



International Journal of Medical Anesthesiology

E-ISSN: 2664-3774
P-ISSN: 2664-3766
www.anesthesiologypaper.com
IJMA 2024; 7(3): 159-161
Received: 08-07-2024
Accepted: 17-08-2024

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One lung ventilation in a tracheostomized patient for video assisted thoracoscopic surgery

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DOI: <https://doi.org/10.33545/26643766.2024.v7.i3c.499>

Abstract

Thoracic surgeries and video assisted thoracoscopic surgery (VATS) requires one lung ventilation for optimal surgical exposure. One lung ventilation can be achieved by the use of double lumen tube or with the use of endobronchial blockers. Lung isolation can be challenging in cases of difficult airway or in patients who have alternate airway access like in patients with tracheostomies. Such patients need modifications in technique to the conventional methods of achieving lung isolation. We present a case of patient with tracheostomy for VATS who was successfully managed with the help of EZ-Blocker® inserted through the tracheostomy tube.

Keywords: EZ Blocker, one-lung ventilation, double lumen tube, bronchial blocker, tracheostomy

Introduction

Thoracic surgery requires techniques for separation of the lungs and one lung ventilation so that optimal conditions for surgical dissection can be provided. The commonly used methods to achieve OLV are use of double lumen tube and bronchial blockers. Achieving lung isolation and providing OLV is difficult and challenging in patients who have a tracheostomy tube in situ. In these patients the usual methods for OLV are either difficult to execute and or cannot be replicated as compared to a normal airway.

Case Report

A 63-year-old male patient was admitted in our institute for video assisted thoracoscopic surgery (VATS) with wedge resection of right lower lobe. Patient was a known case of triple malignancy i.e. diffuse large B cell Lymphoma of jejunum and ileum, poorly differentiated squamous cell Carcinoma mid thoracic esophagus and poorly differentiated Carcinoma of subglottic region. The patient had undergone previous surgery – thoracic esophagectomy and coblation of the subglottic lesion. The patient had received multiple cycles of chemotherapy for the above malignancy. The patient had been tracheostomized in view of stridor due to the subglottic lesion. On screening a metabolically active nodular soft tissue density was found measuring 2.8*2.1 cm in the superior segment of right lower lobe and patient was subsequently posted for surgery. The surgeons plan for surgery was VATS/thoracotomy with excision of lesion which demanded lung isolation and one lung ventilation.

A thorough pre anesthetic evaluation and investigations requisite for the surgery was done. Procedure was explained to the patient and relatives and informed consent was obtained. Under aseptic precautions a thoracic epidural catheter was inserted in T5- T6 level for perioperative pain management. The patient had a 7.5 mm tracheostomy tube in situ. Anaesthesia circuit was connected to the tracheostomy tube and patient preoxygenated. General anesthesia was induced with Intravenous Propofol, Fentanyl and Atracurium. Anaesthesia was maintained with O₂+ Air+ Sevoflurane + intermittent doses of Atracurium. EZ-Blocker® (EZB) was prepared to be inserted for obtaining one lung ventilation. The EZ-Multiport™ adaptor provided with the EZB was connected to the tracheostomy tube. EZB was inserted under vision with help of a flexible 3.9 mm bronchoscope and device was positioned with the Y extensions placed in left and right main bronchi. The right cuff was inflated and lung isolation achieved confirmed by auscultation of the lungs. The cuff was deflated and the patient was turned to left lateral position. The positioned of the blocker was rechecked by the bronchoscope and the cuff inflated again to check for the lung isolation. The screw cap of the multiport was tightened to fix the blocker in position.

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Patient was ventilated using pressure control mode adjusted to maintain normal oxygen saturation and end tidal carbon dioxide levels.

Optimal condition for the surgery could be provided for the procedure to be completed successfully. At the end of procedure, the cuff of the blocker was deflated and both lungs were ventilated. Neuromuscular blockade was reversed and patient was shifted to ICU for postoperative monitoring.

