Thoracoscopic-Assisted Lobectomy*

Preliminary Experience and Results

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A preliminary report is made on the use of videothoracoscopy to achieve pulmonary lobectomy in 16 patients, including 12 with centrally located pulmonary metastases and 4 with benign lesions (3 bronchiectases and 1 endobronchial hamartoma). Videothoracoscopy was performed on eight right-lower lobes, one middle lobe, two right-upper lobes, four left-lower lobes, and one left-upper lobe with a thoracoscope and conventional thoracic instruments. All patients received standard pulmonary lobe resection with lymph node clearance similar to that achieved with open thoracotomy. The mean operative time was 3 h (range, 2.5 to 4 h). Average blood loss was 100 mL and mean length of hospital stay was 6 days (range, 4 to 8 days). A combination of videothoracoscopy with use of conventional instruments resulted in similar performance but less chest wall interruption than in conventional pulmonary lobectomy. Videothoracoscopy showed safer and faster lung resection, which subsequently minimized the perioperative morbidity. Pain intensity was lessened, functional recovery was quicker, and hospital stays were shorter in the patients we reviewed. (Chest 1995; 107:553-55)

Key words: thoracoscopy; lobectomy; preliminary experience

Over the past several years, thoracoscopic surgery has been developed and applied to multiple forms of intrathoracic diseases, both benign and malignant.1-18 However, complex endoscopic techniques and the lack of specific instruments remained a significant "rate-limiting step" in applying these techniques to operations involving major lung procedures such as lobectomies. Undoubtedly, the same expertise as in open thoracotomy is essential in determining the final outcome. During the past 2 years at Chang Gung Memorial Hospital, we have performed thoracoscopic lobectomies using conventional instruments as described below.

**Materials and Methods**

**Patients**

Sixteen patients underwent thoracoscopic lobectomy between March 1992 and Feb 1994. There were nine men and seven women with an age range of 26 to 62 years (mean 53 years). Three patients had known bronchiectasis; one with persistent hemothysis due to endobronchial hamartoma. The other 12 patients were referred to us with a centrally located pulmonary metastases on chest radiographs and computed tomography. Primary tumor histologic findings were metastatic sarcoma of the limbs (6), renal cell carcinoma (3) adenocarcinoma of the colon (2) and metastatic leiomyosarcoma (1). Operative consents were obtained for pulmonary lobectomy. All patients were informed that an open thoracotomy might be necessary if thoracoscopic lobectomy was not possible.

**Technique**

We performed all thoracoscopic-assisted pulmonary lobectomies while the patient was under general anesthesia. A double-lumen endotracheal intubation was used to allow contralateral ventilation and ipsilateral lung collapse. We positioned and surgically prepared the patient in a lateral decubitus position for standard thoracotomy, should an open approach ultimately be necessary. We generally initiate a "first view" of the thoracic cavity by introducing the thoracoscope through a "trocars-protected" site at the seventh intercostal space in the mid-axillary line. After thoracoscopic exploration, second and third incision sites were chosen and created in a basic "triangulated" configuration which synchronized the conventional instruments and videothoracoscope in the same direction toward the pathologic target. Within these three incision sites, the one closest to the disease was extended to an adequate length (usually 4 to 6 cm) so that long conventional thoracic instruments could be passed easily through and manipulated freely as in an open procedure. We strongly recommend early creation of a so-called extended "manipulation channel" to achieve a safer and quicker procedure instead of only using it for specimen retrieval at the end of the operation. The procedure usually started with the dissection of the interlobar fissure and pleural adhesions with electrocautery. Lung parenchyma were retracted using conventional ring forceps. The interlobar arteries were identified and dissected carefully using right-angled hemostat and diathermy. Blunt dissection using a wall suction tube aided in the exposure of the interlobar vessels. The vessels were encircled with 2-0 silks and the ligation performed similarly as in an open thoracotomy. These may be performed either with the suture tied directly through the extended manipulation channel or in an externally tied knot that is cinched down inside the thoracic cavity with a right-angled
Results

Sixteen patients underwent thoracoscopic lobectomy involving eight right-lower lobes, one middle lobe, two right-upper lobes, four left-lower lobes, and one left-upper lobe. The operative time, i.e., the time between incision and closure, ranged from 2.5 to 4 h. The mean time was 3 h. There were no intraoperative complications necessitating conversion to open thoracotomy. Postoperative ventilator support varied from 2 to 7 h. The duration of chest tube drainage varied from 3 to 6 days (mean 5 days). All patients did very well with an average hospital stay of 4 to 8 days. Mean follow-up in these 16 patients was 9 months. There was no postoperative mortality or morbidity.

Discussion

Videothoracoscopic lobectomy has been shown to be feasible, with promising results reported in the literature.\textsuperscript{11,12,16} Endoscopic instruments manipulated through trocars or thoracoports, however, often made the procedures complicated and time-consuming, especially when performing major thoracoscopic procedures such as lobectomy. Untoward injury to any interlobar vessels or lung parenchmal that commonly and inconsequentially occurred during thoracoscopic lobectomy, was much more difficult to control and to repair through trocar holes in the chest wall. Such an intraoperative complication was much more likely to occur if the surgeon was inexperienced with the procedure. Technical problems relating to the manipulation of endoscopic instruments under image visualization usually interrupted the procedure and prolonged operative time. Our opinion therefore, was to emphasize performance of thoracoscopic procedures using conventional instruments, especially when performing thoracoscopic lobectomy. Surgeons should take advantage of every opportunity to use the familiar, already available, and more economic conventional instruments to perform the operation. By using conventional instruments, the surgeon can perform the same procedures as in open thoracotomy with more natural hand manipulation than when using endoscopic instruments.

The same expertise as for an open procedure is essential to determine outcome with the thoracoscopic approach. One would expect similar results because the same or similar procedure was performed.

This article shows that thoracoscopic-assisted lobectomy is feasible using conventional instruments. Thoracoscopic-assisted lobectomy performed similarly to conventional open thoracotomy seems to be easier and safer and is as minimally invasive as using specific thoracoscopic instruments. The creation of an extended “manipulation channel” allows the introduction of the same instruments as used in open thoracotomy, facilitating the dissection of the interlobar vessels in a more natural and safer way. Therefore, we strongly recommend the early creation of such an extended manipulation channel.

In our opinion, thoracoscopic-assisted surgery, appears to be a viable alternative to “open” thoracotomy for pulmonary lobectomy. This approach resulted in decreased perioperative morbidity for patients requiring lobectomy without forfeiting the treatment yield of an “open” thoracotomy procedure in these patients. We emphasize performing “major” thoracoscopic procedures in an already familiar way, using conventional instruments to achieve a safer, quicker, and more economical procedure. In addition, the thoracoscopic approach using conventional instruments will have a favorable impact on the overall cost. The potential benefits are enormous for patients and the entire health-care system.

References