Robotic-assisted segmentectomy of lingual segment of the left upper pulmonary lobe

Shiguang Xu, Bo Li, Renquan Ding, Bo Liu, Hao Meng, Shumin Wang

Department of Thoracic Surgery, Northern Hospital, Shenyang 110015, China

Correspondence to: Shumin Wang, MD, PhD. Department of Thoracic Surgery, Northern Hospital, No. 83, Wenhua Road, Shenhe District, Shenyang 110015, China. Email: sureman2003congo@163.com.

Submitted Jan 20, 2015. Accepted for publication Mar 03, 2015.
doi: 10.3978/j.issn.2305-5839.2015.03.11
View this article at: http://dx.doi.org/10.3978/j.issn.2305-5839.2015.03.11

Clinical data

History

The patient, a 50-year-old woman, was admitted due to "repeated hemoptysis for more than half a year". The patient began to cough up blood about 6 months ago. The blood was bright red in color, and the patient spitted about 6 times during each attack. She spitted up fresh blood again one month ago and received anti-inflammatory and hemostasis treatment in a local hospital. Then, she visited our hospital for further management. She did not suffer from fever. Her physical performance was normal, and the body weight did not obviously change.

Physical examination

The body temperature was 36.3 ℃. Auscultation revealed slightly harsh breath sounds in the left upper lung field; however, no dry or wet rales or pleural friction rubs were heard. No other positive sign was detected.

Auxiliary examination

Chest CT: the lingular bronchus of left upper lobe showed cystic and cylindrical dilatation, along with thickened walls. Small dotted and patchy intensities were visible around it. Left bronchial dilation accompanied with peribronchitis was considered (*Figure 1*).

No obvious abnormality was found in ECG, echocardiography, pulmonary function test, blood gas analysis, and other biochemical tests.

Pre-operative diagnosis: bronchiectasis of the left upper lobe.

Pre-operative preparation

Bronchiectasis of the left upper lobe was considered based on the symptoms, signs, and imaging findings. The symptoms were remarkably alleviated after medical treatment; however, a clear lesion persisted and was confined to the lingular bronchus. Resection of lingual segment of the left upper pulmonary lobe was then decided. The surgery was performed using da Vinci robotic system.

Surgical procedures

Anesthesia and body position

After the induction of general anesthesia, the patient was placed in a right lateral decubitus position under double-lumen endotracheal intubation. With her hands put in front of head, she was fixed in a Jackknife position with single-lung (right) ventilation (*Figure 2*).

Procedures

Incisions: a 1.5-cm camera port was created in the 8th intercostal space (ICS) at left posterior axillary line, two 1.0-cm working ports were separately made in the 5th ICS at left anterior axillary line and the 8th ICS at scapular line, and a 4-cm auxiliary port was made in the 7th ICS at midaxillary line (*Figure 3*).

The robot Patient Cart were connected over the patient's head. A 12-mm trocar was placed at the camera port in the 8th ICS at right posterior axillary line to be attached with

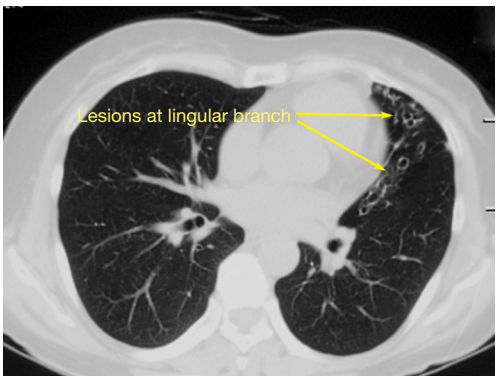

Figure 1 Dilation of the lingular bronchus of left upper lobe.

Figure 2 The patient's position: in the right lateral decubitus position and in a Jackknife position.

Figure 3 Distribution of incisions: "8857".

