New ideas - Thoracic oncologic
Closed chest lobectomy with subxyphoid retraction

Alaaddin Yilmaz, Bart Pieter Van Putte*, Wim-Jan Van Boven

Department of Cardiothoracic Surgery, St Antonius Hospital, Nieuwegein, The Netherlands

Received 3 February 2011; received in revised form 10 May 2011; accepted 13 May 2011

Abstract

An important disadvantage of the video-assisted thoracoscopic surgery (VATS) lobectomy technique remains the minithoracotomy for specimen removal resulting in some degree of traction on the ribs even without the usage of a rib retractor. We describe a new technique of VATS lobectomy in supine position consisting of complete lymph node dissection and subxyphoidal removal of the lobe(s) preventing any degree of rib traction.

© 2011 Published by European Association for Cardio-Thoracic Surgery. All rights reserved.

Keywords: Minimally invasive surgery; Lung cancer surgery; Lobectomy; Lung

1. Introduction

Since September 2009, 20 consecutive patients were operated by closed chest video-assisted thoracoscopic surgery (VATS) lobectomy. The patients (mean age 56.5±16.6 years) were operated for non-small cell lung cancer (NSCLC, n=12), broncho-alveolar cell carcinoma (BAC, n=1), pulmonary metastasis (n=1), carcinoid tumour (n=1), aspergilloma (n=2), bronchiectasia (n=1) or lung sequester (n=2). The clinicopathological characteristics are depicted.

Patients were operated in supine position with one pillow placed under the ipsilateral thorax. The ipsilateral arm is flexed and positioned over the head with the surgeon standing at the same side (Fig. 1). In case of emergency, the thoracic cavity can easily be entered by an anterolateral thoracotomy or even a median sternotomy in the same position.

The camera port is introduced on the posterior axillary line in the sixth intercostal space at xyphoid level. This is followed by CO₂ insufflation at a flow of 6–8 l/min instituting an intrathoracic pressure of 8 mmHg. Localisation of the second and third thoracoport is dependent on the anatomy of the intrathoracic cavity. Mostly, the preferred space was intercostal five midclavicular and intercostal four midaxillary (Fig. 2). The fourth port is introduced under direct thoracoscopic view just under the xyphoid and is used for insertion of an endoretractor. Detachment of the diaphragmatic attachments is not required.

We always start with dissecting the inferior pulmonary ligament till the inferior pulmonary vein. Secondly, the fissure between the lobes is developed (Fig. 3). The pulmonary artery is dissected from the fissure towards the hilum in a peripheral to central manner. Once the central dissection of the fissure is further developed, the pulmonary vein is dissected and cut with an endostapler. Each arterial side branch of the involved lobe is dissected and cut separately. Large branches are cut with an endostapler and the small ones clipped. Subsequently, the lobar bronchus is isolated and cut with the endostapler. Finally, in case of malignancy, lymph node dissection is completed according to the ESTS guidelines [1]. Lymph node station seven is easily identified through this approach by central dissection over the main stem bronchus in an inferomedial plane. In case of a right upper lobe resection, station seven can be identified in the plane between the main bronchus and the pulmonary artery. The other stations can easily be reached in the same manner as in open surgery. The lung specimen is put into an endobag and removed through the subxyphoid incision which is extended 3 cm (Fig. 4). One drain is inserted through the subxyphoid incision.

Median operation time was 161 min (range: 112–309 min) and median blood loss was 61 ml. Patients were extubated in the operating room and transferred to the recovery unit. All patients returned to the ward next morning. The thoracic drain was removed after a median length of 5.0±4.1 days. Median hospital stay was 6.0±5.8 days (range: 4–29 days). Two patients had a pneumothorax after removal of the drains necessitating insertion of a new drain without observing further complications.

2. Discussion

VATS lobectomy was already described in the early 1990s. Recently, it became a more widely accepted strategy to
treat benign and malignant disease resulting in fewer respiratory complications, shorter length of hospital stay and comparable five-year survival [2–4].

An important disadvantage of the described techniques in the literature remains the utilisation minithoracotomy necessitating some degree of traction on the ribs. We introduced the VATS lobectomy by subxyphoidal retraction preventing any kind of utilisation thoracotomy and facilitating lobe removal through a subxyphoid incision. The subxyphoid approach supports lobe(s) removal by extending the incision if necessary. The subxyphoid incision does not interfere with the respiration which may result in a faster respiratory recovery. Insufflation of \( \text{CO}_2 \) is essential in this approach since it creates a far bigger working space facilitating lobe dissection and lymph node dissection. However, it is very important to be aware of the risk of compromising the venous return especially at pressures above 10 mmHg and furthermore, the theoretical risk of \( \text{CO}_2 \) embolisation in case of major bleeding. Changing the lateral decubitus approach into the proposed approach resulted in less postoperative pain due to avoidance of an utilisation thoracotomy and xyphoid drain insertion. The median length of chest drainage and hospital stay in our patients is comparable with other series [3]. This might be explained by the clinical pathways which were developed based on the former lateral decubitus thoracotomy approach. We expect that the length of chest drainage and hospital stay can be shortened once the protocols are changed.

It is important to notice that correct closure of the subxyphoid wound is essential in order to prevent the risk wound herniation.

In conclusion, VATS lobectomy with subxyphoid retraction is feasible and safe for benign and malignant disease. Further study is needed to test whether this approach will lead to less complications and faster recovery of the patients.
References


eComment: Some points

Author: Elsayed M. Elmistekawy, Department of Cardiothoracic Surgery, Faculty of Medicine, Tanta University, Tanta, Egypt
doi:10.1510/icvts.2011.268011A

I would like to ask the authors of this paper [1] about:

1. Pain management: was a specific pain management protocol used for the patients? Has thoracic epidural been used? From the authors experience is the pain different from that experienced with traditional mini-thoracotomy?
2. Is there any risk for hernia using this technique? How was the subxyphoid incision closed to prevent this risk?
3. Was minithoracotomy needed at all in this series?

Reference