

Uniportal video-assisted thoracoscopic surgery (UVATS) right lower lobectomy for a giant T4 squamous cell lung tumour

Journal of International Medical Research

50(4) 1–6

© The Author(s) 2022

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/03000605221097374

journals.sagepub.com/home/imr

Rawand Abdulrahman Essa^{1,2,3},
Sirwan Khalid Ahmed^{1,2,3}  and
Dunya Hars Bapir³

Abstract

Video-assisted thoracoscopic surgery (VATS) is one of the unique methods that have revolutionized the discipline of minimally-invasive thoracic surgery in the last two decades. Previously, double-port VATS lobectomy has been used for the resection of T4 tumours. This current case report presents a 68-year-old male that presented with a productive cough of 3 months' duration, associated with fever, chest pain and loss of body weight. He was haemodynamically stable. The patient underwent surgery under general anaesthesia using a uniportal VATS (UVATS) approach. A 2-cm incision was made in the mid-axillary line through the right 5th intercostal space with no rib spreading. The tumour was put into a specimen bag, cut into pieces and then removed via the mouth of the bag using a grasper. After good haemostasis, a single chest drain was placed and the small incision was sutured in layers. The postoperative course was uneventful and no complications were observed. On the 6th day postoperative, the patient was discharged home. This current case demonstrated that UVATS resection for T4 tumours might be a viable approach in the hands of skilled surgeons. It should also provide decreased postoperative pain, faster recovery and shorter hospitalization.

¹Department of Cardiothoracic and Vascular Surgery, Rania Medical City Hospital, Rania, Sulaimani, Kurdistan-region, Iraq

²Department of Cardiac Care Unit, Rania Teaching Hospital, Rania, Sulaimani, Kurdistan-region, Iraq

³Department of Biotechnology, Institute of Science and Modern Technology, Rojava University, Qamishlo, Syria

Corresponding author:

Sirwan Khalid Ahmed, Department of Cardiac Care Unit (CCU), Rania Teaching Hospital, 774 City Centre, Rania 46012, Kurdistan region, Iraq.

Email: sirwan.ahmed1989@gmail.com



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative

Commons Attribution-NonCommercial 4.0 License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

Keywords

Advanced lung cancer, lobectomy, video-assisted thoracoscopic surgery (VATS), uniportal VATS, minimally-invasive surgery, T4 lung tumours, single-port VATS

Date received: 12 December 2021; accepted: 11 April 2022

Introduction

T4 lung cancer tumours are those that are >7 cm in size or have invaded the mediastinum, diaphragm, heart, trachea, great vessels, spine, oesophagus, carina, recurrent nerve or have a distinct tumour nodule(s) in a different ipsilateral lobe.¹ T4 lung tumours have long been considered unsuitable for surgery because they spread locally to the central organ structures.² Therefore, many studies have confirmed the survival benefit of a multimodal approach consisting of surgical resection in combination with neoadjuvant therapy and/or adjuvant therapy for selected patients with locally advanced lung tumours.¹

Uniportal video-assisted thoracic surgery (UVATS) is one of the unique methods that have revolutionized the discipline of minimally-invasive thoracic surgery in the last two decades.³ VATS is progressively replacing open surgery as the standard of surgical therapy for early-stage lung cancer, demonstrating improvements in postoperative pain, morbidity, recovery and lung function preservation.⁴ In comparison with the conventional multiportal approach, studies have shown that UVATS is a safe and feasible technique for advanced stages of nonsmall-cell lung cancer.⁵ However, with the advancement of technology and surgical skills, UVATS has become a challenging option for treating T4 lung tumours, even though published data remain limited.² It is assumed that complex procedures such as lobectomy, revascularization, pneumonectomy,

and chest wall resection should be performed only by experienced surgeons.⁶ A previous report proposed a 25-case learning curve for minimally-invasive T4 tumour resection for professional surgeons that have performed more than 100 VATS surgeries during their careers.⁷ The aim of this current case report is to describe the first patient, and the largest lung tumour (T4N0M0), to be removed by UVATS.

