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Right middle lobe and S6 sleeve lobectomy for pulmonary mucoepidermoid carcinoma originating from the bronchus intermedius: A case report

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Central Picture Legend:

The right middle lobe and S6 sleeve resection and the bronchial reconstruction.

Glossary of Abbreviations

Extended sleeve lobectomy (ESL)

mucoepidermoid carcinoma (MEC)

pulmonary artery (PA)

Right middle lobe (RML)

sleeve lobectomy (SL)
Central message:

Right middle lobe and S6 sleeve lobectomy for carcinoma localized in the bronchus intermedius is useful for avoiding bilobectomy.

Introduction

Extended sleeve lobectomy (ESL) is an atypical bronchoplasty procedure involving multilobar resection to avoid pneumonectomy. Right middle lobe (RML) and S6 sleeve lobectomy (SL), which are not classified as ESL, are rare procedures that preserve lung function. We report a case describing the application of RML and S6 SL.

Case presentation

A 66-year-old man presented with a nodule in the bronchus intermedius on computed tomography (Figure 1A). Bronchoscopy indicated mucoepidermoid carcinoma (MEC) (cT1cN0M0, stage IA3) (Figure 1B, C). Respiratory function was normal. Although bilobectomy was feasible based on predicted postoperative lung function, RML and S6 SL were performed to preserve the basal segment, as the tumor was low-grade without lymph node metastasis, and adequate margins for resection were expected. The Ethics Committee of Kanagawa Cancer Center approved the study protocol (2023EKI-138, January, 2024). The patient provided informed written consent for publication.
Surgical Technique

Right 5th intercostal posterolateral thoracotomy with a 22-cm incision was performed. First, all interlobar fissures were divided and the RML vessels were exposed. The supplementary video shows a dissection of the pulmonary artery (PA) and vein of the S6 segment. After stapling between the S6 and basal segments, the bronchus intermedius and basal segmental bronchus were encircled. The peripheral side of the bronchus was cut at the end of the basal segmental bronchus to ensure adequate surgical margins. A specimen was extracted by pulling dorsally behind the interlobar PA. The bronchial resection margin was pathologically negative on frozen sections. To release tension on the bronchial anastomosis, the pulmonary ligament was dissected and gauze was inserted over the diaphragm to elevate the basal segment. Anastomosis was performed with interrupted 4-0 PDS RB-1. First, three stitches were placed in the deepest anastomosis and the center stitch was ligated. Another stitch was placed on the outer side, and the deeper stitch was ligated. This maneuver was performed halfway through the bronchus. The remaining outer half of the bronchus was ligated after suturing. No air leakage was detected at the bronchial anastomosis, and the basal segment was well-expanded. No kinking of PA occurred. The anastomotic site was covered with a pericardial fat pad. Surgery required 182 minutes; 10 mL blood loss occurred.
Outcome

The postoperative course was uneventful; the patient was discharged on postoperative day 6. Microscopy revealed a low-grade MEC with prominent cystic lumen, well-differentiated tumor cells, and no prominent nuclear fission pattern (pT1cN0M0, stage IA3) (Figure 2A). No complications occurred, even at the anastomotic site, with good lung expansion (Figure 2B, C). He has remained recurrence-free for 11 months postoperatively.

Discussion

MEC is a rare lung cancer type histopathologically classified as low-or high-grade. Low-grade MEC is almost always curable by surgical resection, and has a good prognosis.}

Several technical difficulties can occur in ESL and RML + S6 SL compared to SL: greater discrepancies in bronchial caliber, increased anastomotic site tension, and combined angioplasties, however these procedures are a promising strategy in appropriate patients. RML and S6 SL have not been described in the available literature. When performing this procedure:

1. The basal PA and bronchus are in close proximity due to anastomosis within the lung lobe and poor maneuverability of the needle; thus, a small and strongly curved suture needle should be selected.

2. Discrepancies in bronchial calibers are not a substantial problem because the basal bronchial caliber is widened by cartilage. When B7 stenosis occurs at the anastomosis,
sacrificing S7 should be considered.

3. Because the RML and B6 bronchi are under the PA, en bloc extraction may be difficult. In such cases the specimen should be divided into two parts at the end of the RML bronchus far from the tumor.

4. Methods for releasing tension at the anastomotic site include dissecting the pulmonary ligament and packing the base of the lung with gauze.

5. If the PA is kinked due to bronchial shortening, PA plasty may be considered. In our case, we selected open thoracotomy over minimally invasive surgery for bronchial anastomosis due to poor maneuverability and to ensure safe extraction of the specimen under PA.

Conclusions

RML and S6 SL can be performed safely, and may preserve respiratory function in selective patients.

Acknowledgments

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References


**Figure legends**

**Figure 1:** A. Chest computed tomography revealed a tumor in the bronchus intermedius (maximum size, 2.4 cm). B. Bronchoscopy indicated a smooth-surfaced tumor at the bronchus intermedius. C. The tumor extended to the entrance of the middle lobe and B6 bronchi.

**Figure 2:** A. Hematoxylin and eosin staining indicated that the tumor consisted mainly of mucous cells, intermediate cells with a squamous component (×400 magnification). B. Postoperative chest radiography, indicating good residual lung expansion. C. Bronchoscopy 2 weeks after surgery indicated good healing of the anastomotic site.
Postoperative (1 months after surgery)