



# Robotic-assisted right upper lobectomy

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**Abstract:** We are going to share the experience of robotic surgery for right upper lobectomy. A 71-year-old patient underwent robotic-assisted thoracoscopic surgery for a primary lung adenocarcinoma. The patient was discharged on postoperative day 3 without any perioperative complications. The pathological stage was T1aN0M0 (stage IA). Our result showed the robotic-assisted thoracoscopic surgery was a feasible and reliable surgical approach for non-small cell lung cancer (NSCLC).

**Keywords:** Robotic-assisted thoracoscopic surgery; right upper lobectomy

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## Clinical data

The patient was a 71-year-old man admitted because of cough and expectoration lasting a week. Chest computed tomography (CT) (*Figure 1*) showed a nodular shadow on the right upper lobe of the lung. The local hospital considered the possibility of inflammation, and cough improved after anti-inflammatory treatment. A second CT scan showed that the lesions did not shrink. The patient even visited our hospital again. Positron emission tomography (PET)-CT findings were highly suggestive of lung cancer. The patient's cardiopulmonary function, blood gas analysis, and laboratory tests were normal. There was no positive sign or supraclavicular lymph node enlargement on physical examination. He had a history of diabetes (5 years). Twenty years previously, he underwent surgery for the gallbladder stones.

## 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 (left) ventilation (1) (*Figure 2*).

## Ports

A 1.5-cm camera port (for a 12-mm trocar) was placed in the 8<sup>th</sup> intercostal space (ICS) at the right middle axillary line, and three separate 1.0-cm working ports (for 8-mm trocars) were made in the 5<sup>th</sup> ICS (#1 arm) at the right anterior axillary line, the 8<sup>th</sup> ICS (#2 arm) at the right posterior axillary line, and the right 8<sup>th</sup> ICS (#3 arm), 2 cm from the spine. An auxiliary port (for a 12-mm trocar) was made in the 7<sup>th</sup> ICS near the costal arch (2) (*Figure 3*).

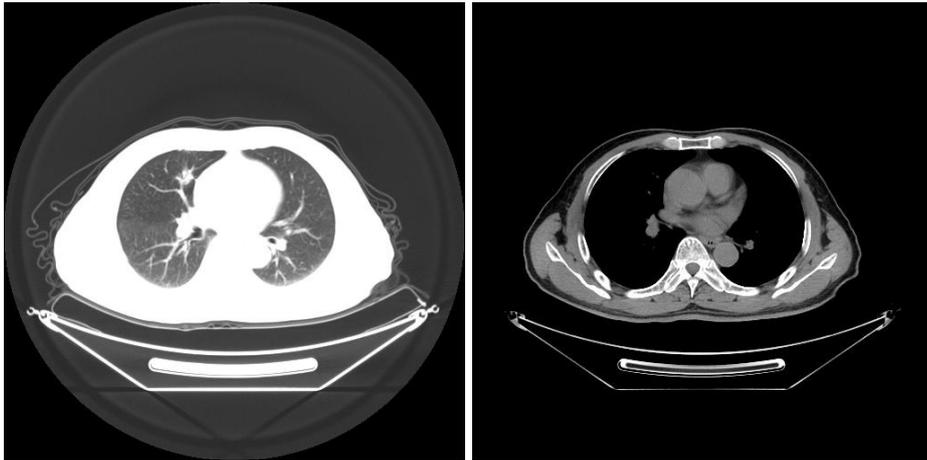
## Installation of the surgical arms

The robot patient cart was positioned directly above the operating table and then connected. The #2 arm was connected to a bipolar cautery forceps, and the #1 arm was connected to a unipolar cautery hook. An incision protector was used in the auxiliary port (3).

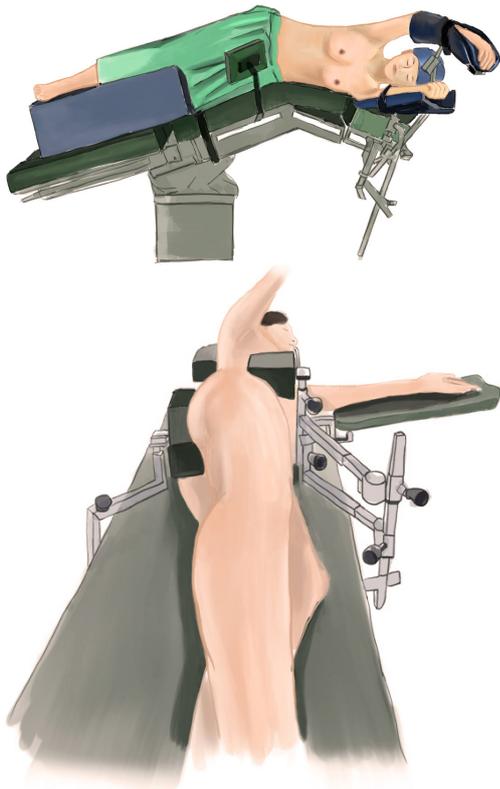
## Surgical procedure (see *Figures 4-14*)