Case report

In September 2021, a 68-year-old male presented to the Department of Cardiac Care Unit, Rania Teaching Hospital, Rania, Sulaimani, Kurdistan-region, Iraq with a productive cough of 3 months' duration, associated with fever, chest pain and loss of body weight. The patient was haemodynamically stable. The patient's vital signs and laboratory test results were within normal limits. On 25 September 2021, a radiological examination was undertaken. A computed tomography scan showed a giant tumour in the right lower lobe of the lung (Figure 1). The histopathological examination revealed a large lobular, centrally hypodense soft tissue mass (squamous cell carcinoma; 99 × 93 × 107 mm in size) with a rim of increased metabolic activity in the lower lobe of the right lung. The pathological state was defined as T4N0M0. After careful evaluation, the cardiothoracic and vascular surgery team decided on surgery. On 20 October 2021, the patient was sent for surgery.

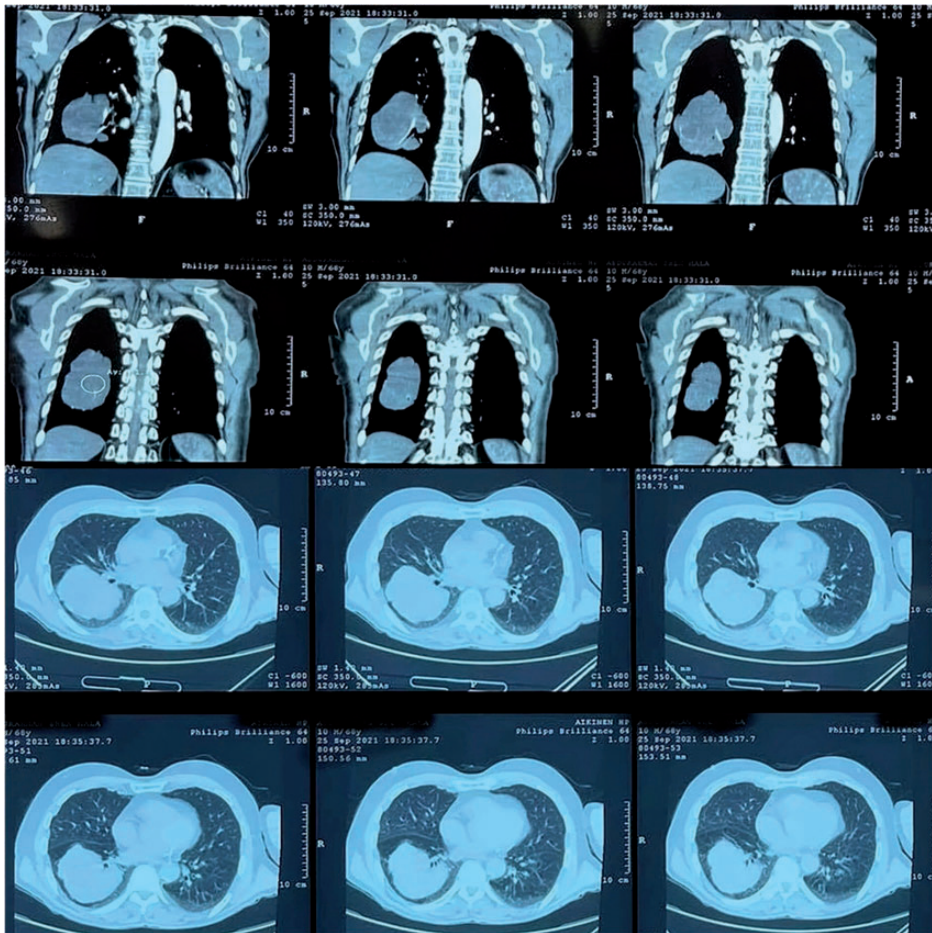


Figure 1. A computed tomography scan of a 68-year-old male that presented with a productive cough of 3 months' duration, associated with fever, chest pain and loss of body weight showed a giant tumour in the right lower lobe of the lung.

Minimally-invasive surgery was performed using a single-port (uniport) VATS approach as described below.

On 20 October 2021, the patient underwent general anaesthesia and was placed in the supine position. The patient was intubated with a double-lumen tube. After that, the patient was positioned in the left lateral decubitus position. Through UVATS, a 2-cm incision was made in the mid-axillary line through the right 5th intercostal space with no rib spreading (Figure 2a). The tumour was put into the specimen bag

and then it was cut into pieces. Later, the mouth of the bag was put outside and the pieces were removed with a grasper (Figure 2b). Standard lymph node dissection was undertaken. After good haemostasis, a single chest drain was placed and the small incision was sutured in layers (Figure 2c). The postoperative course was uneventful and no complications were observed. On the 6th day postoperative, the patient was discharged home. Ethical approval was not required for this case report. Written informed consent was

