Left-sided modified Kergin carinoplasty as an alternative to carinal resection for centrally located non–small cell lung cancer pretreated by radiochemotherapy

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Carinal resection is associated with significant mortality and morbidity, mainly related to anastomotic complications.1-3 This holds especially true for left-sided carinal resection1 and resections performed for centrally located tumors after neoadjuvant treatment.3 We designed a modified left-sided Kergin procedure4,5 to avoid a left-sided carinal pneumonectomy after neoadjuvant radiochemotherapy for centrally located non–small cell cancer (NSCLC) of the left main stem bronchus with carinal involvement.

Clinical Summary
A 63-year-old male patient was seen with a squamous cell carcinoma situated at the inferior border of the proximal left main stem bronchus, with extension to the inferior part of the carina and the proximal right main stem bronchus. Distant metastases were excluded by thoracoabdominal computed tomographic scan, bone scintigraphy, and magnetic resonance imaging of the brain. Mediastinoscopy revealed the presence of a per continuum subcarinal American Thoracic Society 7 lymph node involvement, without involvement of other mediastinal nodes. The tumor was classified as T4 N2 M0 NSCLC, and the patient underwent neoadjuvant sequential radiochemotherapy with 3 cycles of cisplatin (100 mg/m²) and docetaxel (85 mg/m²), followed by accelerated radiotherapy to 44 Gy. Partial clinical response was obtained, and resection was considered with a modified Kergin procedure to obtain complete resection while avoiding a left carinal pneumonectomy.

A left-sided thoracotomy was performed after selective right-sided intubation. The aortic arch was mobilized, and the Botalli ligament was divided with preservation of the left recurrent nerve. The carina, the distal part of the trachea, and the medial aspect of the right airway were dissected. The endotracheal tube was retracted, and jet ventilation was installed. A left-sided pneumonectomy was performed, and the inferior circumference of the left main stem bronchus was resected en bloc with inferior part of the carina, together with the inferior part of the right airway up to the intermediate bronchus, leaving a defect of 6 cm in the right airway (Figure 1, A). Frozen-section analysis confirmed tumor-free margins at the level of the resected airway. The superior circumference of the left main stem bronchus was used as a pedicled airway flap...
and sutured into the defect of the carina and the right airway (Figure 1, B). After completion of the reconstruction, the endotracheal tube was repositioned in the trachea. The airway and the mediastinum were reinforced by an intrathoracically transposed pedicled latissimus dorsi flap. At the end of the procedure, the patient was extubated. The postoperative course was uneventful. A repeated bronchoscopy revealed morphologic and functional integrity of the airway. Postoperative controls by repeated computed tomographic scan and bronchoscopy revealed no local recurrence or distant metastases as late as 30 months after the operation.

Discussion
The Kergin procedure was first described in 1952 and was originally designed for airway reconstruction after resection of rightsided centrally located tumors involving the right-sided tracheobronchial angle.4 A bronchial flap of the medial part of the right main stem bronchus was created during right pneumonectomy and was turned upward order to cover the lateral airway defect at the level of the carina. The technique was applied to 11 patients, with no mortality and uneventful healing of the airway in all cases.5

We modified this concept and adapted it to a patient with centrally located NSCLC, originating at the inferior part of the left main stem bronchus and extending to the inferior part of the carina and of the contralateral main stem bronchus. In this situation, the pedicled airway flap was created from the tumor-free cranial circumference of the left main stem bronchus during left pneumonectomy. The flap was rotated downward and allowed a satisfactory reconstruction of the carina and of a 6-cm long defect of the medial aspect of the contralateral airway. This modified left-sided Kergin procedure allowed complete resection of centrally located NSCLC of the left main stem bronchus with direct extension into the carina and the contralateral airway, pretreated by radiochemotherapy. The main advantage of this technique is the avoidance of a risky end-to-end anastomosis after lengthy airway resection in the context of a carinal pneumonectomy after induction therapy.

References

Thoracoscopic operation with local and epidural anesthesia in the treatment of pneumothorax after lung transplantation

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Intratable pneumothorax in the native or in the transplanted lung may occur after lung transplantation, and successful thoracoscopic repair with general anesthesia has been reported.1 For recipients after lung transplantation, however, the risks of general anesthesia itself cannot be negligible, especially during the early postoperative period. We report 2 cases of intratable pneumothorax after lung transplantation successfully treated by thoracoscopic operation with local and epidural anesthesia.

Clinical Summaries
PATIENT I. A 47-year-old man with a history of multiple episodes of bilateral pneumothorax underwent right single-lung transplantation for interstitial pneumonia associated with rheumatoid arthritis. Soon after extubation on postoperative day (POD) 9, a significant ulcerative stricture developed in the right main bronchus and was treated with repeated bronchoscopic débridements. On POD 27, the patient had a pneumothorax develop in the native lung. The initial treatment consisted of chest tube drainage. Pleurography was performed through the chest tube, and a major air leak site was found in the left lower lobe. On POD 34, the patient underwent thoracoscopic operation with local and epidural anesthesia. A thoracic epidural catheter was placed immediately before the operation. Ropivacaine 0.2% (5-7 mL) was injected into the

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