Tracheobronchial anomaly: one-lung ventilation difficulty during thoracoscopic esophagectomy for esophageal cancer

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Abstract
We describe a case of difficult deflation of the upper right lobe caused by the existence of a tracheobronchial anomaly during the thoracoscopic esophagectomy. A 70-year-old man with a history of myocardial infarction and dysphagia was diagnosed with thoracic esophageal squamous cell carcinoma. Endoscopy revealed a type 2 tumor in the lower esophagus and a superficial lesion in the middle esophagus and computed tomography showed no evidence of metastasis. We performed 2 courses of neo-adjuvant chemotherapy followed by thoracoscopic esophagectomy. During surgery, one-lung ventilation using right bronchus balloon occlusion was performed. However, the upper lobe of the right lung did not deflate, and upper mediastinal dissection was difficult. Intraoperative bronchoscopy revealed a right tracheal bronchus arising from just under the bifurcation. We reviewed the preoperative 3-dimensional computed tomography, which showed the right tracheal bronchus causing intraoperative incomplete deflation of the upper lobe. We recommend investigating this anomaly with 3-dimensional computed tomography before thoracoscopic esophagectomy.

Key words: Tracheobronchial anomaly, tracheal bronchus, one-lung ventilation, esophageal cancer, thoracoscopic esophagectomy

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Fig 1. Intraoperative view of thoracoscopic esophagectomy in the prone position. Open white triangle indicates the upper lobe of the right lung which did not deflate during one-lung ventilation with right main bronchus balloon occlusion. Asterisk indicates the trachea, and white triangle indicates the esophagus.

Fig 2. Three-dimensional computed tomography showed the existence of a right tracheal bronchus arising from just under the bifurcation (arrow).
bronchus is rare, occurring in 0.1% to 2% of patients; however, it may cause problems during thoracic surgery including intraoperative injury of the lung and bronchus. In the present case, 3D CT showed the existence of the right tracheal bronchus. Therefore, it should be determined whether this airway anomaly exists before performing TSE. During TSE for esophageal cancer, one-lung ventilation with balloon occlusion of the right lung is useful for dissecting the left side of the trachea because it makes it easy to rotate the trachea compared to using double-lumen tube intubation. The existence of a tracheal bronchus was considered a limitation to the balloon occlusion method. Insufficient occlusion of the right bronchus may disturb creating enough surgical field and cause the intraoperative unexpected lung or vessel injury. When preoperative CT detected the tracheal bronchus, we considered the following three methods: First; the use of a double-lumen tube, which might be useful for one-lung ventilation, Second; hyper-pressure artificial pneumothorax under two-lung ventilation, which might be useful in terms of stable hemodynamics and oxygenation, Third; lymph node dissection around the left recurrent nerve via the cervices before TSE.

Conclusions

We reported a case of a tracheobronchial anomaly diagnosed during TSE for esophageal cancer. We recommend preoperative carefully check the airway tract with a thin slice CT and when detect the suspicion of a right tracheal bronchus, create the 3D CT before TSE for esophageal cancer.

Author’s contributions

HK and TN reported the case and wrote the manuscript. HK, YT, JI, SU, KF, ST, HM, and MK performed the surgery and perioperative management of the patient and helped in drafting the manuscript. HK, TN, and KH participated in revising the manuscript critically. All authors read and approved the final manuscript.

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References