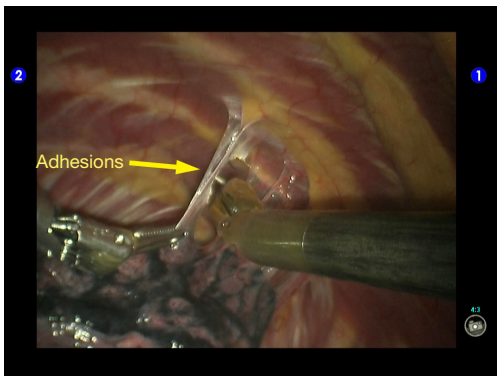

Figure 4 Dissect the pleural adhesions.

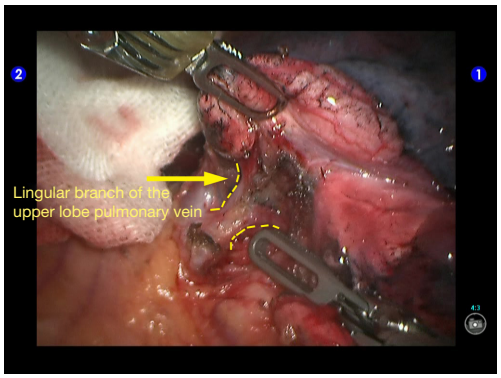

Figure 5 Dissociate the lingular branch of the upper lobe pulmonary vein.

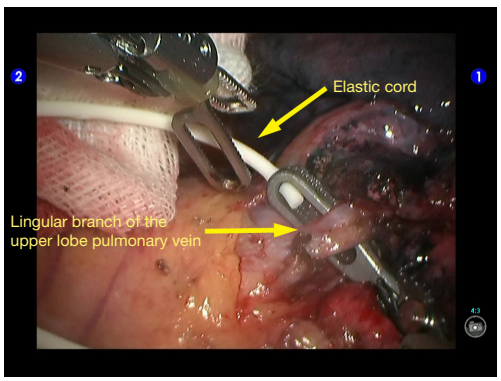

Figure 6 Insert the elastic cord.

the camera arm. The robot metal trocars were respectively attached to the 2# arm (left hand) and 1# arm (right hand) at the incisions in the 5th ICS anterior axillary line and the 8th ICS scapular line. Incision protector was applied in the auxiliary port.

The robot Patient Cart is positioned directly above the operating table and then connected. Its left hand is attached to bipolar cautery forceps, and its right hand is attached

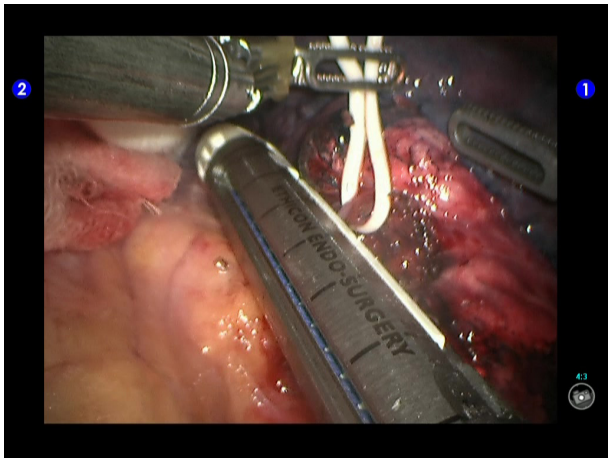

Figure 7 Transect the lingular branch of the upper lobe pulmonary vein using a white reload.

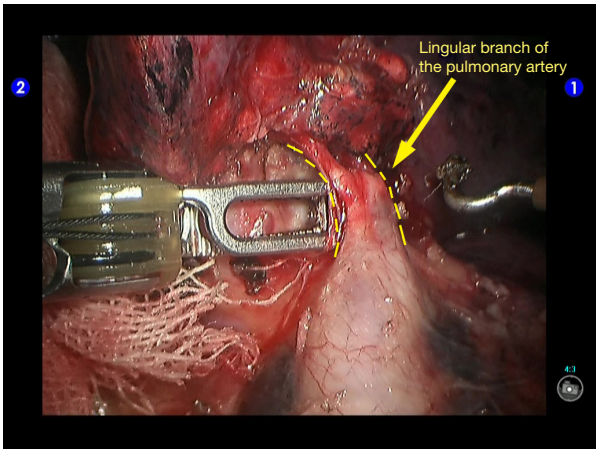

Figure 9 Expose the lingular branch of the upper lobe pulmonary artery.

