

Minimally invasive open surgery approach with muscle-sparing thoracotomy

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Abstract

Open thoracotomy continues to be the gold standard approach for thoracic surgery despite the recent developments in thoracoscopic and robot-assisted procedures. It has been advocated that muscle-sparing thoracotomy reduce postoperative pain, preserve pulmonary function, and lessen postoperative complications. Another potential advantage is the availability of extrathoracic musculature. Minimally invasive open surgery approach with muscle-sparing thoracotomy is the basic but important procedure.

Muscle-sparing thoracotomy

Open thoracotomy continues to be the gold standard approach for thoracic surgery despite the recent developments in thoracoscopic and robot-assisted procedures. A frequently made argument is that a “less invasive” thoracotomy, which has rarely been directly compared with video-assisted thoracic surgery (VATS), may mitigate the advantage of VATS. A posterolateral thoracotomy (PLT) provides excellent exposure of the lung, pulmonary hilum, and mediastinum. However, disadvantages of this approach include the division of the latissimus dorsi and sometimes other chest wall muscles such as trapezius, rhomboids, and serratus anterior, resulting in increased potential for blood loss, a moderate time requirement for opening and closing the incision, prolonged ipsilateral shoulder and arm dysfunction, scoliosis, compromised pulmonary function, and chronic postthoracotomy pain syndromes [1-4]. In an attempt to decrease these shortcomings, less invasive thoracotomy procedures, such as muscle-sparing thoracotomy (MST) have been introduced [5-10]. We briefly review the reports about minimally invasive open surgery approach with MST, as the basic but important procedure.

Various types of MST have been proposed, including vertical and transverse axillary thoracotomy [5,6], auscultatory triangle thoracotomy [7], limited lateral thoracotomy [8], and muscle-sparing PLT [9]. Common to these incisions is preservation of the integrity of the latissimus dorsi and the serratus anterior or division of these muscles in line with the direction of their fibers. There have been modifications of these techniques, including anteroaxillary and PLT with latissimus dorsi and serratus anterior detachment from its origin [11-13]. In general, it has been advocated that these MST approaches reduce postoperative pain, preserve pulmonary function, and lessen postoperative complications. Another potential advantage is the availability of extrathoracic musculature, such as latissimus dorsi and serratus anterior, for rotational flap control of postresectional space problems, emphysema, or bronchopleural fistulas [4].

Postthoracotomy pain can present for several weeks and months and represents a serious problem for some patients. Chronic pain, in particular, may have a major effect on the quality of life and is associated

with significant health care costs. Neurophysiologic assessments have shown that intercostal nerve function is more commonly impaired 1 month after the operation with PLT than with MST [14].

Four studies reported seroma in the MST groups, which accounted for the higher rates of seroma seen overall in the MST approach due to the creation of flaps [4,15-17]. Various authors have tried to reduce the rates of seroma by modifying their technique such as the anteroaxillary thoracotomy technique. Despite the higher rates of seroma, the overall rates of complications reported, and therefore, hospital stay, were comparable between the groups. Suturing the skeletal muscle fascia to the subcutaneous tissue of the chest wall and postoperative use of compression garments are recommended as preventive measures.

Recently, a meta-analysis in which 12 trials were included, comprising 571 patients in the MST group and 512 patients in the PLT group, showed that MST resulted in quicker postoperative recovery and better shoulder function [18].

At our institution, MST approach have been adopted for most of lung cancer surgeries. And MST approach balances optimal skeletal muscle preservation with favorable exposure of various thoracic structures. Although this brief review does not propose a novel surgical technique, we hope that it will assist thoracic surgeons in improving their clinical skills.

Conclusion

We advocate the MST approach in most cases, particularly on the physically active patients who are dependent on a quicker recovery of

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shoulder function. However, even in this era of novel thoracoscopic and robot-assisted surgeries, the importance of open procedures in routine medical practice cannot be emphasized enough. MST is considered a basic but important technique for reducing the invasiveness of open procedures, and its practicality should be repeatedly recognized, regardless of how often we use it.

Disclosures

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Conflicts of interest

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