### *Postoperative condition*

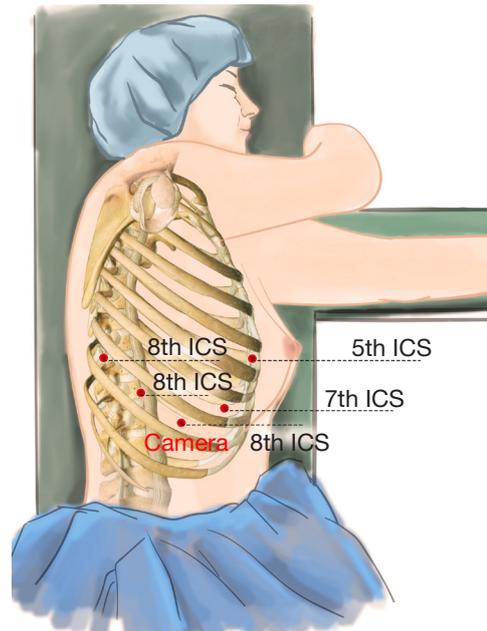
Postoperative treatments included anti-inflammation and phlegm-resolving treatment. The thoracic drainage tube was withdrawn 2 days after surgery, and the patient was discharged 3 days after surgery. No



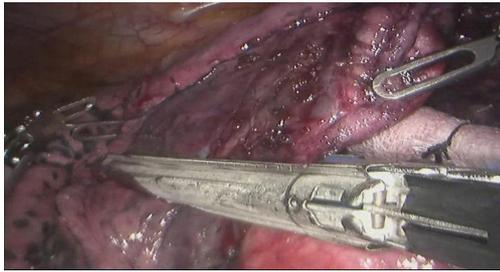
**Figure 1** Preoperative CT scan a nodular in the right upper lobe. CT, computed tomography.



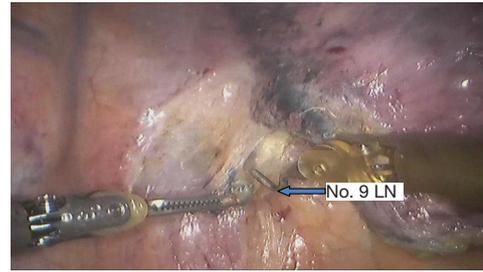
**Figure 2** Jackknife position.



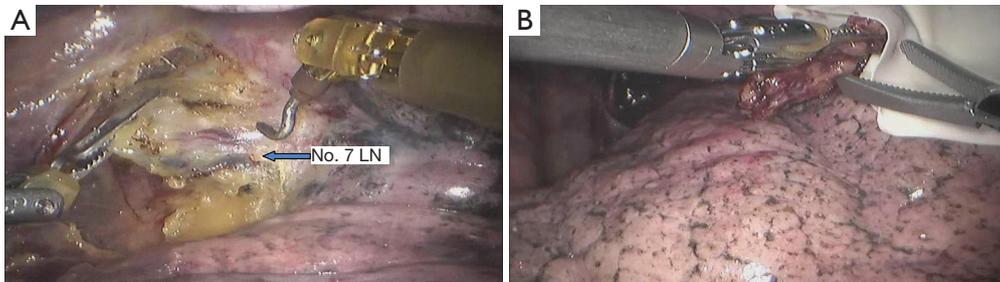
**Figure 3** Ports in the 5<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> ICS. ICS, intercostal space.



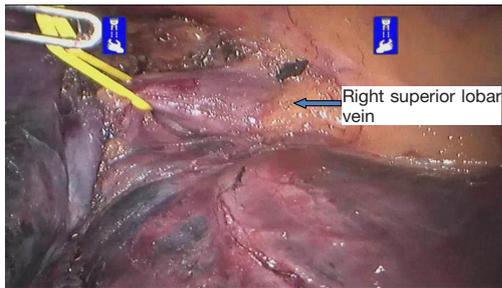
**Figure 4** After wedge resection of the lesion, a diagnosis of a lung cancer was made by quick-frozen section during the surgery, and then the lobectomy was performed.



