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Video-assisted thoracoscopic bronchial sleeve lobectomy

The authors declare no financial disclosure

Abstract

Bronchial sleeve lobectomy offers a chance to avoid excessive resections such as pneumonectomy in central lung tumors. Recent technical advances enable complex procedures such as video-assisted thoracoscopic bronchial sleeve lobectomy (VABSL). We present a case of a 64-year-old patient who underwent the right upper VABSL due to adenocarcinoma. During resection the bronchus was transected and a specimen removed due to tumor proximity. Intraoperative frozen section revealed no neoplastic infiltration in the bronchial cut line. Due to a stiff round shape of the bronchial defect, impossible to approximate by direct suturing without kinking, sleeve lobectomy was undertaken. Bronchial section was performed through utility incision partly under direct vision. End-to-end anastomosis was led with open surgery needle holder, forceps and with continuous Maxon 4–0. Postoperative stay was uncomplicated and bronchoscopy revealed wide lumen of anastomosis.

Key words: lung cancer, minimally invasive surgery, video-assisted thoracoscopic surgery, bronchial sleeve resection

Adv. Respir. Med. 2017; 85: 250–252

Introduction

Lung cancer is the leading cause of death due to malignancies. Surgery is the treatment of choice in early stages of non-small cell lung cancer (NSCLC). Bronchial sleeve lobectomy offers a chance to avoid excessive resections such as pneumonectomy in central lung tumors [1]. Recent technical advances enable performance of complex procedures like video-assisted thoracoscopic bronchial sleeve lobectomy [2].

Case report

We present a case of a patient who underwent the right upper video-assisted thoracoscopic bronchial sleeve lobectomy due to NSCLC with a special consideration of the technical aspects of the procedure. A 64-year-old man with a biopsy-confirmed adenocarcinoma in the right upper lobe was admitted to the hospital in October 2014.

The first symptom of the NSCLC was pneumonia. Due to this respiratory infection, a chest X-ray was performed and the neoplastic change detected. The preoperative contrast-enhanced chest computed tomography and positron emission tomography proved the lesion to be localized in the right upper lobe only without nodal involvement. The spirometry revealed a good functional status — forced expiratory volume in 1 second was 3.44 L (100%), and forced vital capacity was 4.94 L (111.8%). Prior to the surgery, the patient had never been operated. He did not report any other comorbidities or loss of weight. The patient had a 67 pack-year smoking history. He smoked an electronic cigarette for last two years. There were no abnormalities in the physical examination. Double lumen intubation with a left double lumen tube enabled right lung deflation. The patient was positioned in a left lateral decubitus position with a hyperextended hip. First incision in the seventh anterior axillary line and the second in the ninth

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DOI: 10.5603/ARM.2017.0041

Received: 01.07.2017

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ISSN 2451–4934

Figure 1. Primary cut line

Figure 3. Performance of bronchial anastomosis

Figure 2. Secondary cut lines

Figure 4. Endoscopic photo of the bronchial anastomosis

scapular line were performed. The camera was introduced through the anterior port. A 4-cm-long utility incision was performed in the fourth intercostal space and the elastic wound protector inserted. The operative steps were performed in the following sequence - apico-anterior trunk of the artery (EndoGIA vascular stapler), right upper lobe vein (EndoGIA vascular stapler), posterior ascending artery (ligature and LigaSure Dolphin Tip — Covidien Dublin, Ireland), well developed fissure (electrocautery). Complete freeing of the hilar structures enabled the final inspection of the anatomical relations between the tumor and the origin of the right upper lobe bronchus. The dissection of the right upper lobe bronchus manifested a neoplastic infiltration. Due to proximity of the tumor, the bronchus was sharply transected and the specimen was removed. The intraoperative frozen section revealed no neoplastic infiltration in the bronchial cut line. However, due to an uncommonly stiff round shape of the vast bronchial defect, which was

not possible to be adequately approximated by direct suturing without significant kinking, the decision to perform a sleeve lobectomy was undertaken. The bronchial section was performed through the utility incision partly under direct vision. The pulmonary ligament was freed. The end-to-end anastomosis was led with an open surgery needle holder, forceps and with Maxon 4-0 (Covidien Dublin, Ireland). The suture was continuous starting from the posterior part of the anastomosis to the anterior one. No stay sutures were used. The water seal test proved adequate airtightness. Systemic lymphadenectomy (groups 2R, 4R, 7, 10R, 11R) was performed. One chest tube 28 French was left and the incisions were closed. Total surgery time was 300 minutes, and blood loss was 100 ml. Immediately following the surgery, the patient was kept in the high dependency unit until stable and then admitted

for the regular ward. No postoperative complications were reported. The chest tube was removed on the third postoperative day. The patient was discharged home on the fourth postoperative day. The bronchoscopy revealed wide lumen of the anastomosis. The final histopathological examination confirmed adenocarcinoma of the right lung (T2aN1Mx stage II A). Basing on the decision of the multidisciplinary team, the patient was not given the adjuvant chemotherapy, instead being directly qualified for the thoracic surgery. The bronchoscopy performed three months after the surgery showed appropriate healing without stenosis. The patient has remained asymptomatic during the fourteen-month-long monitoring.

Discussion

Constant development of operative technique of thoracic surgeons enables them to perform most complex procedures through minimally invasive approach [3]. Video-assisted thoracoscopic bronchial sleeve lobectomy offers a chance to avoid excessive pulmonary resections. Patients may gain from the advantages of this minimally invasive technique including shorter hospital stay [4–8], smaller incision and reduced postoperative pain [4, 5, 7, 8]. However, this procedure is not widely practiced due to its technically challenging bronchial reconstruction, which is its most problematic issue [7–9]. Thus, video-assisted thoracoscopic bronchial sleeve lobectomy ought to be conducted only by technically skilled surgeons in video-assistance experienced centers. As recent technical advances enable performance of such a complex procedure due to improved outcomes [7–12], video-assisted thoracoscopic bronchial sleeve lobectomy is becoming an acceptable alternative for the open technique [7, 9, 10].

Conclusions

Bronchial anastomosis is preferably accomplished through an utility incision [8], which was the technique described in this case report. It distinguishes video-assisted thoracoscopic bronchial sleeve lobectomy from video-assisted thoracoscopic (VATS) lobectomy [13]. Although video-assisted thoracoscopic bronchial sleeve lobectomy is feasible, it is difficult to predict whether it can be routinely offered to patients

with locally advanced NSCLC even in experienced centres [2, 7, 9].

Conflict of interest

The authors declare no conflict of interest.

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