Case report - Thoracic oncologic

Single-port video-assisted thoracoscopic left upper lobectomy

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Abstract

Video-assisted thoracic surgery (VATS) anatomic lobectomy for lung cancer was initially described in 1993. Since then, many thoracic surgery departments have progressively adopted this technique, although the approach description may vary greatly among them. Most of surgeons use three incisions but the lobectomy can be performed by only one port, especially when it is performed by surgeons experienced in double-port technique. Lower lobes are the easiest cases to perform. To the best of our knowledge this is the first report of a single-port upper lobectomy with no rib spreading.

Keywords: Thoracoscopy/VATS; Minimally-invasive surgery; Lobectomy; Lung cancer; Surgery/incisions/technique

1. Introduction

In the past two decades video-assisted thoracoscopic surgery (VATS) has been performed with increasing frequency for lung cancer treatment. Most of surgeons use three incisions but the surgery may be accomplished by using two ports or even only one. This report describes the technique for a left upper lobectomy by a single incision.

2. Clinical summary

A 72-year-old male smoker, past tuberculosis lung infection, and with antiplatelet treatment for suspected coronary artery disease was admitted to our unit for surgery of a left upper lobe mass. A computed tomography (CT)-scan revealed a 4-cm mass in the upper lobe of the left lung (LUL). Bronchoscopy was normal and respiratory function tests showed a FEV\textsubscript{1} of 55%. A positron emission tomography (PET)-scan showed high uptake in the left upper mass with no lymph node involvement. The patient was proposed for VATS.

3. Surgical technique

Under general anesthesia a VATS approach by 4 cm single-incision was done in the 5th intercostal space, in an anterolateral position. Strong adherences to the upper lobe and incomplete fissure were detected. Surgery was commenced by detaching the upper lobe with a harmonic scalpel and blunt dissection. A mass was confirmed by digital palpation in the LUL too deep to perform a wedge resection.

The camera was placed in the lower part of the utility incision and the instruments were inserted above before starting the lung dissection.

The apical-anterior arterial trunk was exposed and divided with a stapler which had been inserted through the upper part of the incision (Video 1). Optimal traction of the upper lobe was necessary in order to achieve an adequate exposure of the arterial branches of the pulmonary artery.

Dissection of the upper vein was the next step. The bifurcation of the upper vein and lingular vein allowed us to insert a stapler to the upper vein through the upper part of the incision (Video 1). Optimal traction of the upper lobe was necessary in order to achieve an adequate exposure of the arterial branches of the pulmonary artery.

Dissection of the upper vein was the next step. The bifurcation of the upper vein and lingular vein allowed us to insert a stapler to the upper vein through the upper part of the incision while the camera was placed below the stapler (Fig. 1a). For lingular vein no optimal angulation was achieved by staplers, so two proximal and one distal hem-o-lok clips were placed (Fig. 1b). The vein was then divided with scissors (Video 1).

We continued the procedure by dissecting and stapling the posterior artery and the bronchus of the LUL. The lingular artery was also divided by a stapler. The last step of the lobectomy was stapling the fissure from anterior to posterior (Video 2). The specimen was finally removed in a protective bag.

Systematic lymph node dissection of the subcarinal, aorto-pulmonary window and prevascular space finished the procedure (the camera was placed in the upper part of the incision) (Fig. 2a).
A single chest tube was placed in the posterior part of the utility incision (Fig. 2b). Total surgery time was 175 min and estimated blood loss was 500 cm³. The chest tube was removed on the 2nd postoperative day and the patient was discharged on the 3rd postoperative day with no complications.

The pathological examination revealed a 4-cm squamous cell carcinoma. A total of 16 lymph nodes and four nodal stations were studied.

4. Discussion

VATS anatomic lobectomy was initially described in 1993 [1, 2]. Since 2004, Rocco et al. published different articles about the single-port VATS approach [3]. Since then, there has been an increasing interest in this minimal-invasive technique. One of the potential advantages is that only one intercostal space is involved. Some authors have reported less postoperative pain and fewer paresthesias in patients operated on for minor procedures through a single-port in comparison to the classical triple-port approach [4].

The use of multiple ports entails more facilities for performing VATS lung resection and provides different angles for hilar dissection and lymphadenectomy. However, the performance of a lobectomy can be accomplished by only one incision. From June 2010 to April 2011 we have performed 16 major pulmonary resections by uniportal approach (CHUAC and UCTMI). All of the cases were performed by these authors, all of whom had previous experience in VATS surgery, specially in double-port technique for major pulmonary resections [5] and single-port technique for minor procedures (wedge resections, pneumothorax, etc.). Initially only lower lobes cases were selected [6, 7].
When several lower lobes cases had been accomplished with good results, the upper lobes were attempted. To the best of our knowledge this is the first report of a single-port upper lobectomy with no rib spreading.

The size of the performed utility incision was comparable to the ones commonly used for double or triple-port approach. The incision was made at the level of the 5th intercostal space to get good access to upper hilar structures and lymph node stations. An adequate exposure of the lung is mandatory in order to successfully access the upper lobe. It is of utmost importance to coordinate the movement of the camera with the surgical instruments.

VATS left upper lobectomy is probably the most difficult and challenging major pulmonary resection [8]. The location of the pulmonary artery in relation with the branching pattern of the left pulmonary artery and the aorta increases the difficulty of the procedure. When we began performing uniportal lobectomies, we believed that upper lobes would not be amenable for uniportal approach due to the difficult angulation for staplers. Sectioning first the arterial trunk helps the access with the aid of staplers to the upper vein, which is the most uncomfortable structure to reach with staplers from the utility incision. With gained experience with double-port technique and first successful single-port lower lobectomies performed, we noticed that upper lobectomies would be able to be accomplished by using hemoclips (Hem-o-lok, Teleflex Medical, Inc, Reading, PA, USA) for hilar structures, which were not feasible with staplers. The use of hem-o-loks for vascular branches is safe and their placement is easy. Some authors have reported lobectomies by using these devices with good results [9].

References