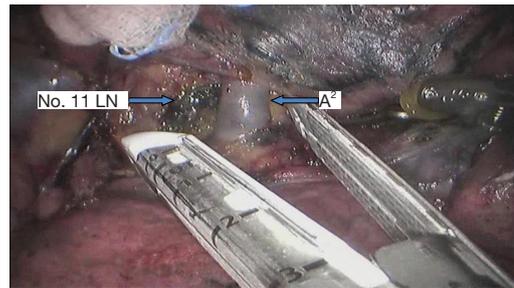
**Figure 5** The lymph nodes (No. 9) in the inferior pulmonary ligament were removed.



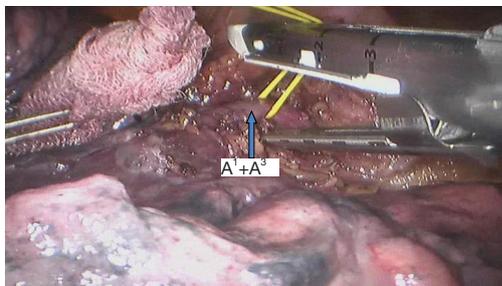
**Figure 6 (A,B)** The pleura of the hilum was opened, and the subcarinal lymph node (No. 7) were removed.



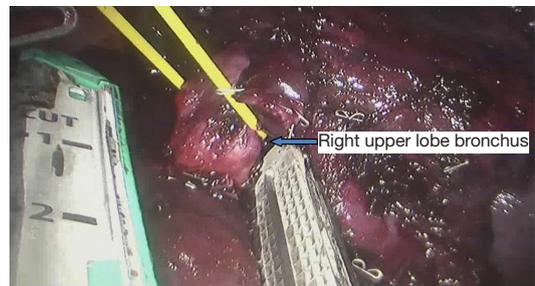
**Figure 7** The upper pulmonary vein was pulled using an elastic cuff and cut using the Endo GIA.



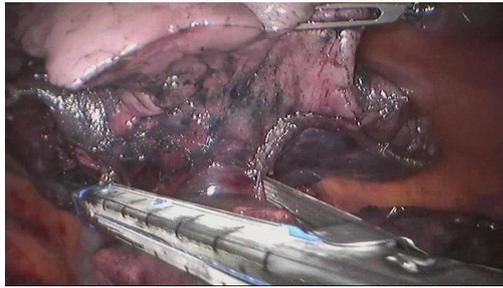
**Figure 9** The lymph node (No. 11) was removed. The posterior segmental artery in the right upper lobe ( $A^2$ ) was clamped and divided using the Endo GIA.



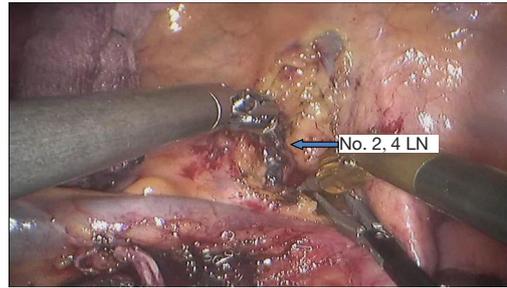
**Figure 8** The apical and anterior branches of arteries ( $A^1+A^3$ ) were pulled using elastic cuffs and cut by Endo GIA.



**Figure 10** The right upper lobe bronchus was clamped and divided using the Endo GIA.



**Figure 11** The horizontal fissure was clamped and divided using Endo GIA.



**Figure 13** Lymph node (No. 2 and No. 4) were removed.



**Figure 12** An extraction bag was inserted to harvest the completely resected right upper lobe through the incision.



**Figure 14** The bronchial stump leak test was negative result. A closed chest drainage tube was placed in the camera port. Then the chest was closed.

complications were observed during hospitalization. Pathological diagnosis was invasive adenocarcinoma (2.0 cm × 1.5 cm × 1.0 cm) in the right upper pulmonary lobe. No metastasis was seen at the bronchial stump or the sampled lymph nodes. The pathological stage: pT1aN0M0, IA stage.

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### Footnote

*Conflicts of Interest:* The authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/amj.2017.01.08>). 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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