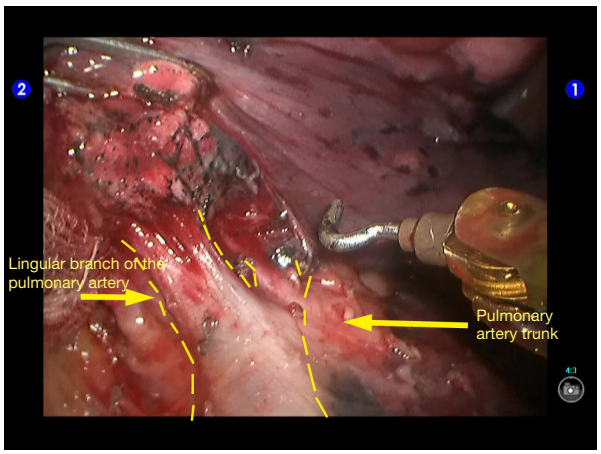

Figure 8 Dissociate the lingular branch of the upper lobe pulmonary artery.

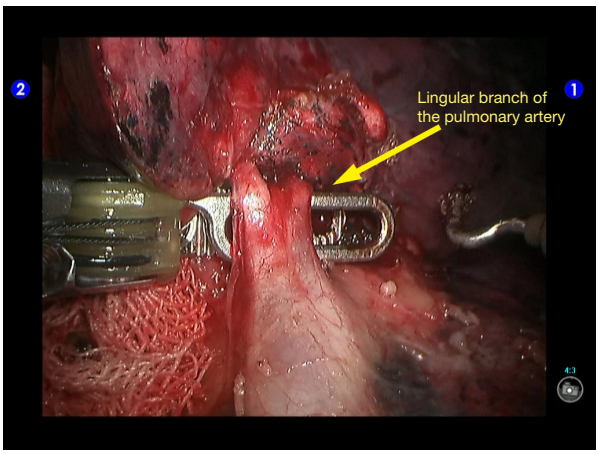

Figure 10 Expose the lingular branch of the upper lobe pulmonary artery.

to a unipolar cautery hook. Inspection of the thoracic cavity showed that there were many cord-like structures adhered in the upper lobe. These cord-like structures were then dissected with the unipolar cautery hook (*Figure 4*). Inspection also showed that the lesion was localized inside the lingual segment of the upper lobe, and the lung fissures developed well.

Segmentectomy: the anterior mediastinal pleura was cut open to dissociate the lingular branch of the upper lobe pulmonary vein (*Figures 5*,*6*). Endoscopic dissecting sealer was inserted through the auxiliary port, and the vein was transected using a white reload (*Figure 7*). Cut open the oblique fissure to dissociate the lingular branch of the upper lobe pulmonary artery (*Figures 8-12*) and then transect it using a white reload (*Figure 13*). Dissociate the lingular segmental bronchus (*Figures 14-16*) and then clamp it with a blue reload. An anesthesiologist was asked to suction sputum and ventilate the operated lung. After the proper segments of the upper lobe were found to be well ventilated, the lingular segmental bronchus was dissected (*Figure 17*). The inter-segmental gap was separated using two golden reloads and one blue reload, and thus the lingual segment was removed (*Figures 18-20*). A specimen bag was inserted via the auxiliary port to harvest the specimen (*Figure 21*).

Wash the thoracic cavity. The residual lungs were well dilated, without air leakage. The trauma surfaces and the post-operative lung surfaces were sprayed and covered with

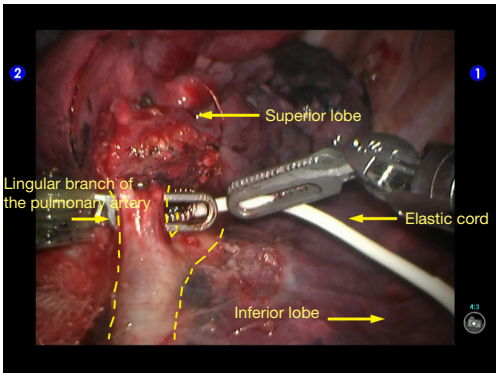

Figure 11 Insert the elastic cord.