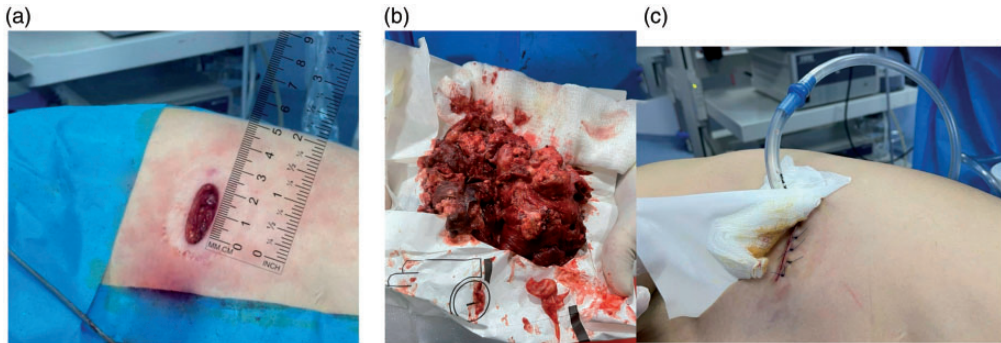


Figure 2. The surgical removal of a giant squamous cell carcinoma from a 68-year-old male that presented with a productive cough of 3 months' duration, associated with fever, chest pain and loss of body weight: (a) a 2-cm incision was made in the right 5th intercostal space; (b) the resected lobe with the giant tumour was removed using uniportal video-assisted thoracoscopic surgery; (c) a single chest drain was placed and the small incision was sutured in layers. The colour version of this figure is available at: <http://imr.sagepub.com>.

obtained from the patient to publish his case. The reporting of this study conforms with the CARE guidelines.⁸

Discussion

This current case report describes the successful and uneventful surgical resection of a centrally positioned, giant lung tumour using a UVATS approach. Generally, large and central lung tumours are challenging for VATS procedures and the majority of these patients that are in the final stages of their disease have a poor prognosis.^{9,10} VATS resection for large lung tumours is rarely undertaken or discussed because of adhesions, narrow spaces and the difficulty of moving the lobe, so it remains a difficult operation to undertake using a UVATS approach.² The difficulty associated with T4 lung cancer is related to the size of the tumour, which occupies the chest cavity, reduces the field of vision and requires more time to resect. Another difficulty is adhesion to the surrounding structures, which also takes more time and may cause more incidental injuries when compared with a smaller sized tumour. The pulmonary parenchyma is

more brittle in tumours of a larger size. However, the surgeon should take care of the pulmonary parenchyma when grasping the lung tissues. Even during the extraction of the excised tumour. In addition, the tumour should be put in the specimen bag and then cut into pieces for removal separately, because tumour seeds may spread into the chest cavity.

Thoracoscopic major lung resection for advanced stage lung cancer is now widely accepted in institutions with surgeons that are skilled in VATS.⁶ In this current patient, a 2-cm incision was made in the mid-axillary line through the right 5th intercostal space with no rib spreading. In skilled hands, UVATS has been shown to be a viable approach for advanced lung tumours.² A previous study demonstrated that advanced patients operated upon by VATS had similar results when compared with open surgery.⁶ The successful execution of complicated UVATS lobectomy is dependent upon the expertise and experience gained through doing UVATS over time.¹¹ Patients with advanced nonsmall-cell lung cancer have been successfully operated on using single-port VATS; including redo-VATS and completion

pneumonectomies, vascular reconstruction, patients after high doses of chemo-radiotherapy,¹² complex pneumonectomies,¹³ bronchial sleeve lobectomies¹⁴ and lobectomies with chest wall resection.¹⁵ Although experienced surgeons are implementing this technique to treat advanced tumours, the number of publications showing results remains limited.⁵

To date, no randomized controlled trials have been reported on the long-term results of VATS resection for T4 lung tumours.² Several studies have found that VATS preserves the immune response better than thoracotomy surgery.¹⁶ This current case had an excellent outcome and there were no complications during their intraoperative and postoperative care. A previous case report described the use of a double-port VATS left upper lobectomy, angioplasty and bronchoplasty for a large central lung cancer.⁹ In our opinion, a UVATS approach is preferable.

In conclusion, this current case demonstrated that single-port (uniportal) VATS resection for T4 tumours might be a viable approach in the hands of skilled surgeons and allow decreased postoperative pain, faster recovery and shorter hospitalization. Our experience with single-port or UVATS technology allows us to handle the most difficult cases in the same way as the two- or three-port approaches.

