Posterolateral thoracotomy without muscle division: a new approach to complex procedures

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Abstract

Today, there is a strong increase in video-assisted thoracic surgery; however, there are still some diseases and interventions that need a wide pleural cavity exposure (i.e. sulcus tumours and extended resections). These complex procedures are usually performed via a standard posterolateral thoracotomy, which is a good approach but has significant disadvantage due to pain and difficulty coughing. We propose a new thoracotomy that avoids a dorsal muscle division but has the same intrathoracic exposure as a posterolateral thoracotomy.

Keywords: Thoracotomy • Surgery/incisions/exposure/techniques • Wound closure • Pain

INTRODUCTION

Today, the main trend in surgery is to look for a less invasive approach with a lower incidence of complications that enables patients to recover faster. Thoracic surgery is not an exception, which is the cause of the strong increase in video-assisted thoracic surgery in all forms of this specialty. However, there are still some diseases and interventions that need a wide pleural cavity exposure (i.e. sulcus tumours and extended resections). In these procedures, it is common to perform a posterolateral thoracotomy with a division of the latissimus dorsi and serratus muscles, so it provides a good exposition and approach to any intrathoracic structure. Unfortunately, while this incision offers a good surgical approach, it has significant disadvantages, such as severe post-operative pain, reduced shoulder girdle movement, difficulty coughing and expectorating, etc. These complications lead to major complications and prolong the length of stay. Almost all of these complications are attributable to the division of the large chest wall muscles. We propose a new thoracotomy that avoids a dorsal muscle section but has the same intrathoracic exposure as a posterolateral thoracotomy.

TECHNIQUE

In this approach, the patient is placed in a lateral decubitus position. A skin incision is made similar to that of a posterolateral thoracotomy. The final length of this incision depends on the type of intervention. The incision is then carried downward through the subcutaneous and superficial facial layers of the latissimus dorsi until its insertion is reached and exposed. This muscle is elevated from the chest wall and detached from the column and iliac crest to avoid dividing the muscle fibres. This procedure is similar to latissimus dorsi myoplasty (Fig. 1). To avoid muscle stress and damage, the muscle is moved cranially and placed between warm wet towels. After this manoeuvre, the anterior serratus is elevated and detached from its rib insertions (Fig. 2) because the arm is not abducted 90° in this thoracotomy (unlike a Noirclerc thoracotomy [1]), and its fibres are not parallel to the intercostal space. Both muscles are then dissected and freed, but their fibres are undamaged (Fig. 3) to provide clear rib exposure that enables the opening of a thoracotomy that is sufficiently wide for any thoracic intervention. A schematic diagram with detached lines and incisions is shown on Fig. 4.

At the end of the operation and after pleural cavity closure, both muscles are reattached to their origins. For this technique, we recommend manual sutures made of polyglycolic acid. We also recommend leaving two suction drainages (Jackson-Pratt®) in the subcutaneous layer, over the latissimus dorsi, to avoid seroma formation.

COMMENT

In general thoracic surgery, complex procedures are usually performed via a standard posterolateral thoracotomy, which offers a wide pleural cavity exposure. However, this approach has a very significant disadvantage, namely the division of latissimus dorsi and serratus anterior, which is the cause of principal post-operative complications such as atelectasis and pneumonia due to pain and difficulty coughing [2]. The latissimus dorsi is a wide, flat, triangle-shaped and powerful muscle. Its origins are the spinous processes of the thoracic T6–T12 vertebrae, the
The thoracolumbar fascia, the iliac crest, and the inferior 3 or 4 ribs, and it inserts into the floor of the intertubercular groove of the humerus. It pulls the forelimb dorsally and caudally and, very importantly, contributes to the lifting and lowering of the ribs to assist with respiratory movements, mainly during coughing. Therefore, the latissimus dorsi should not be injured during pulmonary resection procedures. If it is damaged, the function of this muscle must be performed by the pectoralis major, pectoralis minor, subscapularis and teres major muscles, which have low efficacies during coughing. Thus, patients undergoing posterolateral thoracotomies have longer lengths of stay and slower functional recoveries.

Since the development of general thoracic surgery, thoracic surgeons have tried to avoid sectioning powerful dorsal muscles, especially the latissimus dorsi and serratus anterior. Various thoracotomy techniques attempting to achieve this goal have been described. In 1973, Noirclerc et al. [1] reported a lateral thoracotomy without muscle incision, which protected the latissimus dorsi and divided the serratus along its fibres. Since then, many other muscle-sparing thoracotomies have been proposed [4–7], the foremost of which is Gingsberg's vertical axillary thoracotomy [8]. However, all of these approaches have serious limitations (e.g. they cannot be enlarged, their intrathoracic exposures are restricted and they are not recommended for complex interventions). In his own words regarding vertical axillary thoracotomy, Gingsberg [8] wrote: 'I do not use it when chest wall resection or extremely difficult hilar dissection are anticipated.' Gingsberg also advocated the use of standard posterolateral thoracotomy. However, the approach we suggest in this paper does not have this limitation, and the views of all of the intrathoracic areas are perfect.

Another benefit of this thoracotomy is that, in the event of a bronchopleural fistula (an occurrence that is not unusual during intricate pulmonary resection or bronchoplasty procedures, which are the procedures that require large thoracotomies), the latissimus dorsi or serratus could be used to perform a myoplasty procedure to close the fistula because this approach protects...
these muscles. If a posterolateral thoracotomy were to be performed, this possibility would be unavailable.

Conflict of interest: none declared.

REFERENCES