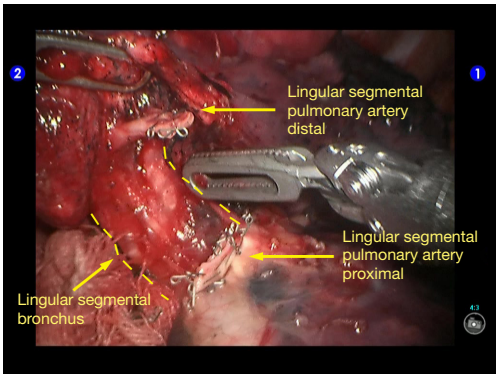

Figure 14 Dissociate the lingular segmental bronchus.

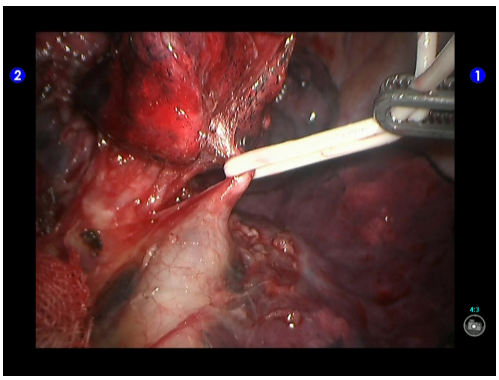

Figure 12 Pull up the lingular branch of the upper lobe pulmonary artery with the elastic cord.

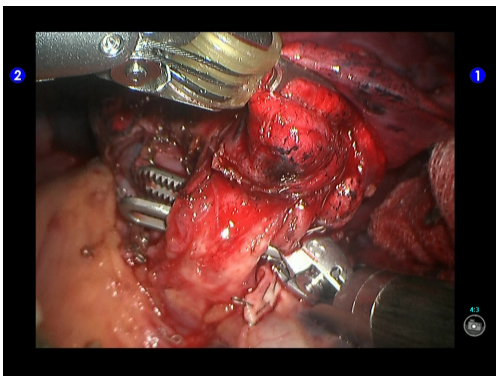

Figure 15 Expose the lingular segmental bronchus.

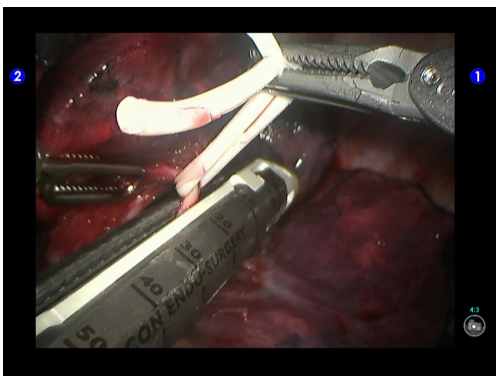

Figure 13 Transect the lingular branch of the upper lobe pulmonary artery with a white reload.

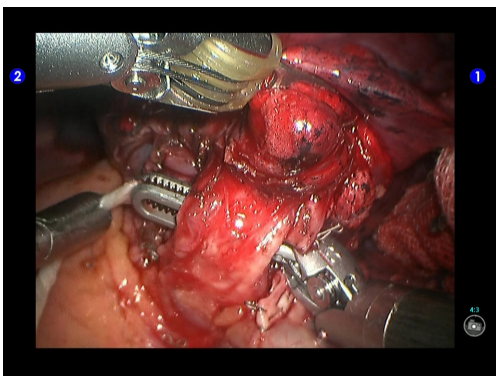

Figure 16 Insert the traction belt.

the sol of Tistat absorbable hemostatic gauze. After the robot system was withdrawn, the thoracic drainage tube was indwelled at the camera port before closing the chest. Close the chest after lung recruitment.