Acknowledgement

The authors thank the patient for consenting to publication of this report.

Authors Contribution

R.A.E. and S.K.A. contributed to the concept, drafting and reporting of the case. R.A.E. and S.K.A. provided the case and put forward their own unique opinions on the revision of the manuscript. R.A.E., S.K.A. and D.H.B. acquired the clinical data and analysed all images. R.A.E. and S.K.A. contributed to the revision of the

manuscript. All authors have read and approved the final manuscript.

Declaration of conflicting interest

The authors declare that there are no conflicts of interest.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ORCID iD

Sirwan Khalid Ahmed  <https://orcid.org/0000-0002-8361-0546>

References

1. Rami-Porta R, Bolejack V, Crowley J, et al. The IASLC lung cancer staging project: proposals for the revisions of the T descriptors in the forthcoming eighth edition of the TNM classification for lung cancer. *J Thorac Oncol* 2015; 10: 990–1003.
2. Brascia D, De Iaco G, Schiavone M, et al. Role of video-assisted thoracic surgery in T4 NSCLC. *J Vis Surgery* 2020; 7: <https://jovs.amegroups.com/article/view/47701>.
3. Gonzalez-Rivas D. Uniportal video-assisted thoracic surgery. *Ann Cardiothorac Surg* 2016; 5: 75.
4. Schnorr P, Zalepugas D, Patrini D, et al. Stage IIIA non-small cell lung cancer: a contraindication for video-assisted thoracic surgery lobectomy?—a narrative review. *Curr Challenges Thorac Surgery* 2020; <https://ccts.amegroups.com/article/view/45856>.
5. Gonzalez-Rivas D, Fieira E, Delgado M, et al. Is uniportal thoracoscopic surgery a feasible approach for advanced stages of non-small cell lung cancer? *J Thorac Dis* 2014; 6: 641–648.
6. Hennon MW and Demmy TL. Video-assisted thoracoscopic surgery (VATS) for locally advanced lung cancer. *Ann Cardiothorac Surg* 2012; 1: 37–42.
7. Nakanishi R, Fujino Y, Yamashita T, et al. Thoracoscopic anatomic pulmonary resection for locally advanced non-small cell

- lung cancer. *Ann Thorac Surg* 2014; 97: 980–985.
8. Gagnier JJ, Kienle G, Altman DG, et al. The CARE guidelines: consensus-based clinical case reporting guideline development. *Headache* 2013; 53: 1541–1547.
 9. Hou G-J, He Y and Zhao P. Video-assisted thoracoscopic left upper lobectomy and broncho-and-angioplasty for a giant central lung cancer complicated with intratumoral abscess: one case report. *J Thorac Dis* 2018; 10: 4484–4486.
 10. Sanchez-Lorente D, Guzman R, Boada M, et al. Is it appropriate to perform video-assisted thoracoscopic surgery for advanced lung cancer? *Futur Oncol* 2018; 14: 29–31.
 11. Gonzalez-Rivas D, Paradela M, Fernandez R, et al. Uniportal video-assisted thoracoscopic lobectomy: two years of experience. *Ann Thorac Surg* 2013; 95: 426–432.
 12. Gonzalez-Rivas D, Delgado M, Fieira E, et al. Single-port video-assisted thoracoscopic lobectomy with pulmonary artery reconstruction. *Interact Cardiovasc Thorac Surg* 2013; 17: 889–891.
 13. Gonzalez-Rivas D, de la Torre M, Fernandez R, et al. Video: Single-incision video-assisted thoracoscopic right pneumonectomy. *Surg Endosc* 2012; 26: 2078–2079.
 14. Gonzalez-Rivas D, Fernandez R, Fieira E, et al. Uniportal video-assisted thoracoscopic bronchial sleeve lobectomy: first report. *J Thorac Cardiovasc Surg* 2013; 145: 1676–1677.
 15. Gonzalez-Rivas D, Fernandez R, Fieira E, et al. Single-incision thoracoscopic right upper lobectomy with chest wall resection by posterior approach. *Innovations (Phila)* 2013; 8: 70–72.
 16. Nagahiro I, Andou A, Aoe M, et al. Pulmonary function, postoperative pain, and serum cytokine level after lobectomy: a comparison of VATS and conventional procedure. *Ann Thorac Surg* 2001; 72: 362–365.