Discussion

Thoracic and thoracoscopic surgeries require one lung ventilation wherein the collapsed lung helps in introduction of the instruments and proper dissection. Usually, OLV is achieved by the use of double lumen tubes or by the use of bronchial blockers. Use of DLT and its insertion requires skill and expertise as the rigid material and the design may cause trauma to the trachea and the upper airway structures. Insertions of DLT becomes more complicated in patients who have a difficult airway and in patients who have been tracheostomized.

Various methods have been used for lung isolation in tracheostomized patients. One of the methods is to remove the tracheostomy tube and inserting the DLT in the conventional orotracheal placement ^[1]. This was not possible in our patient as the patient had a subglottic growth and narrowing of the trachea in the subglottic area. Alternatively, the DLT can be inserted through the stoma but the chances of malposition is more and might be limited by the aperture of the stoma as well as smaller airway length due to the tracheostoma. Special small specific DLT for tracheostomized patients (Rüsch Tracheoparts, Teleflex Medical Europe Ltd., Athlone, Co, Westmeath are, Ireland) has been described in the literature ^[2]. Those DLTs are shorter and curved between the intratracheal and extratracheal parts. The set of double-lumen tracheostomy tubes also included an adjustable flange and an adjustable neckband to stabilize the tube after its insertion.

Alternatively bronchial blockers (BBs), such as Cohen Flex-tip Blocker (Cook Critical Care, Bloomington, IN), the Univent Torque Control Blocker and the wire-guided Arndt Endobronchial Blocker can be used ^[3-7]. There are reports of the use of Fogarty catheter for lung isolation in tracheostomized patients ^[8].

These can be used by either removal of the tracheostomy tube and insertion of a normal endotracheal tube through the stoma followed by a bronchial blocker or passing a bronchial blocker through the cuffed tracheostomy tube using the connector assembly provided with the blocker.

Campos has previously reported various methods of OLV in patients with tracheostomy using a BB through a single-lumen endotracheal tube or through a tracheostomy cannula ^[9]. Limitations of using bronchial blocker are longer placement time as manipulation is required for proper positioning, and possibility of dislocation during surgical manipulation.

We used EZB in our patient for achieving lung isolation and one lung ventilation. Advantage of using the EZB are its ease of insertion and the design namely the Y shape of the distal portion allows the blocker to rest on the carina thus making it less prone to malposition. The two different colored extensions with inflatable cuff allow either of the lungs to be isolated. Kus and colleagues, observed that the EZB had a shorter time to correct position and had a lower

incidence of malposition than the Cohen Flex-Tip Blocker ^[10]. Mourisse and colleagues observed that quality of lung deflation with EZB is comparable to DLT. They also observed that EZB causes less injury to the tracheal and bronchial mucosa, when compared with the DLT ^[11]. Rispoli and colleagues demonstrated that the EZB can also be used via tracheostomy ^[12]. A retrospective analysis of 100 patients undergoing thoracic surgery concluded that the EZ-blocker is an efficient, easy-to-use and safe airway device for OLV especially when DLT insertion is difficult ^[13].

EZ blocker have some limitations with regard to its use. One of the important limitations of the EZB is the smaller suction channel, when compared with a DLT. The EZB has a 7-French outer diameter with two lumens for each limb resulting in minimal diameter for each lumen. This makes it difficult to apply effective suction or oxygen insufflation to the nondependent lung in case of hypoxemia.

Proper deployment of the Y-shaped distal part requires a minimum of 4 cm distance between the distal end of the SLT and the carina. In our patient the tracheostomy tube had to be withdrawn out for the Y-limbs to be deployed. After the blocker was positioned on the carina the tracheostomy tube was repositioned back.

The recommended tube size for the EZ to be inserted is 7mm internal diameter and above. In this patient the blocker could be successfully inserted and positioned with the use of 7.5mm size tracheostomy tube.

