

# Robotic thoracic surgery: S<sup>1+2</sup> segmentectomy of left upper lobe

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**Abstract:** We are going to share the experience of robotic surgery for lung segmentectomy. A 50-year-old patient underwent robotic-assisted thoracoscopic surgery for a ground glass opacity (GGO) in the S<sup>1+2</sup> segment of left upper lobe. The patient was discharged on postoperative day 3 without any perioperative complications. The pathological stage was T1aN0M0 (stage IA). Our result showed the robotic approach was feasible and reliable for lung segmentectomy.

**Keywords:** Robotic-assisted thoracoscopic surgery; segmentectomy

Received: 02 December 2016; Accepted: 27 December 2016; Published: 21 January 2017.

doi: 10.21037/amj.2017.01.13

View this article at: <http://dx.doi.org/10.21037/amj.2017.01.13>

## Clinical data

A 50-year-old woman was found to have a pulmonary nodule for 4 years detected by computed tomography (CT), Chest CT (*Figure 1*) showed ground glass opacity (GGO) in the S<sup>1+2</sup> segment of left upper lobe. The lesion size increased from 5 to 8 mm during follow-up. The patient's did not have any clinical syndrome and her cardiopulmonary function, blood gas analysis and laboratory tests were normal. There was no positive sign or supraclavicular lymph node enlargement on physical examination. She has no medical history.

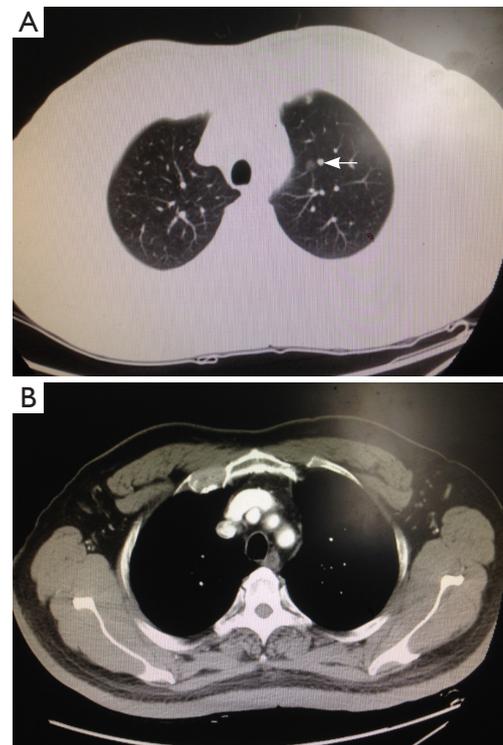
## Operation steps

### Anesthesia and body position

The patient received general anesthesia by double-lumen endotracheal intubation and was placed in the lateral decubitus position and in a jackknife position, with single-lung (right) ventilation (1) (*Figure 2*).

### Ports

A 1.5-cm camera port (for a 12-mm trocar) was created in the 8<sup>th</sup> intercostal space (ICS) at the left mid axillary line, and three separate 1.0-cm working ports (for 8-mm trocars)



**Figure 1** Preoperative CT showed GGO in the S<sup>1+2</sup> segment of left upper lobe. GGO, ground glass opacity.

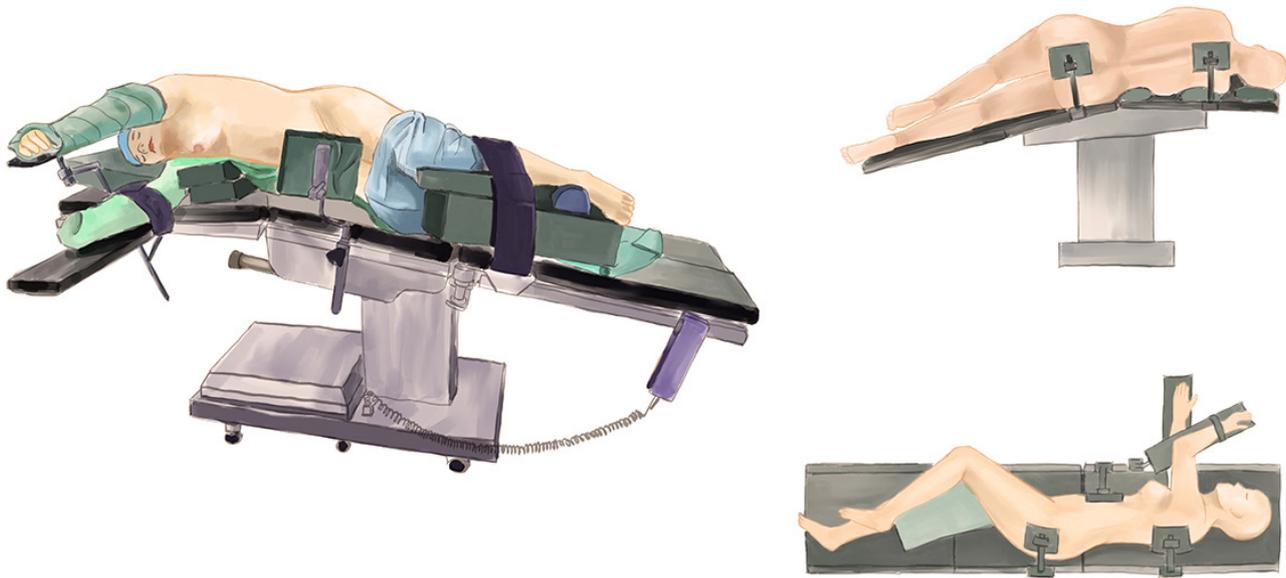


Figure 2 Jackknife position.

