Case report - Thoracic general

Nohl-Oser type tracheobronchoplasty procedure in the treatment of advanced carcinoma of the right upper lobe

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Abstract

Two male patients were admitted with right upper lobe tumor. In both cases, standard upper lobectomy or sleeve lobectomy was not applicable because of the invasion of lateral wall of the lower trachea. The standard surgical option was tracheal sleeve pneumonectomy. Avoidance of pneumonectomy could be achieved by Nohl-Oser tracheobronchoplasty. Both patients had smooth postoperative course. We present these cases because of rarity and to emphasize the alternative techniques. The surgeon should be aware of the possibility of an alternative technique.

Keywords: Lung cancer; Tracheobronchoplasty

1. Introduction

Malignant tumors of the right upper lobe sometimes extend upward to involve the right lateral wall of the lower trachea. On rare occasions, minimal spread of this kind can be managed by a right pneumonectomy with limited excision of the lateral wall of the trachea or tracheal sleeve pneumonectomy. Avoidance of pneumonectomy can be achieved by Nohl-Oser type tracheobronchoplasty [1] or tracheobronchoplasty described by Sato in 2002 [2]. Although these procedures require more experience and skill on the part of the surgical team, they provide superior postoperative pulmonary functions, and survival figures comparable with conventional extended resections [3]. We describe two patients in whom Nohl-Oser tracheobronchoplastic procedure was done.

2. Patient 1

A 53-year-old man was admitted with right-sided chest pain, dry cough, hemoptysis, and weight loss. A chest radiograph showed consolidation at the right upper lung field. Chest computed tomography (CT) demonstrated a soft tissue mass contacting vena cava superior. Magnetic resonance imaging (MRI) demonstrated a hilar and suprahilar mass of $60 \times 45 \times 35$ mm, extending carina inferiorly. The mass was in close contact with both right main bronchus and tracheal carina and superior vena cava. Main bronchus was narrowed (Fig. 1a). No evidence of mediastinal lymphadenopathy was demonstrated. Fiberoptic bronchoscopy revealed a necrotic mass protruding to the main bronchus. The upper lobe orifice was located at the level of tracheal carina. The tumor invasion into the right tracheal wall was suspected, and biopsy was taken both from the mass and suspected areas on tracheal wall. Pathologic examination demonstrated squamous cell carcinoma. The suspected areas were clear. Systemic examination demonstrated no evidence of metastasis. Though the clinical stage was III B, the tumor was localized and considered resectable. A right posterolateral thoracotomy was done. Routine dissection of the hilum showed that the upper lobe vessels could be secured. The lower trachea was exposed next by dividing the vena azygos. Tight adhesions were dissected with sharp dissection around superior vena cava carefully. The right lateral wall of the trachea was opened 3 cm above the bifurcation, and this incision was then carried vertically downward both in front and at the back, continuing onto the right main bronchus and bronchus intermedius. The posteromedial wall of the bronchus...
intermedius was left in continuity with the main carina. Finally, the bronchus was cut transversely above the middle lobe bronchus (Fig. 1b). Clear frozen section margin was confirmed. After inferior pulmonary ligament was ligated and divided, reconstruction was commenced by suturing the remaining portion of the bronchus intermedius into the tracheal defect with interrupted absorbable sutures. The sutures were started from below at the level of the carina and continued upward until the bronchial opening of the middle and lower lobes came to lie opposite the upper end of the defect (Fig. 1c). Radical dissection of mediastinal and hilar lymph nodes was performed. Pathologic examination confirmed tumor remnants on bronchial margin. Postsurgical pathologic stage was T4N0Mo (stage IIIB). Postoperative flexible bronchoscopy did not show stenosis, separation, or other complications. Delayed space problem persisted for 2 weeks. He was sent to radiotherapy. Because of feeling well, he did not complete radiation therapy. He died 13 months later.

3. Patient 2

A 65-year-old man was referred for a surgical opinion because of cough, hemoptysis, progressive shortness of breath with wheezing and a chest roentgenogram that showed opacification of the right upper lobe. CT demonstrated right upper lobe atelectasis and a mass extending right hilum (Fig. 2a and b). The suspicion of mediastinal lymphadenopathy was present. Arterial blood gases showed hypoxemia and pulmonary function tests showed a severe obstructive pattern (oxygen tension [PaO2], 60 mmHg; carbon dioxide tension [PaCO2], 40 mmHg; forced expiratory volume in 1 s [FEV1], 1.2 l; predicted postoperative FEV1, 1.1 l). Bronchoscopic washing cytologic examination was normal. Systemic examination demonstrated no
evidence of metastasis. At mediastinoscopy, no lymph node was involved. 

He underwent exploratory thoracotomy, with the intention of possibly employing the same operative technique as in the first patient. At thoracotomy, the tumor was found in right upper lobe involving the outer surface of the lateral wall of the main bronchus and trachea. Frozen section examination showed nonsmall cell lung cancer. Exactly the same operation was performed as in patient 1. Postoperative progress was satisfactory. Pathologic examination demonstrated moderate-grade squamous cell carcinoma. Peribronchial lymph node was involved. Postsurgical pathologic stage was T3N1M0 (stage IIIA). He was not offered adjuvant radiotherapy. He was seen periodically. Twenty-seven months later, local recurrence was detected in mediastinal area and radiation therapy was offered. The patient refused to have radiation therapy.

4. Comment

Bronchoplastic procedures sometimes have a role in surgery of malignant pulmonary lesions. Tracheal sleeve pneumonectomy or right pneumonectomy with limited excision of the lateral wall of the trachea are the only surgical possibilities for a tumor involving the carina and tracheobronchial angle [4]. Surgical alternative to sleeve pneumonectomy are the tracheobronchoplastic procedures described by Nohl-Oser in 1982 [1] and Sato in 2002 [2]. Both procedures preserve the right middle and lower lobes, and are suitable for the patient with limited pulmonary reserve. Our patient 2 had a very limited pulmonary reserve. Before considering such a technique, a careful examination should be done because the size of tumor, its location in close proximity to the main pulmonary artery, and the involvement of hilar and/or mediastinal lymph nodes are considered contraindications to operation.

Nohl-Oser tracheobronchoplasty has distinct advantages. It ensures rigidity of the repaired wall and a normal respiratory epithelial lining. It is applicable only in those patients in whom extension of tumor involvement in the trachea is less than the length of the bronchus intermedius [1]. The tracheobronchial anastomosis was covered with a viable tissue in the reported cases [1,2]. We did not support anastomotic line, and had no complication at the site of anastomosis. We think that the Nohl-Oser tracheobronchoplasty is a safe and applicable method for selected tumor of right upper lobe. It must be added to surgical armamentarium.

References