

# Minimally invasive thymectomy for locally advanced recurrent thymoma

Wentao Fang, Jian Feng, Chunyu Ji, Yangwei Xiang

Department of Thoracic Surgery, Shanghai Chest Hospital, Shanghai 200030, China

**Contributions:** (I) Conception and design: W Fang; (II) Administrative support: W Fang; (III) Provision of study materials or patients: W Fang, J Feng; (IV) Collection and assembly of data: J Feng, C Ji, Y Xiang; (V) Data analysis and interpretation: W Fang; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

**Correspondence to:** Wentao Fang, Department of Thoracic Surgery, Shanghai Chest Hospital, Shanghai 200030, China. Email: vwtfang12@shchest.org.

**Background:** Minimally invasive thymectomy for early stage thymoma patients has been shown to yield similar oncological results while being helpful in reducing surgical trauma, improving postoperative recovery, and diminishing incisional pain. However, patients with locally advanced tumors, preoperative induction therapies, or prior history of mediastinal surgery have been considered as not suitable for video-assisted thoracoscopic surgery (VATS). This video aims to show that VATS thymectomy may also be feasible in reoperation for recurrent invasive thymoma in selected cases.

**Methods:** A 45-year-old female patient had recurrent type B2 thymoma in the anterior mediastinum 10 years after tumor resection through left thoracotomy. The lesion was in rcStage III. Reoperation was carried out via left approach VATS. The tumor was resected completely together with remnant thymus, pericardium, the left phrenic nerve, and the left innominate vein.

**Results:** The patient recovered uneventfully and was discharged on postoperative day 4. Pathologic study revealed an rpStage III type B tumor, invading the left phrenic nerve and the left innominate vein.

**Conclusions:** VATS thymectomy may also be feasible in locally advanced thymic tumors or recurrent diseases. In selected cases, VATS should at least be tried so that this subgroup of patients may also benefit from minimally invasive surgery.

**Keywords:** Minimally invasive surgery; thymectomy; thymoma; recurrent; advanced stage

Received: 18 January 2016; Accepted: 01 March 2016; Published: 21 March 2016.

doi: 10.21037/jovs.2016.03.09

**View this article at:** <http://dx.doi.org/10.21037/jovs.2016.03.09>

## Introduction

Video-assisted thoracoscopic surgery (VATS) in thymectomy for thymoma patients has been shown to yield similar oncological results while being helpful in reducing surgical trauma, improving postoperative recovery, and diminishing incisional pain (1-6). Because of these advantages, VATS are increasingly accepted as an alternative approach for early stage thymic tumors. Patients with locally advanced tumors, preoperative induction therapies, or prior history of mediastinal surgery are generally not considered as suitable candidates for VATS thymectomy. However, it is this subgroup of patients who may actually benefit more from minimally invasive surgery, as they are often associated

with diminished cardiopulmonary function, or need more functional preserve to tolerate other treatment modalities. With the advance in surgical techniques, VATS thymectomy has begun to be applied selectively in such difficult cases. This video aims to show that VATS thymectomy is indeed feasible in reoperation for recurrent invasive thymoma (*Figure 1*).

## Patients and methods

Informed consent was acquired from the patient before surgery. The patient was a 45-year-old female who had surgery for thymoma 10 years before at another hospital.



**Figure 1** Video-assisted thoracoscopic thymectomy for a locally invasive recurrent thymoma (7).

Available online: <http://www.asvide.com/articles/935>

Her first operation was tumor resection via left anterolateral thoracotomy. Postoperative histologic study revealed a type B2 thymoma at Masaoka stage II. There was no clear description of the resection margin in her pathology report. No adjuvant therapy was offered after operation. During follow-up, a mass reappeared in the anterior mediastinum 2 years after the first surgery. And the mass enlarged slowly in consecutive CT scans. The patient was in good condition upon presentation. The mass was 5 cm × 3 cm in size, had irregular contour, and deviated slightly to the left pleural cavity. Adhesion or limited invasion into the left upper lobe was suspected. But the left innominate vein appeared to be intact. PET scan showed a high uptake of the mass and local recurrence was diagnosed. The tumor was staged as rcStage III based on preoperative workup. Reoperation to remove the entire mass and the remnant thymus was decided, as this appeared to be the best choice for the patient.

A left side approach was selected because the recurrent lesion located left to the midline and appeared to have a close relationship to the left upper lobe and left phrenic nerve on preoperative CT scan. After intubation, the patient was placed in semi-supine position, with the left chest propped up for 45 degree. The left arm was abducted and suspended on a frame above her head. First an observation port was created in the 6<sup>th</sup> intercostals space at the mid axillary line, and a 10-mm 30 degree thoracoscope was introduced through a 12-mm airtight trocar for exploration. Fortunately there was only limited adhesion due to the first operation, and no pleural dissemination was identified. A working port in the 4<sup>th</sup> intercostals space in the mid-clavicle line through another 12-mm trocar and an assistant port in the 3<sup>rd</sup> intercostals space in the anterior

axillary line through a 5-mm trocar were then produced. The position of these three ports made an equilateral triangle to make sure that instruments would not fight with each other. Only slide-shaft instruments were used as they could pass through the airtight trocars. The surgery then proceeded under VATS, with the help of CO<sub>2</sub> insufflation at a pressure of 6–8 cmH<sub>2</sub>O.

First, adhesion of the left upper lobe to the chest wall was freed by harmonic scalpel. The left upper lobe was found adhering to but not invaded by the mass. It was thus readily detached from the mass, exposing the left anterior mediastinum and the left hilum. Upon exploration, the thymus was found not having been removed together with the tumor at the first operation. The body of the thymus as well as both upper poles were still in place. Dissection of the thymus started from the retrosternal space to the right mediastinal pleura surface. The upper poles of the thymus were freed to reveal the left innominate vein. The tumor was found densely adhere to or invading the innominate vein. However, invasion was quite limited, and the distal and proximal part of the vein could be exposed. The left phrenic nerve was then identified, but found to be invaded by the tumor at the level of aortic arch. Also the tumor adhered densely to the pericardium. At this point it was decided that the tumor could be resected under VATS. Pericardium was opened and resected together with the mass. The left phrenic nerve was also transected. The left innominate vein was first dissected at its distal end and then at its proximal end with endostaplers. The tumor was then removed en-bloc with the remnant thymus and surrounding structures coresected in a retrieving bag through the enlarged working port without spreading the ribs. During the entire dissection, care was taken not to clamp or grasp the mass so as to prevent spillage of tumor tissue.

## Results

The patient recovered uneventfully and was discharged on the 4<sup>th</sup> postoperative day. Histologic examination revealed a type B2 thymoma invading the left phrenic nerve and the innominate vein. It was staged as rpStage III.

## Conclusions

Minimally invasive approach should not be limited only to early stage thymic tumors without prior treatment. In selected cases, VATS thymectomy may also be feasible in locally invasive tumors or recurrent diseases. This would

help minimize surgical trauma, reduce incisional pain, and facilitate early recovery. Although long-term outcome still awaits proof from large sample results, it does no harm at least to try VATS exploration first, as long as oncological principles are observed (8). These should include total thymectomy together with the tumor, en-bloc resection of the lesion and invaded surrounding structures, and a no-touch technique to prevent iatrogenic tumor spread so as to minimize the risk of local recurrence.

### Acknowledgements

None.

### Footnote

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

*Informed Consent:* Written informed consent was obtained from the patient for publication. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

### References

1. Odaka M, Akiba T, Yabe M, et al. Unilateral thoracoscopic subtotal thymectomy for the treatment of stage I and II thymoma. *Eur J Cardiothorac Surg* 2010;37:824-6.
2. Ng CS, Wan IY, Yim AP. Video-assisted thoracic surgery thymectomy: the better approach. *Ann Thorac Surg* 2010;89:S2135-41.
3. Jurado J, Javidfar J, Newmark A, et al. Minimally invasive thymectomy and open thymectomy: outcome analysis of 263 patients. *Ann Thorac Surg* 2012;94:974-81; discussion 981-2.
4. Gu ZT, Mao T, Chen WH, et al. Comparison of video-assisted thoracoscopic surgery and median sternotomy approaches for thymic tumor resections at a single institution. *Surg Laparosc Endosc Percutan Tech* 2015;25:47-51.
5. Youssef SJ, Louie BE, Farivar AS, et al. Comparison of open and minimally invasive thymectomies at a single institution. *Am J Surg* 2010;199:589-93.
6. Pennathur A, Qureshi I, Schuchert MJ, et al. Comparison of surgical techniques for early-stage thymoma: feasibility of minimally invasive thymectomy and comparison with open resection. *J Thorac Cardiovasc Surg* 2011;141:694-701.
7. Fang W, Feng J, Ji C, et al. Video-assisted thoracoscopic thymectomy for a locally invasive recurrent thymoma. *Asvide* 2016;3:179. Available online: <http://www.asvide.com/articles/935>
8. Toker A, Sonett J, Zielinski M, et al. Standard terms, definitions, and policies for minimally invasive resection of thymoma. *J Thorac Oncol* 2011;6:S1739-42.

doi: 10.21037/jovs.2016.03.09

**Cite this article as:** Fang W, Feng J, Ji C, Xiang Y. Minimally invasive thymectomy for locally advanced recurrent thymoma. *J Vis Surg* 2016;2:58.