

Anesthetic Considerations Of Bronchocarinal Resection Anastomosis

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Citation

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Abstract

INTRODUCTION

Surgical resection of the tracheobronchial tree with end-to-end anastomosis for carcinoid tumors is an accepted treatment modality with long-term survival rate. For the anesthetist, however, this procedure is challenging. We present the anesthetic considerations in a patient who underwent carinal and sleeve left main bronchus resection for atypical carcinoid tumor performed through right thoracotomy.

CASE REPORT

A 33-year-old, female patient, who was presented to her local hospital with a history of fever, chills, cough and one attack of hemoptysis, chest-x ray showed a collapsed left lung (Fig 1).

Figure 1

Fig 1: Chest x-ray showing collapsed left lung.

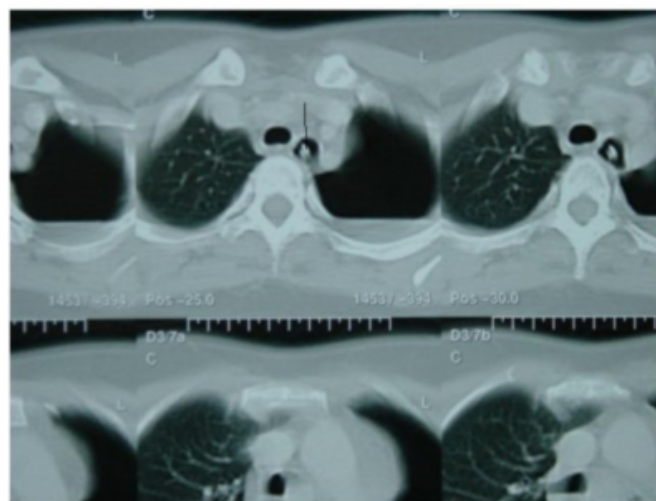


She was diagnosed and treated as a case of pneumonia, later on, after few weeks she had a second attack of hemoptysis for which a CT- scan of the chest was performed that

revealed an endobronchial lesion obstructing the left main stem bronchus (Fig 2).

Figure 2

Fig 2: Chest CT scan showing lesion in the lumen of the left main bronchus (black arrow).



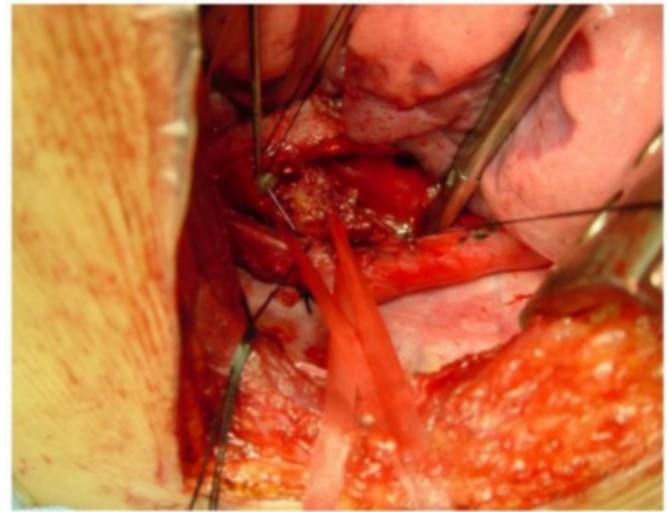
A bronchoscopy was performed and showed a tumor involving the left main stem bronchus but biopsy was not taken because of prolonged partial thromboplastin time (PTT). Other laboratory investigations were normal. The prolonged PTT was discovered to be due to lupus anticoagulant. Pulmonary function tests showed an FEV1 of 1.47 liter (54% predicted), FVC of 1.7 liter (52% predicted) and FEV1/FVC 86%. There was moderate to severe reduction of lung volumes with normal diffusion capacity. The patient was referred to our hospital for further evaluation and possible surgery. Additional investigations done revealed normal ECG, bone scan and U/S of the abdomen. Repeated chest x-ray and CT scan of the chest confirmed the diagnosis of left main stem bronchus lesion extending to the carina with complete obstruction of the left

main bronchus and complete collapse of the left lung. Another rigid bronchoscopy was performed which showed lobulated lesion in the left main bronchus encroached into the midline above the carina. The carinal mucosa was edematous, red in color and bled easily, however, a biopsy from this tumor showed atypical carcinoid. The patient was scheduled for right thoracotomy. Preoperative assessment revealed well looked lady with shortness of breath but not distressed. There was no lymphadenopathy or clubbing. Vital signs were normal. Chest examination revealed deviated trachea to the left side, marked decrease of breath sounds in the left lung with coarse inspiratory crackles but no rhonchi. Cardiovascular system was normal. Abdomen was soft, lax with no organomegaly. Arterial blood gases (ABG) on room air showed, PaO₂ 78mmHg, PaCO₂ 43mmHg and O₂ saturation 94%.

