



Absent Lung Deflation Because of Blockade Using an Endobronchial Blocker

Endobronşial Bloker Kullanarak Yapılan Blokaj Sonucu Başarısız Akciğer Deflasyonu

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One-lung ventilation is required for various thoracic procedures. In addition, various strategies such as the use of double-lumen tube, univent tubes, and endobronchial blocker have been used for performing one-lung ventilation. Each of these techniques has its advantages and limitations. Certain factors for failure of endobronchial blocker to provide lung deflation has been described in literature. We report a different aetiology of failure of lung deflation, although the endobronchial blocker was appropriately placed.

Keywords: Lung deflation, endobronchial blocker, blockade

Çeşitli torasik işlemler için tek akciğer ventilasyonu gerekmektedir. Ayrıca, tek akciğer ventilasyonunu gerçekleştirmek için çift lümenli tüp, uninvent tüp ve endobronşial bloker kullanımı gibi stratejiler kullanılmaktadır. Bu tekniklerin her birinin avantajları ve kısıtlılıkları vardır. Literatürde akciğer deflasyonunu sağlamak için kullanılan endobronşial bloker başarısızlığını etkileyen bazı faktörler tanımlanmıştır. Bu çalışmada, endobronşial blokerin doğru bir şekilde yerleştirilmesine rağmen ortaya çıkan akciğer deflasyonu başarısızlığının farklı bir etiolojisi sunulmaktadır.

Anahtar kelimeler: Akciğer deflasyonu, endobronşial bloker, blokaj

Introduction

Various techniques for performing one-lung ventilation (OLV) include double-lumen tube (DLT), univent tube, and bronchial blocker (1, 2). DLT remains the most conventional technique for OLV; however, a bronchial blocker is used in cases in which placement of DLT or univent tube is not feasible. The basic principle of successful lung separation after bronchial blocker placement warrants understanding and expertise with bronchial blocker placement. Here, we report a clinical experience of a case in which an adequately separated lung with an “accurately placed” Arndt endobronchial blocker (AEBB) was used for one-lung ventilation, and yet, lung separation was “apparently” unsuccessful.

Case Presentation

A 50-year-old lady was scheduled for left upper lobectomy because of lung cancer. She was a known case of laryngeal cancer and underwent laryngectomy and was tracheostomized. She currently presented with lung metastasis. Her preoperative routine investigations were within normal. Her tracheostomy stoma appeared healthy. In the operation room, routine monitors such as 5-lead electrocardiogram, non-invasive blood pressure, and pulse oximeter were attached. An 18-G intravenous access was secured. Epidural catheter was placed in the T8-9 interspace in the left lateral position. The tracheostomy tube was exchanged with a flexible tracheostomy tube under topicalization of the stoma site using lignocaine. After preoxygenation with 100% oxygen, anaesthesia was induced with incremental sevoflurane, and fentanyl (50 µg) was intravenously administered. Under bronchoscopic guidance, the length of the flexible tracheostomy tube in the trachea was adjusted so as to keep it above carina. Thereafter the flange of the tracheostomy was adjusted at the skin to prevent its movement. After confirming the tube placement, propofol (50 mg), fentanyl (50 µg), and vecuronium (5 mg) were intravenously administered. Then, a 7-Fr AEBB (Cook Medical, Bloomington, USA) was placed in the left main bronchus under the guidance of a fiberoptic bronchoscope (FOB). The patient was positioned in the lateral position for thoracotomy. The AEBB position was confirmed using bronchoscopy and its cuff was inflated. The lung separation was satisfactory, and surgery proceeded. The lung was ventilated under the pressure-controlled mode during the surgery. Lobectomy was accomplished. To check for any lung injury leading to air leak, thoracic cavity was filled with normal saline and both the lungs were inflated and ventilated. For this purpose, AEBB cuff was deflated to enable ventilation of both lungs to check for any air leak from the lung surface. There was no air leak from the lung. AEBB was then re-inflated to allow for continuation of the surgery with OLV. How-

ever, this time, lung deflation was inadequate. FOB revealed the optimal placement of the bronchial blocker. To enable deflation, suction (-20 cmH₂O pressure) was applied to the AEBC lumen. The suction remained ineffective in causing lung deflation. Reinserting the nylon wire loop to exclude luminal obstruction was not feasible for this 7-Fr AEBC. Since the surgery was to be continued, the AEBC balloon was deflated and a period of apnoea was allowed to allow the lungs to collapse. Thereafter, OLV was resumed. This technique led to the collapse of the surgical non-dependent lung. The surgery was completed and haemostasis ensured. After completing the surgery, AEBC was removed under bronchoscopic guidance to assess for non-deflation of the lung but nothing significant was observed. AEBC was examined for any defect or obstruction that was responsible for the absence of lung deflation during the second episode. The AEBC was flushed with saline. On flushing, strands of mucous and epithelial plugs extruded from its lumen. This caused the obstruction of the AEBC lumen and this prevented deflation of the lung.

Discussion

A major drawback of using bronchial blockers is the extended time necessary for lung deflation because of its small lumen (1,2). To hasten lung deflation, disconnection from the ventilator, use of suction through the lumen of blocker, and denitrogenation of the lung with 100% oxygen have been reported (1-3). However, our case demonstrates the cautious use of suction for rapid deflation because it may lead to mucous plugging of the lumen, thereby hampering lung deflation. Resuming ventilation after lung surgery or tissue handling may cause tissue debris to ascend towards the central airway along the airflow and cause lumen obstruction, particularly if suction is applied. Opening the blocked lumen of AEBC by reinserting a nylon wire loop is possible only in 9-Fr AEBC and not in smaller sized blockers. Murphy's eyes are incorporated only in 9-Fr blockers to facilitate deflation. The disconnection technique for lung deflation may lead to opposite lung contamination with blood or secretions, particularly when used at the end of surgery (1). Another alternative would be to use FOB for selective suctioning of the bronchus before resuming one-lung ventilation (3).

Conclusion

We conclude that the cautious use of suction with endobronchial blocker for OLV as it may lead to lumen obstruction. This is more concerning once the possibility of mucus, tissue debris, or blood is present in the blocked bronchus because of

surgical intervention. It would be practical to perform a fiber-optic-guided endobronchial suction, followed by deflation of the lung using an endobronchial blocker with suction.

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