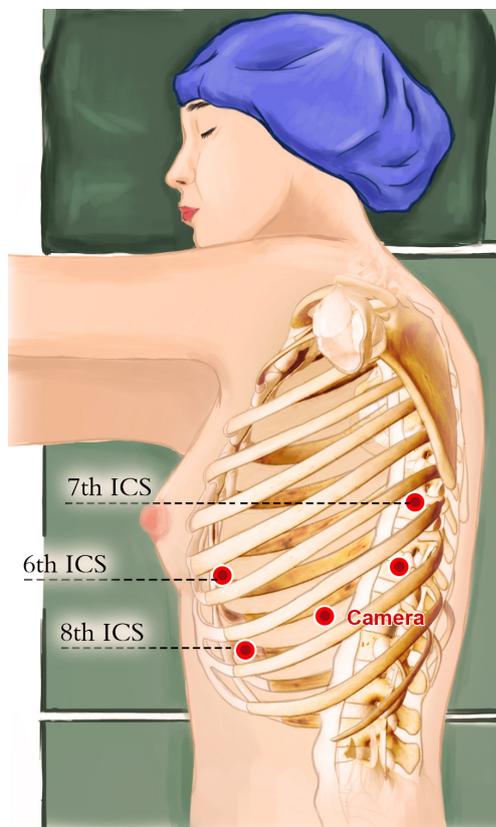


Figure 3 Ports in the 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> ICS. ICS, intercostal space.

were made in the 6<sup>th</sup> ICS (#1 arm) at the left anterior axillary line, the 7<sup>th</sup> ICS (#2 arm) at the left posterior axillary line, and the left 8<sup>th</sup> ICS (#3 arm), 2 cm from the spine. An auxiliary port (for a 12-mm trocar) was made in the 8<sup>th</sup> ICS near the costal arch (2) (Figure 3).

#### *Installation of the operation arms*

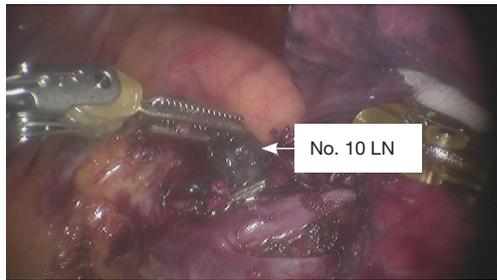
The robot Patient Cart is positioned directly above the operating table and then connected. The 2# arm was connected with bipolar cautery grab and the 1# arm was connected with a unipolar cautery hook. Incision protector was applied in the auxiliary port (3).

#### *Surgical procedure*

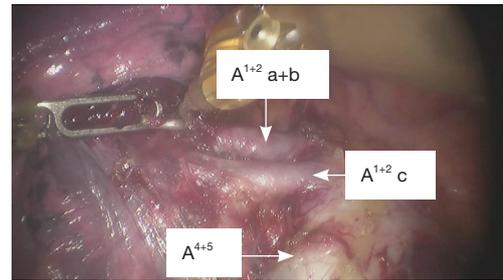
See Figures 4-18.

#### **Postoperative condition**

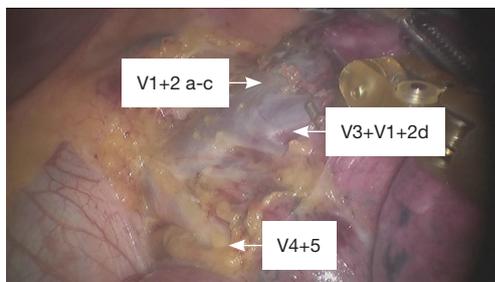
Postoperative treatments included anti-inflammatory and phlegm-resolving treatment. The thoracic drainage tube was withdrawn 2 days after surgery, and the patient was discharged 3 days after surgery. No complications were observed during hospitalization. Pathologic diagnosis was microinvasive adenocarcinoma 0.8 cm in the apex posterior segment of the left upper pulmonary lobe. No metastasis was seen at the bronchial stump or in the sampled



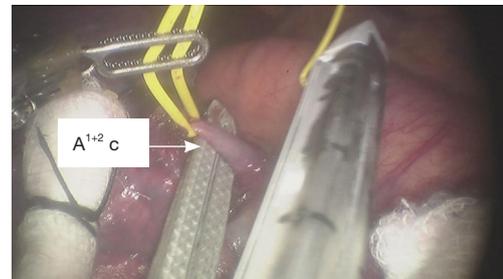
**Figure 4** The pleura of hilum was opened, and the lymph nodes (No. 10) were removed.