Thus, EZ blocker was found to be effective in lung isolation in our patient who has been tracheostomized. The EZ blocker was easy to introduce and the blocker was in position even when the patient was turned to a lateral position for the VATS procedure.



Fig 1: EZ Blocker inserted through the tracheostomy tube for one lung ventilation in patient undergoing VATS



Fig 2: EZ multiport connected to the tracheostomy tube for insertion of the EZ Blocker



Fig 3: Patient in lateral position with EZ Blocker in situ. The Anaesthesia circuit connector was replaced with a catheter mount to avoid traction on the assembly.

Conclusion

In the present case, VATS lobectomy was successfully managed by the use of EZ blocker through the tracheostomy tube to achieve lung isolation. The EZ blocker could be inserted without difficulty through the tracheostomy tube and patients positioned without the blocker getting displaced. EZ blocker is a good alternative to the other commonly used bronchial blockers or DLT currently available in difficult airway situation for one lung ventilation.

References

1. Tobias JD. Variations on one-lung ventilation. *J Clin Anesth.* 2001;13(1):35-9
2. Masamune T, Matsukawa T, Ookawa I, et al: Double-lumen tracheostomy tube (Tracheopart) used in two patients for one-lung ventilation under general anesthesia. *Masui* 53:1418-1420, 2004
3. Cohen E. The Cohen Flexitip Endobronchial Blocker: An alternative to a Double Lumen Tube. *Anesth Analg*

- 2005; 101:1877-9.
4. Campos HJ. An update on bronchial blockers during lung separation techniques in adults. *Anesth Analg* 2003; 97: 1266-74.
5. Kosarek L, Busch E, Abbas A, Falterman J, Nossaman BD. Effective use of bronchial blockers in lung isolation surgery: An analysis of 130 cases. *The Ochsner Journal* 2013; 13(3): 389-93.
6. Seo DM, Lee JH, Lee SG, Ban JS, Min BW. One lung ventilation using a Univent tube in a patient with permanent tracheostomy after total laryngectomy: a case report. *Korean J Anesthesiol* 2006; 50:213-6.
7. Banu Cevik, Ozlem Sezen, Arzum Orskiran, Attila Ozdemir, Recep Demirhan, A method of single-lung ventilation in a patient with permanent tracheostomy: Torque controlled endobronchial blocker (Uniblocker), *BJA: British Journal of Anaesthesia*, Volume 113, Issue eLetters Supplement, 29 December 2014
8. patients Vretzakis G, Theodorou E, Mikroulis D. Endobronchial blockade through a tracheostomy tube for lung isolation. *Anesth Analg.* 2008; 107: 1644-1645
9. Campos JH. Lung isolation techniques for patients with difficult airway. *Curr Opin Anaesthesiol.* 2010;23:12-7.
10. Kus A, Hosten T, Gurkan Y, Gul Akgul A, Solak M, Toker K. A comparison of the EZ-blocker with a Cohen flex-tip blocker for one-lung ventilation. *J Cardiothorac Vasc Anesth.* 2014;28:896-9.
11. Mourisse J, Liesveld J, Verhagen A, et al. Efficiency, efficacy, and safety of EZ-blocker compared with left-sided double-lumen tube for one-lung ventilation. *Anesthesiology.* 2013;118:550-61.
12. Rispoli M, Nespoli MR, Salvi R, Corcione A, Buono S. One-lung ventilation in tracheostomized patients: our experience with EZ-blocker. *J Clin Anesth.* 2016;31:288-90
13. Moritz A, Irouschek A, Birkholz T, Prottengeier J, Sirbu H, Schmidt J. The EZ-blocker for one-lung ventilation in patients undergoing thoracic surgery: clinical applications and experience in 100 cases in a routine clinical setting. *J Cardiothorac Surg.* 2018 Jun 25;13(1):77.

How to Cite This Article

Yalla N, Nara J. One lung ventilation in a tracheostomized patient for video assisted thoracoscopic surgery. *International Journal of Medical Anesthesiology.* 2024;7(3):159-161.

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