Modified tube fixation technique for uniportal video-assisted thoracic surgery

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Abstract: As the development of video-assisted thoracoscopic surgery (VATS), uniportal VATS has gained more and more attention for its obvious benefits. However, there are some shortcomings in conventional tube fixation. In present article, we introduced a new tube fixation technique to overcome these shortcomings.

Keywords: Modified; tube fixation; uniportal; video-assisted thoracoscopic surgery (VATS)

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Introduction

As the development of video-assisted thoracoscopic surgery (VATS), uniportal VATS has gained more and more attention for its obvious benefits compared with conventional multi-port VATS, such as less postoperative pain, fewer paresthesias, higher patient satisfaction (1-4) and the direct view to the target tissue (5). With the uniportal VATS, the surgery could be done like open operations (6,7), which are familiar to surgeons. Conventionally, a chest tube drain is placed through the port incision site or a new incision site on another intercostal space 1 level downward and secured to the skin by tacking sutures. However, as we know, there are some shortcomings in this conventional tube fixation, such as leakage of fluid or air, intra-operative paresthesia and post-operative pain caused by the anchoring suture, which may lower the patients’ satisfaction. To overcome these shortcomings, we designed a new tube fixation technique for uniportal VATS.

Technique

The details are as follows (Figures 1,2). First, when the uniportal VATS was completed, the skin and subcutaneous tissue were pulled up and the intercostal muscle in the same intercostal space was transpierced with a mosquito forceps about 2.0 cm beyond the distal end of the incision site. Second, the drainage tube was clamped and punctured into the cavity, which is as alike as the procedure of doing a chest drainage that is familiar to thoracic surgeons in general. Third, after the drainage tube was placed properly, the subcutaneous tissue was sutured conventionally. Fourth, the drainage tube was anchored about 1.0 cm beyond the incision with a silk thread which was passed through the subcutaneous suture. Finally, the skin incision was closed by subcutaneous continuous suture with a 3-0 self-retaining suture (Quill™ knotless tissue-closure device, Angiotech Puerto Rico Inc., Vancouver, Canada) which was cut flush to the skin lastly. When remove, one end of the anchoring
silk thread was snipped and the drainage tube was pulled out which just like removing the stiches, and the wound was sealed with Vaseline gauze immediately.

**Comment**

As the development of VATS and enhanced recovery after surgery (ERAS), more attention has been paid to reduce post-operative pain and improve the aesthetic outcomes. And, many efforts have been made. Son et al. (2) reported a modified incision and closure technique for uniportal VATS. In their technique the skin is incised lower than an intercostal muscle incision, and the chest tube transpierces the chest wall muscle about 1 cm below the incision. Finally, nylon is used for tube fixation and is anchored through the subcutaneous suture. It was valid, and applied about 20 cases in our department. However, we found that was somewhat intricate especially at the first few cases. Moreover, there was more trauma in their technique because more dissection between the subcutaneous tissue and chest wall muscle.

**Figure 1** Tube placement. (A) After pulling up the skin and subcutaneous tissue the intercostal muscle was transpierced with a mosquito forceps about 2.0 cm beyond the upper incision site; (B) the drainage tube was clamped and punctured into the cavity; (C) a silk thread was passing through the subcutaneous suture.

**Figure 2** Tube anchoring. (A) Tying knots about 1.0 cm beyond the incision; (B) anchoring the drainage tube; (C) the outcome.
was performed. It did not meet the standard of mini-invasiveness. Furthermore, it increased the difficulty and time of conversion to an open surgery if needed in their technique.

To conclude, our new tube fixation technique for SITS is effective with less trauma and a better cosmetic effect, and easy to perform.

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Footnote
Conflicts of Interest: The authors have no conflicts of interest to declare.

References