



Uniportal video-assisted thoracoscopic surgery using an intra-muscle closure during removal of drain

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Uniportal video-assisted thoracic surgery (VATS) for lung cancer was first reported by Gonzalez-Rivas in 2012 (1). This was a case report of a 74-year-old woman who underwent a single-port approach for a lower-lobe lobectomy by VATS. Since then, uniportal VATS has been rapidly adopted worldwide. Especially in China, large volumes of surgical cases have enabled rapid acquisition and dissemination. According to the latest review (2), uniportal VATS is seldom performed in North America due to the lack of available evidence to justify the safety and advantage of uniportal VATS compared to multiportal VATS. There are other approaches besides uniportal VATS, such as various multiportal VATS techniques, robotic-assisted thoracic surgery, and open or muscle-sparing thoracotomy, but their superiority is not clear yet. It is necessary to understand that this is a report of the technique of intramuscular closure in combination with single-drain VATS skin drainage free stitching under these circumstances.

The methods of chest tube removal and safe closure are old and new topics. As early as the 1960s, safe and cosmetically superior closures of thoracic drains were reported (3,4). Although there are some studies on the method of fixation of the skin of the thoracic drain, there are few reports after drain removal. Simon (5) mentioned that the three techniques for closure after removal of the tube as follows: “(I) a suture can be placed across the wound during placement of the tube and tied following removal, (II) a vaseline gauze dressing can be placed at the entrance site and

then a compressive dressing is secured upon removal of the chest tube, and (III) Fledge *et al.* (4) described a suture can be drawn through a malleable 1/8th-inch aluminum tubing and then used to approximate the edges upon removal of the chest tube”. Plani describes a method using a vertical mattress suture with added sutures on either side (6). This fixation technique is commonly called the “Jo’burg knot”. Inzirillo *et al.* reported a method to improve the “Roman Sandal technique”, which was originally a method of fixing drains and used it for removal (7). After that, a simplified technique (8) or the plaster methods or locking plastic tie technique (9) and the “Roman Sandal technique” (also called centurion sandal) were reported (10). However, there are several potential drawbacks even with these methods. It is possible that intrathoracic fluid or air may leak into the subcutaneous tissue, or air may leak from the outside into the thoracic space, resulting in a pneumothorax or there may be pain and an unsightly scar. Several methods have been recently reported to improve these. Kim *et al.* (11) reported that after suturing the muscle layer, wound closure should be performed using unidirectional absorbable Stratafix sutures (Ethicon, Somerville, NJ, USA) as the continuous subcutaneous suture technique to the opposite sides of the wound. The suture continues around the chest tube until the needle reaches the other end of the incision (11). Yokoyama *et al.* applied a two-layer method of triclosan-coated sutures (12).

I think that this report “*Simple continuous suture to strengthen the closure of intra-muscle used in the removal of*

uniportal video-assisted thoracoscopic surgery thoracic drainage tube" applied the new post-drain removal suturing technique to a uniportal VATS. The use of unidirectional absorbable Stratafix sutures (Ethicon, Somerville, NJ, USA) for sutures is similar to that reported by Yokoyama *et al.* (12) and Kim *et al.* (11). The fact that the wound is split into multiple layers and closed is the same as in Kim *et al.*'s report (11). However, while Kim *et al.* closed in 2 layers, the author closed in 3 layers, which is simply due to the difference in the size of the wound. Generally, during thoracotomy, a thoracic drain is inserted from a site separate from the surgical wound (13). This improves wound healing by opening the chest wounds and helps prevent drainage infections. During drain insertion, it is important to make the tip of the drain penetrate the chest wall obliquely. If the chest wall penetration is straight, a pneumothorax on removal or infection may spread from the chest wall into the thoracic cavity. In uniportal VATS, these principles are not applied because the drainage tube is directly inserted into the thoracic cavity from the incision. Therefore, it is necessary to ensure that the muscle layer and subcutaneous tissue are closed tightly during chest tube removal. In this respect, this method is very good.

Simple continuous suture to strengthen the closure of intra-muscle combined with removal-free stitches on the skin with uniportal VATS is a convenient and feasible suture method. This is evident from the fact that most patients are satisfied with their incision. Most patients are satisfied with the healing of their incision. However, as stated by the author, it is necessary to compare the effect and cost with the conventional method. Also, subcutaneous emphysema as a complication took place in 4% cases. This should also be compared with the conventional method in future studies.

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