End-to-side bronchial anastomosis using the continuous suture technique

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Sleeve resection with bronchial anastomosis has become a routine procedure in most thoracic units. Several studies have reported satisfactory outcomes after this surgery; however, they all used the traditional interrupted suture technique. Experience with the continuous suture technique for tracheal and bronchial anastomosis was first reported in 1999.¹ This technique is rapid and easy to perform, and the results are comparable to those obtained using the interrupted suture technique. Kutlu and Goldstraw¹ report 100 consecutive cases of various anastomoses; however, they were all performed end to end. Therefore, the reliability of the continuous suture technique for end-to-side bronchial anastomosis remains unconfirmed.

Clinical Summary

End-to-side bronchial anastomosis is undertaken as part of the Barclay's procedure, a technically demanding operation for lung cancer. In the original technique,² the intermediate bronchus is anastomosed to the trachea (end to end), and the left main bronchus is anastomosed to the intermediate bronchus (end to side). However, depending on the extent of tumor invasion and technical feasibility, the procedure is suitably modified to some extent. Therefore, procedures that include double anastomoses, of which one is an end-to-side anastomosis, should be termed as "Barclay's procedure."

Barclay's procedure using a continuous suture technique was undertaken in a patient who presented with squamous cell carcinoma originating from the right upper lobe. Bronchoscopic biopsy confirmed tracheal invasion up to 1.5 cm above the carina, and the tumor was staged as T4N0 on positron emission scanning. Intrathoracic staging with frozen-section analysis of the lymph nodes at stations 2, 4, 7, 9, 11S, and 11I confirmed that complete resection could be achieved in terms of nodal disease. The distal trachea, right main bronchus, upper lobe, and proximal part of the intermediate bronchus were resected with negative margins. The first anastomosis (end to end) was undertaken between the trachea and the left main bronchus. Next, the intermediate bronchus was anastomosed to the left main bronchus (end to side) using the continuous suture technique (Figure 1). The postoperative course was uneventful,

Figure 1. Schematic illustration of end-to-side anastomosis.

and the tumor was staged as T4N0. The patient remains on routine clinical follow-up for 14 months (Figure 2).

Discussion

The basic principles of bronchial anastomosis play a critical role in end-to-side anastomosis. Minimal dissection of the bronchi to prevent blood supply is probably the most crucial aspect for a satisfactory outcome. In Barclay's procedure, the proximal bronchial vessels are inevitably damaged. Therefore, distal anastomosis that is generally performed end to side must be located at least 2 cm from the proximal anastomosis.³ Care should also be taken to prevent the occurrence of anastomotic tension postoperatively on complete inflation of both lungs.

Although Mitchell and colleagues⁴ recommend creating an orifice entirely in the cartilage to provide maximum support, we always make an incision at the junction between the membranous and cartilaginous regions of the bronchus. It may be speculated that the homogenous distribution of traction force after anastomosis by using the continuous technique decreases the possibility of tearing. The length of the incision is equal to the diameter of the bronchial orifice. The posterior portion (membranous part) is initially anastomosed

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Figure 2. Six months after Barclay's procedure using the continuous suture technique. (Siemens LSO HI-REZ Biograph 16; Siemens Medical Systems, Munich, Germany).

using 4-0 polypropylene (Figure 1). Subsequently, the anterior portion is sutured, and the anastomosis is completed without any difficulty. No additional precautions are taken to provide ventilation during the procedure. Apnea after complete saturation generally facilitates completion of the anastomosis.

We have performed end-to-side bronchial anastomoses in a few cases in which the continuous technique was used only for the posterior part of the anastomosis. In the reported case, end-to-side anastomosis was performed using the continuous technique for the entire circumference, and it resulted in a satisfactory outcome. This suggests that continuous suturing seems to be an adequate technique even for end-to-side bronchial anastomoses.

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Thrombus in the left superior pulmonary vein after left upper pulmonary lobectomy

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Renal infarction related to lung resection is rarely reported. We first encountered a case of renal thromboembolism midterm after lung resection. Creating a stump of pulmonary vein after major lung resection is among the

few ways in which surgeons can generate a thrombus in the arterial system, which may lead to organ infarction. Infarction after lung resection, however, has rarely been reported. We present a case of renal infarction after lung resection.

Clinical Summary

A 76-year-old man underwent resection of the left upper lobe for lung cancer. Thirteen months after the operation, he sought treatment with severe right flank pain. A computed tomographic scan of the chest and abdomen, and of the pelvis with intravenous injection of contrast medium, revealed a large, wedge-shaped infarction of the left kidney (Figure 1). We detected a ball thrombus floating in the stump of the left superior pulmonary vein (LSPV), which we had left at the operation 13 months before. We consider this infarction of the kidney to be caused by thromboembolism.

We admitted the patient and started anticoagulation therapy with heparin (20,000 units/d intravenously) and warfarin sodium (3 mg/d). Twelve days after the anticoagulation therapy had been started,

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