The patient was taken to operating room where cardio respiratory monitoring was instituted. Intravenous and arterial lines were established. A thoracic epidural catheter was inserted At D 7-8. After preoxygenation anesthesia was induced with i.v. sufentanil 10 mcg and propofol 200 mg. Cisatracurium 12 mg i.v was then given to facilitate endotracheal intubation which was achieved with single-lumen armored tube. Left-side internal jugular vein was cannulated. Maintenance of anesthesia was accomplished with 50% N₂O in O₂ and 2% sevoflurane. The patient was positioned on left lateral position and a right posterolateral thoracotomy was performed. After mobilization of the lower trachea, carina, and both main bronchi, resection of the carina and 2 cm of the proximal left main bronchus was necessary to achieve curative resection margins. During the surgery ventilation was maintained by advancing the armored endotracheal tube into the partially transected right main bronchus under vision manipulated by the surgeon (Fig 3).

Figure 3

Fig 3: Surgical field showing the armored tube positioned in the right main bronchus (white arrow).



Excision of the tumor was performed with primary anastomosis between the right main bronchus and the trachea, with the transected end of the left main bronchus so that new carina was reconstructed. Surgical retraction of the inflated right lung was used without deleterious intraoperative hypoxemia. At the end of surgery atropine/neostigmine (0.5/2.5 mg) were given i.v and the trachea was extubated. The patient was transferred to the surgical intensive care unit for further observation. She made uneventful recovery and eventually she was discharged to the surgical floor. Histopathology report of the excised specimen showed atypical carcinoid tumor with free resected margins.

DISCUSSION

It is well known that resection of the tracheobronchial tree is indicated in patients who have tracheal obstruction due to primary tracheal tumor, tracheal stenosis, congenital anomalies, and vascular lesions (1). In previous reports it was shown that for patients who had operable tumors, approximately 80 % had segmental resection (may include carina or larynx) with primary anastomosis, 10 % had segmental resection with prosthetic reconstruction and 10 % had insertion of a T-tube stent (2, 3 and 4). In the present case report the tumor originated from the left main bronchus and involved the carina. The anticipated problem was to maintain oxygenation during the procedure with the use of surgical retraction of the right lung.

However, oxygenation was well maintained and there was no serious hypoxemia occurred.

Ventilation and maintaining oxygenation during tracheobronchial resection surgery is the challenging moment for the anesthesiologists. A variety of methods for providing adequate oxygenation and carbon dioxide elimination have been used during tracheal resection. These include, standard orotracheal intubation (5), insertion of a tube into the opened trachea distal to the area of resection (6), high frequency jet ventilation (HFJV) through the stenotic area (7), low frequency jet ventilation for stent insertion (8), high frequency positive pressure ventilation (HFPPV) (9) and cardiopulmonary bypass specially when left thoracotomy approach is used (10). In the case presented, we have used the standard orotracheal intubation method. That method was sufficient to maintain adequate oxygenation during surgery which was performed through right thoracotomy to facilitate good exposure of the carina and both main bronchi, although the right lung was kept inflated during the operation. Moreover, the same tube was advanced into the right main bronchus manipulated by the surgeon to ventilated the right lung during resection of the left main bronchus and the carina without deleterious hypoxemia.

We think that the anticipated technical limitations to the performance of tracheobronchial surgery can now be overcome by careful preoperative assessment of the site and degree of obstruction, close intraoperative communication between the surgeon and anesthesiologist, improved anesthetic management techniques, and intensive postoperative care. It is well known that the ability to provide adequate ventilation throughout the perioperative period is a major predictor for better outcome during tracheal resection surgery. We believe that although the results of this difficult surgery depends on the tumor cell type, location, and method of resection, it is generally accepted that a reasonable degree of surgical as well as

anesthetic experience, will improve the survival rate in most patients.

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