to be moved away so that surgical repair would be possible, at the same time single lung ventilation was not an option because of injury to bronchial cuff while carrying out repair. So we decided to deflate the bronchial cuff, inflate the tracheal cuff and take the patient on both lung ventilation. We decided to withdraw the tube slightly so that the bronchial cuff doesn't come in contact while repair of the bronchial tear. The position of the DLT was verified with a fiber-optic bronchoscope and the repair of tracheal tear was carried out by both lung ventilation.

Low tidal volume ventilation (5-6 ml/kg) and more respiratory rate (20-22/min) ventilatory settings with no positive end expiratory pressure was given during the repair. After the repair of the bronchial defect, the primary repair for excision of oesophagus with gastric pull up continued and then the DLT was changed to a single lumen ET. The patient remained stable throughout the surgery. Patient was positioned supine and Double lumen tube was replaced with normal portex cuffed endotracheal tube. Bilateral intercostal drain was inserted prophylactically for pneumothorax prevention. Leak test was done to check for anastomotic leak at the end of the procedure.

In view of the intraoperative complication and airway surgery, the patient was ventilated overnight in ICU on CMV mode and extubated the next day after a spontaneous and T-piece breathing trial. Adequate post-operative pain relief was ensured by giving an epidural bolus of 8cc 0.125% bupivacaine with epidural top-up given every 8hrly. Also iv paracetamol 1gm was given to supplement analgesia. A postoperative X-ray was done and it was normal without the evidence of pneumothorax. The patient did not have any subcutaneous emphysema either.



Figure 1 Left bronchial tear with bluish bronchial cuff seen during esophageal dissection

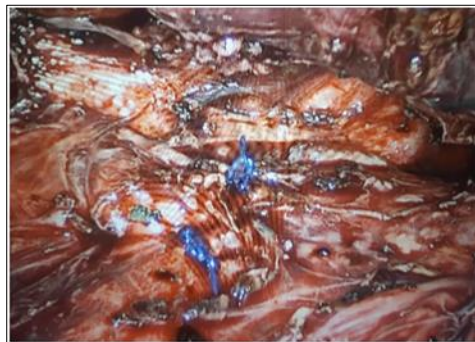


Figure 2 Left bronchi after repair with sutures

3. Discussion

With thoracoscopic surgeries there is always a chance of injury to lower airways. These include tracheal/bronchial tear, pneumothorax, trachea-esophageal fistula, bronchopleural fistula, haemorrhage, cardiac herniation and respiratory failure. Conventional ventilation with an endotracheal tube and intermittent positive pressure ventilation will result in an air leak causing inadequate ventilation or a total loss of tidal volume including anaesthetic gases through the ruptured airway.

In these surgeries one lung ventilation is given to provide a quiet field for surgery, protect the ventilated lung from over distension (by minimizing airway pressure and tidal volume) and maintain adequate gas exchange. Chances of hypoxia are also more during one lung ventilation.

In this case resumption of both lung ventilation was the only option since there was a left bronchial tear and a left sided tube could not be placed. And since we are resuming to both lung ventilation even a normal endotracheal tube could not be placed in lateral position due to difficulty with intubation. We also ensured the tracheal cuff of the double lumen tube remained beyond the vocal cords to minimize the chances of accidental extubation. Early diagnosis and accurate clinical assessment were crucial in the successful outcome of our case. The patient got extubated in ICU the next day and was shifted to normal surgical ward thereafter without any complications.

4. Conclusion

During an unanticipated lower airway injury one must be concerned about delivery of adequate oxygenation and providing best possible conditions to the surgeon to achieve a satisfactory repair of an injured airway.

Steps taken in this case were.

- The same DLT was pulled back and bronchial cuff was deflated to avoid injury to the bronchial cuff and ease in intraoperative repair.
- Both Lung ventilation was initiated in ongoing surgery.

Attention to details of surgery during VATS and change in the delivered ventilatory parameters are necessary during one lung ventilation.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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