

Management of the ventilation in intraoperative tracheobronchial injury with manual occlusion of the rent—An unusual case report

ABSTRACT

Intraoperative tracheobronchial injury is one of the most serious complications of any thoracic surgery. Its management is really challenging both for the surgeons as well as for the anesthesiologists. We present a rare case of intraoperative tracheobronchial injury during esophagectomy and the management of the ventilation by intermittent manual occlusion of the rent as a rescue method. The left-sided bronchus got injured near the carina, while the patient was on one-lung ventilation in a lateral position and the left lung was being ventilated with a left-sided double-lumen tube (DLT). Surgeons decided to repair it in a lateral position and required the right lung to be deflated for surgical access. The endobronchial part of the tube was taken out in the trachea, and the patient was intermittently ventilated by occlusion of tracheal rent by the surgeon as a rescue measure. Intermittent apnea and ventilation were conducted, and the repair of tracheal rent was conducted in the apnea period. A negligible air leak was present after the repair. Manual occlusion of the rent can help restore ventilation in an emergency situation when other options are technically difficult.

Key words: Intraoperative, manual occlusion, tracheobronchial injury

Introduction

Intraoperative tracheobronchial injury is a rare but serious complication in video-assisted thoracoscopic surgery (VATS) esophagectomy.^[1,2] It presents a challenge to the anesthesiologists as well as the surgeons. The causes associated may be direct surgical damage, cautery-induced thermal injury, double-lumen tube (DLT) insertion, and neoadjuvant chemo-radiotherapy.^[3] We present a case of intraoperative cautery-induced tracheobronchial injury and its successful management.


Case Report

A 63-year-old female patient came to our hospital for VATS esophagectomy. She was post-chemoradiotherapy with no other comorbidities. On the day of surgery, general anesthesia was given to the patient and a left-sided 35F DLT was inserted. Surgery was started with one-lung ventilation, and the right lung was deflated for the surgical access. Surgery was uneventful, but while dissecting out left lower paratracheal nodes with ligasure, dissipation of coagulative

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energy occurred leading to thermal injury of the posterior wall of the left bronchus that was 1 cm distal to the carina. A blue cuff was noticed by the surgeons during the procedure, suggesting tracheobronchial injury; however, no change in ventilatory parameters was observed till then. Immediately, a right posterolateral thoracotomy was planned. After assessing the level of injury in the left bronchus, the decision was made to close the defect using patch repair. As the surgeons could not repair the defect with an endobronchial tube *in situ*, the decision to withdraw DLT was made. Complete ventilation failure occurred, EtCO₂ was unrecordable, and saturations dropped to 78–80%. Surgeons were asked to occlude the defect manually to aid ventilation. Ventilation was restored and saturation picked up to 98–99% with EtCO₂ tracing. A plan was made to ventilate the patient for 3 minutes and give apnea for 3 minutes to make repair possible during the apneic phase. The defect was repaired within 45 min with a pericardial patch reinforced by the serratus anterior muscle flap by alternating apnea and ventilation. Saturation was around 90–100% during this period. The patient was turned supine with negligible air leak during ventilation. Hence, surgical resection followed by esophagogastric anastomosis was conducted, which was uneventful. Postoperatively, the patient was ventilated with a low tidal volume of 6 ml/kg and positive end-expiratory pressure 3cmH₂O for 1 day followed by early extubation. No air leak was noticed and further course remained uneventful.

Discussion

Intraoperative tracheobronchial injury is one of the most challenging complications to manage for anesthesiologists.^[2] An essential component of management is to ensure adequate oxygenation and ventilation during the procedure while allowing for good surgical exposure for repair.^[4,5] In this case, the challenge was that we were using left-sided DLT, and the same bronchus got injured. The cuff needs to be withdrawn or deflated to avoid injury to the cuff as it was not possible for the surgeons to repair the rent with the bronchial tube inside. The tube was tightly fit, and we could not advance the cuff beyond the rent. So, we had to take the tube out of the bronchus. Bronchial blocker was not feasible in this case as the rent was on the left bronchus just close to the carina. One option that could have been tried was right-sided DLT but to manipulate the tube in a lateral position was very difficult. There were surgical challenges too in turning the patient supine as the surgical access to the repair of tracheal rent on the posterior wall was not possible in that position. Moreover, surgeons need the right lung to be deflated while

performing the repair of tracheal rent. So, the decision to take the endobronchial lumen out of the left bronchus was taken but we could not maintain ventilation even with low tidal volumes. Manual occlusion of the rent by the surgeons could improve the ventilation. If it had not worked, our next plan was to direct the same tube through bronchoscopic guidance in the right-sided bronchus. Ventilation by occlusion of the rent by the surgeon as rescue was a desperate method that we adopted at that time and it helped us to ventilate the patient.

Conclusion

Manual occlusion of the bronchial rent is one of the rescue methods to achieve ventilation in patients with intraoperative tracheobronchial injury. However, one-lung ventilation with DLT in the normal bronchus will always remain the gold standard.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

References

1. Singh S, Garg A, Lamba N, Vishal. Anaesthetic management of intraoperative tracheo-bronchial injury. *Respir Med Case Rep* 2019;29:100970.
2. George SV, Samarasam I, Mathew G, Chandran S. Tracheal injury during oesophagectomy-incidence, treatment and outcome. *Trop Gastroenterol* 2012;32:309-13.
3. Munasinghe BM, Karunatileke CT. Management of an intraoperative tracheal injury during a McKeown oesophagectomy: A case report. *Int J Surg Case Rep* 2023;105:108010.
4. Little BW, Fowler WM, Gibson S, Popa C, Hodgson JA. Intraoperative management of tracheal cautery injury in a post-bypass cardiac surgery patient. *Mil Med* 2023;188:e2781-3.
5. Khitryan A, Miziev I, Veliev C, Voronova O, Golovina A, Zavgorodnyaya R, *et al.* Case report of successful management of intraoperative tracheal rupture during thoracoscopic esophageal resection in patient with esophageal cancer. *Int J Surg Case Rep* 2019;57:42-6.