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 in aesthetic scar 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 ^{TM} 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

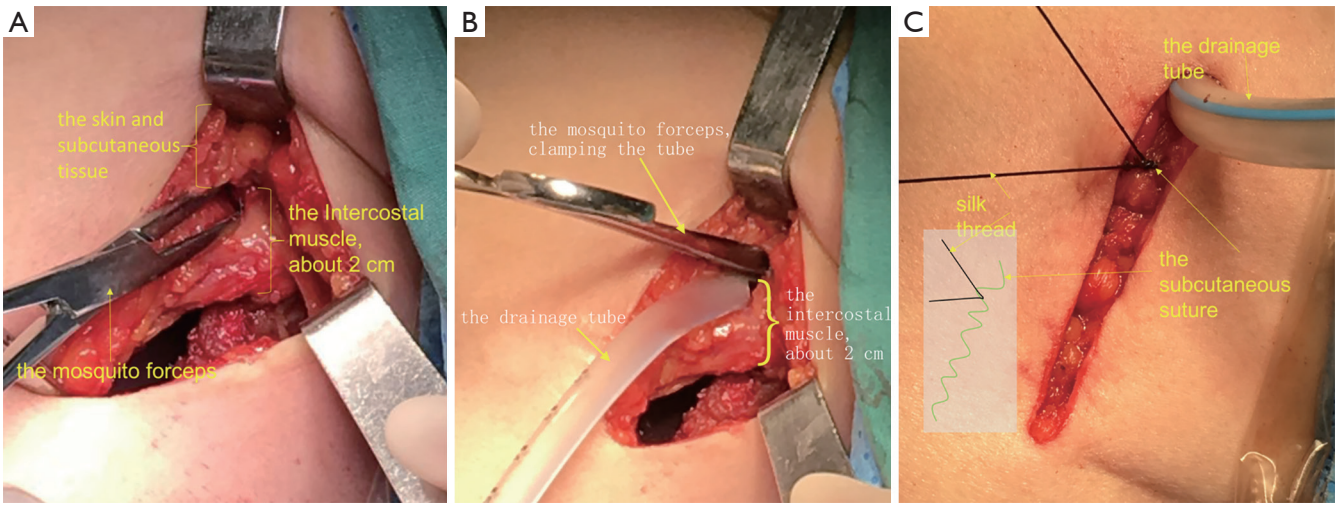

Figure 1 Tube placement. (A) After pulling up the skin and subcutaneous tissue the intercostal muscle was transpierced with a mosquito forceps about 2.0 cm beyond the upper incision site; (B) the drainage tube was clamped and punctured into the cavity; (C) a silk thread was passing through the subcutaneous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

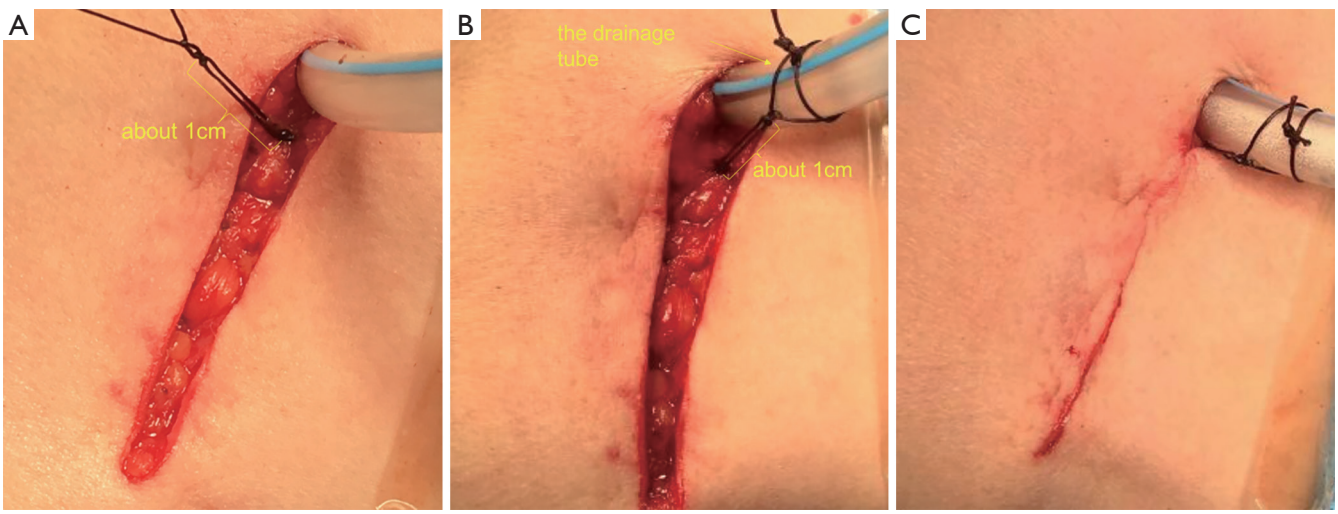

Figure 2 Tube anchoring. (A) Tying knots about 1.0 cm beyond the incision; (B) anchoring the drainage tube; (C) the outcome.

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

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: All authors have completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/vats.2018.10.03). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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