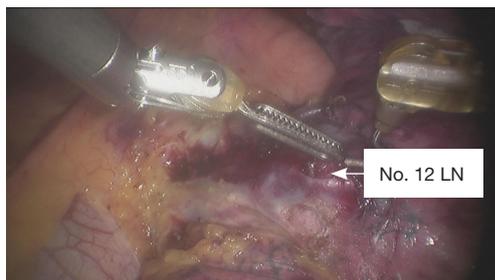
**Figure 8** The branches of A<sup>1+2</sup> and A<sup>4+5</sup> were exposed.



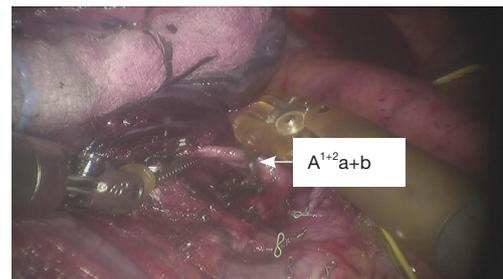
**Figure 5** The branches of the left upper lobe pulmonary vein were exposed.



**Figure 9** The A<sup>1+2</sup> c were skeletonized, pulled using elastic cuffs, and cut by Endo GIA.



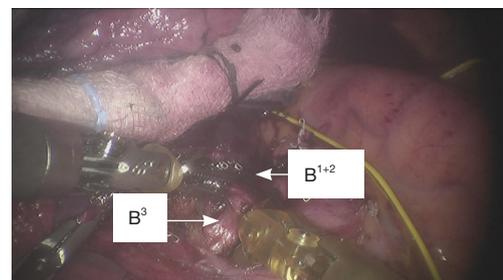
**Figure 6** The lymph nodes (No. 12) were removed.



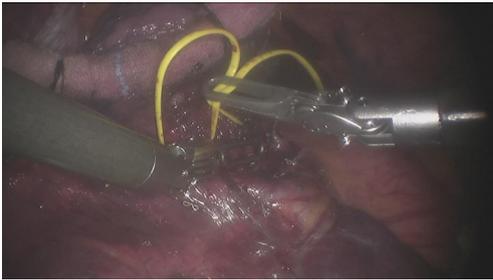
**Figure 10** The A<sup>1+2</sup> a+b were skeletonized and cut by Endo GIA.



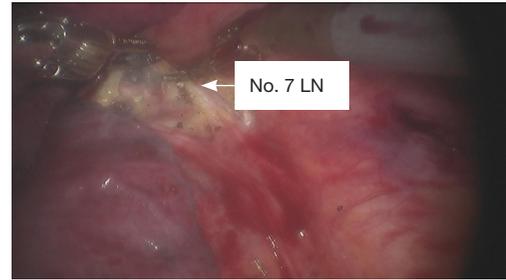
**Figure 7** V1+2 b+c was skeletonized and cut off after ligation.



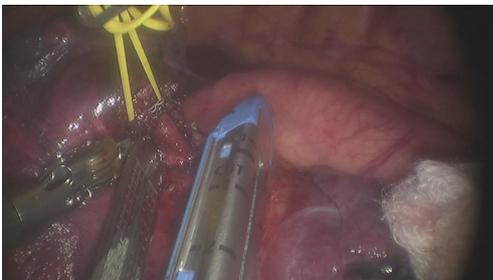
**Figure 11** B<sup>1+2</sup> and B<sup>3</sup> were dissected.



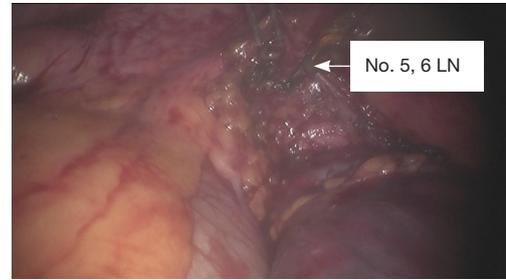
**Figure 12** B<sup>1+2</sup> were clamped, and the lung was ventilated to expose the plane of the proper segment.



**Figure 16** The subcarinal lymph node (No.7) was removed.



**Figure 13** B<sup>1+2</sup> was clamped and divided using Endo GIA.



**Figure 17** Lymph nodes (No. 5, No. 6) were removed.



**Figure 14** Ventilating the lung and expose intersegment plane, cut it using Endo GIA.



**Figure 18** The lung was filled with water and checked for air leak. Then the chest was closed after a chest drainage tube was placed in the camera port.



**Figure 15** Lymph nodes (No. 9) in the inferior pulmonary ligament were removed.

lymph nodes. The postoperational pathologic stage was pT1aN0M0 (IA stage).

**Acknowledgements**

*Funding:* None.

**Footnote**

*Conflicts of Interest:* The authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi>).

[org/10.21037/amj.2017.01.13](https://doi.org/10.21037/amj.2017.01.13)). The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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doi: 10.21037/amj.2017.01.13

**Cite this article as:** Du H, Yang S, Guo W, Jin R, Zhang Y, Chen X, Wu H, Han D, Chen K, Xiang J, Li H. Robotic thoracic surgery: S<sup>1+2</sup> segmentectomy of left upper lobe. AME Med J 2017;2:7.

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