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Primary Author: Jimmy Lin MD
New York Presbyterian - Weill Cornell Medical Center

Co-Authors: Brett Weiner, MD;

Introduction:

Lung isolation is a crucial aspect of many thoracic surgery procedures. Typically, this can be accomplished with either a double lumen endotracheal tube or a single lumen endotracheal tube with a bronchial blocker. However, this may be prove to be difficult in a patient with a known difficult airway. Extensive planning in consultation with the surgical service must take place with consideration for surgical needs in order to optimize operating conditions as well as patient safety. We present a case of a patient with a known difficult airway for a right-sided pneumonectomy where lung isolation was critical due to scarring from tuberculosis destroyed lung with new fungal cavitary disease.

Case Report:

A 49 year-old male with past medical history significant for nasopharyngeal carcinoma status post radiation treatment and two episodes of mycobacterium tuberculosis infection status post antibiotic management presented with a two day history of hemoptysis. Upon review of the patient’s medical record, his prior anesthetic history was notable for a mallampati class 4 airway and mouth opening of only one finger breadth. The use of muscle paralysis during these anesthetics had minimal to no effect on the patient’s limited neck extension and minimal mouth opening. During his most recent surgery, the covering anesthesiologist was unable to get a McGrath size 3 blade into the patient’s mouth necessitating the emergent use of the fiberoptic bronchoscope. This anesthetic was further complicated by rupture of the balloon cuff from the patient’s teeth due to his small oral opening requiring emergent endotracheal tube exchange using a cook catheter.

Following admission from the emergency department, the patient’s hospital course was complicated by respiratory failure requiring intubation which again was difficult requiring the use of the fiberoptic bronchoscope following multiple failed attempts with the McGrath video laryngoscope. Follow-up computed tomography angiography of the chest showed a large cavitary lesion in his right upper lobe suspicious for necrosis secondary to prior mycobacterium tuberculosis infections versus chronic necrotizing pulmonary aspergillosis. The thoracic surgery service was then consulted and decision was made for the patient to have a right pneumonectomy following a ventilation/perfusion scan showing little to minimal function of the right lung.

After consultation with the thoracic surgeon and careful planning, the decision was made to advance the 7.0 endotracheal tube in the left mainstem bronchus under direct visualization using a
flexible fiberoptic bronchoscope instead of exchanging the endotracheal tube out for a double lumen tube given the patient’s known difficult airway. A bronchial blocker was considered, however, given that this was a right-sided pneumonectomy, positioning of the blocker would have proved more difficult and likely not provided optimal operating conditions. Given the indication for the pneumonectomy and likelihood a scarring from previous episodes of tuberculosis, the decision was made to place a right subclavian central venous catheter for rapid fluid resuscitation given the possibility of large blood loss. After the completion of the pneumonectomy, a tracheostomy was performed and the endotracheal tube was removed atraumatically. Following the procedure, the thoracic surgery team requested a thoracic epidural catheter placement for post-operative pain management to aid in weaning from ventilator dependence. This would prove to be challenging given the need to place a high thoracic epidural catheter in a patient under general anesthesia for a number of reasons. First, the patient would need to remain in the lateral decubitus position, making placement more difficult and the risk of intrathecal placement greater. Second, the patient would not be able to communicate with the anesthesia provider therefore increasing the risk of nerve injury. For this patient, we used a right-sided paramedian approach an entered the T6-7 interspace with a 17 gauge Tuohy needle. Loss of resistance to air was achieved at 6.5 cm and no CSF or blood was observed. The epidural catheter was passed easily and no CSF or blood was observed on aspiration of the catheter. A test dose was not given in the operating room due to blood pressure lability but was tested by the intensive care unit team prior to epidural use. Post-operatively, the patient recovered well with excellent pain control without any complications. On Post-operative day 6, the epidural catheter was removed without issue.

Discussion:

This proved to be a challenging and educational case requiring somewhat unconventional anesthetic care. During the preoperative evaluation of patients with known difficult airways for lung isolation surgery, the first step in planning is to determine how to secure the airway. Typically, this would be accomplished with a single-lumen endotracheal tube while the patient is awake.¹ In our present case, we had a patient who already had a secured airway where a decision had to made on how to achieve lung isolation. The concern with using a bronchial blocker was due to these being high maintenance devices with the possibility for frequent dislodgement and need for repositioning2, specifically in a right-sided procedure. In a patient at risk for massive blood loss with obscurement of the surgical field, we opted for the method which would provide the most optimal operating conditions with full lung collapse. Adequate thought also had to be given regarding post-operative pain management as it is crucial for recovery. Thoracic epidural analgesia has long been considered the gold standard for thoracic surgical pain relief as it provides optimal dynamic pain relief and has been shown to be beneficial in preventing postoperative pulmonary complications and facilitating rehabilitation.³ In discussion with the surgeon and the patient’s wife, the benefit of having a thoracic epidural catheter was believed to outweigh the risks which is why we opted for placement.

References:
