

Uniportal video assisted thoracoscopic surgery thymectomy (left approach)

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Background: Video assisted thoracoscopic surgery (VATS) thymectomy for the management of myasthenia gravis and thymoma has been described and routinely performed. With the advent of single port surgery, uniportal thymectomy has gained popularity and left side approach is preferred only if the suspecting tumour is situated on the left mediastinum. However, many doubt or dislike the left side VATS approach to anterior mediastinum as the ventricular apex renders maneuverer of instruments difficult. This is certainly not the case as shown in this video and to date, there is no published manuscript on left uniportal thymectomy.

Methods: Patient positioned semi-supine with left sided propped up and the ipsilateral arm placed naturally and secured by the side and below the chest wall. Cleaned and draped as for sterile procedure. General anaesthesia and lung isolation achieved with a double lumen endotracheal intubation. A 2.5 cm incision was made at 4th intercostal space, anterior axillary line (lateral to nipple line). Extra small size wound protector was used and CO₂ insufflation was not needed. Instruments utilised in this case were “not new” and used for laparoscopic surgery 2 decades ago. This video demonstrates the simple technique of left uniportal approach to total thymectomy. Safe en bloc resection of thymus and thymic tumour with surrounding fatty tissue were performed, by combination of careful pleura dissection using diathermy, traction and blunt dissection of thymus. Extra caution when dividing thymic vein branches from innominate vein is prudent in order to prevent intra-operative haemorrhage and subsequent conversion to sternotomy or thoracotomy.

Results: In this video, total thymectomy was performed without complication. The specimen was removed through the port and a single chest tube was placed at end of procedure for 1 day. Patient went home uneventfully on day 2.

Conclusions: Left uniportal VATS thymectomy is feasible, and preferred for left sided thymoma. This simple approach should be encouraged and performed by all enthusiastic VATS thoracic surgeons.

Keywords: Uniportal; thymectomy

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Introduction

Minimal invasive thymectomy (MIT) was first introduced in 1992 by Landreneau *et al.* (1) and over the next two decades, more approaches have been described by his colleagues whom were also became the legendary pioneers

such as Mark, Yim *et al.* They were extensively analysed and published for the management of myasthenia gravis and thymoma (2-5). MIT can be performed with low morbidity and mortality. In addition, it provides acceptable clinical long term outcome when compared to standard sternotomy approach to the disease. Video assisted thoracoscopic

surgery (VATS) approach has since been routinely performed and recognised as the surgery of choice for thymectomy (6,7).

With the advent of single port surgery, uniportal VATS thymectomy has gained popularity as it has the advantages in terms of further improved cosmesis, patient satisfaction, less surgical trauma (8) and financial savings in particularly over robotic thymectomy (9). Transcervical thymectomy has largely been abandoned as the incidence of failure was alarmingly high, as much as 27% in some series. It was attributed to the incomplete clearance of thymic tissues by the trans-cervical approach, resulting in more anticipated re-operations (10). Suda *et al.* reported a uniportal technique using a subxiphoid approach for extended thymectomy in 2012. It provides simultaneous access to both pleural cavities and greatly improved the surgical view by split-lung ventilation with promising short term results (11). Nevertheless, there are limitations to subxiphoid thymectomy and they include patient obesity, cardiomegaly, and decreased manoeuvrability of instruments (12).

The left side uniportal approach demonstrated in this video actually negates the many problems of sub-xiphoid route. It is a simple procedure to perform surgically, and oncologically feasible for non-invasive, small, intra-thymic and encapsulated thymoma. However, many surgeons doubt or dislike the left side VATS approach to anterior mediastinum as the ventricular apex renders maneuverer of instruments difficult in particularly at the infra-mammary port. This is certainly not the case as shown in this video and to date, there is no published manuscript on left side uniportal thymectomy.

Methods

The patient is positioned in about 30 degree semi-supine position, with left side chest propped up by placing a roll under the left shoulder. The ipsilateral arm is placed naturally and secured by the side and below the chest wall on the padded board. This provides adequate surgical field and avoids the potential of arm ischaemia, similar to the preparation for robotic thymectomy. The right arm is held extended on a padded board which allow access to the right side if required. The operating surgeon, the assistant and the scrub nurse stand along the same left side, with the patient vitals monitor and video screen at the opposite side of the table.

Patient is cleaned and draped as for sterile procedure. General anaesthesia and lung isolation achieved with a



Figure 1 Peri-operative video showing uniportal VATS thymectomy via the left approach (13). VATS, video assisted thoracoscopic surgery.

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double lumen endotracheal intubation. A 2.5 cm incision was made at 4th intercostal space, anterior axillary line (lateral to nipple line) without rib spreading. Extra small size wound protector was used and up to four instruments can be accommodated through this single port access. CO₂ insufflation was not needed to collapse the lung.

The instruments utilised in this case of uniportal thymectomy were “not new” and they had been used for laparoscopic surgery two decades ago. They comprised of an endoscope of 10-mm camera 30 degree lens, 5-mm Maryland Dissector, 5-mm Bowel Grasper, 5-mm “Hock” Diathermy, 5-mm Endoscopic Yanker Sucker, Endoscopic “Peanut”, mounted “Peanut Gauze” on Rampley Sponge Holder and endoscopic Liga-clip.

This video (*Figure 1*) demonstrates the simple technique of left uniportal approach to total thymectomy. Phrenic nerve and internal mammary vessels are the landmarks of entering into anterior mediastinal space. Dissection started from dividing the pleura below the internal mammary vessels and the thymus gently retracted from the sternum by blunt dissection. The dissection continued superiorly until the thoracic inlet and inferiorly until the diaphragmatic level. Safe en bloc dissection of thymus and thymic tumour with surrounding fatty tissue were performed easily by carefully dissecting the pleura using “Hock” diathermy, and this would ensure the release of adhesion between thymus and the surrounding structure. The maneuverer in retrieving the thymus comprised of gentle traction using the atraumatic bowel grasper and blunt dissection using the endoscopic or mounted “peanut gauze”.

Extra caution when dividing the thymic vein branches

from the innominate vein is prudent in all thymic dissection in order to prevent intra-operative haemorrhage and subsequent conversion to sternotomy or thoracotomy. The key is to identify the innominate vein position which is not readily visible, usually found at the level of the junction between internal mammary vessels and the left subclavian vein.

Results

In this video, total thymectomy was performed without complication. The specimen was removed through the port and a single 28 French chest tube was placed through the same incision at end of the procedure for 1 day duration. Patient went home uneventfully on day 2.

Discussion

Understandably the right side uniportal approach is preferred by most surgeons, especially when operating in small female patients, there is more intra pleural space for instruments manipulation, plus easily identifiable anatomical landmarks such as superior vena cava (SVC) and phrenic nerve. Hence, the right sided approach is used unless the tumour is located exclusively on the left sided. However, as demonstrated in this video of left approach to total thymectomy, the anatomical landmarks to anterior mediastinum with the left phrenic nerve, left subclavian vein, and left internal mammary vessels are still easily recognised. The operating surgeon would instantly identify the thymic tissue, thymoma and the associated fatty tissues with the surrounding structures.

By using the left side uniportal approach to the anterior mediastinum, the anterior mediastinal space is actually wider in all three dimensions and more accessible with the SVC situated on the right side. It can be observed from the video that the ventricular apex that occupies the left chest cavity did not hinder instruments manoeuvrability, nor obstructing the surgical view during the entire procedure. This is the advantage of uniportal VATS in which the ergonometry and presumed congested operating field actually never compromised the resection of thymus. Nevertheless, to ensure freedom of movement for the instruments within the pleural space and also to avoid creating a port access that directly “facing” the heart while entering the chest cavity, the incision must be made at 4th intercostal space. The skin incision, this initial and very crucial step, usually determines how easy or difficult the entire procedure would be.

Moreover, one has to avoid the misconception of the necessity in purchasing the most advanced uniportal instruments when performing uniportal surgery. In fact, no new or specially designed uniportal equipments were needed for this procedure. This video clearly highlighted the simplicity of accomplishing the surgery, and the instruments we utilised in this case were been used for three ports VATS and laparoscopic surgery.

This video also demonstrated that left uniportal VATS thymectomy can be performed with similar morbidity and efficacy as multi-ports VATS thymectomy. In this case of uniportal surgery, the benefits to patient were immense. Patient could experience possibly even less surgical trauma, naturally need fewer analgesia, with a short hospital stay and increased satisfaction with better cosmesis.

Conclusions

Left uniportal VATS thymectomy is feasible. This simple and uncomplicated approach should be encouraged and performed by all enthusiastic VATS thoracic surgeons.

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None.

Footnote

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

Ethical Statement: The work was approved by the ethnical committee. 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.

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