Postoperative treatment

Postoperative treatment is similar to that after the conventional open lobectomy. The thoracic drainage tube was withdrawn 7 days after the surgery.

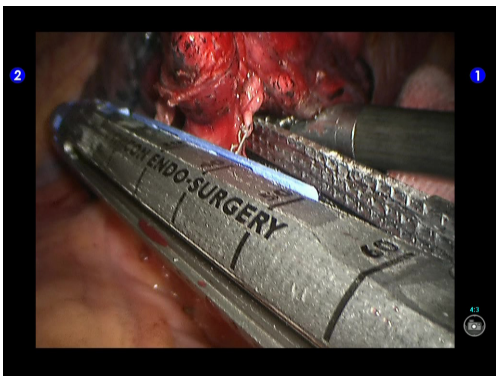

Figure 17 Clamp and dissect the lingular segmental bronchus using a blue reload.

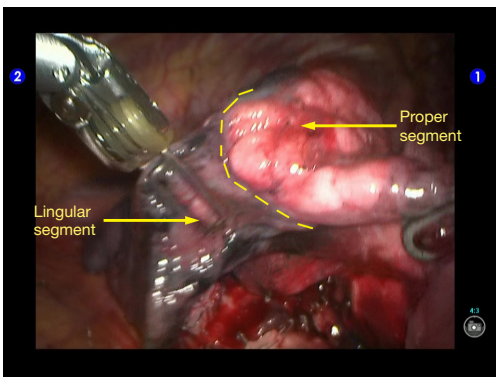

Figure 18 Determine the inter-segmental gap between the lingular segment and the proper segments.

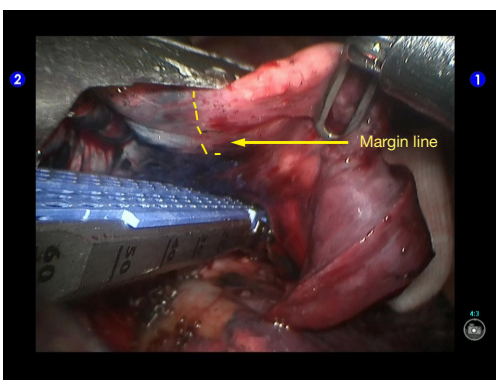

Figure 19 The inter-segmental gap was separated using two golden reloads and one blue reload.

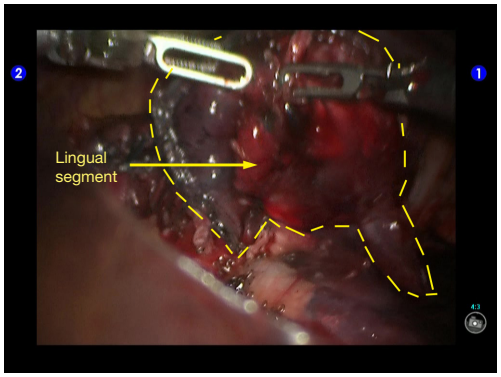

Figure 20 The dissected lingual segment.

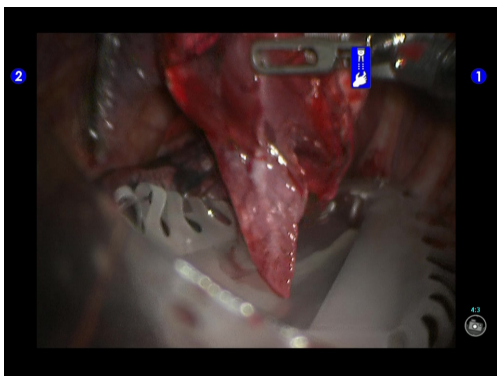

Figure 21 The dissected lingual segment was harvested using a specimen bag.

Pathological diagnosis

The pathological diagnosis was bronchiectasis of the left upper lobe.

Acknowledgements

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Cite this article as: Xu S, Li B, Ding R, Liu B, Meng H, Wang S. Robotic-assisted segmentectomy of lingual segment of the left upper pulmonary lobe. Ann Transl Med 2015;3(12):167. doi: 10.3978/j.issn.2305-5839.2015.03.11