Brief Report on Thoracic Surgery

Troubleshooting of single port video-assisted thoracoscopic lung resection

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Abstract: By now single port video-assisted thoracoscopic surgery is in full swing all over the world. Series of papers have been proved its safety and feasibility. There are still some tricks which could help beginner to overcome the obstacle of operation. In this article, we tried to focus on how to retrieve the specimen from chest wall cavity simply and how to deal with the bleeding episode during operation.

Keywords: Single port VATS; major bleeding; complications; lung resection

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Introduction

Since 2004, the first case of single port video-assisted thoracoscopic wedge resection was first published (1). The novel technique has been expanded its applications in segmentectomy (2), lobectomy (3), pneumonectomy (4), sleeve lobectomy (5), esophagectomy (6) and mediastinal tumor resection (7). The related surgical techniques have been developed maturely and unified. A number of teams around the world have performed hundreds of cases and proved its feasibility and reliability with similar results. However, there are still some tricks could help the beginner to deal with the problem encountering during operations.

How to retrieve the specimen from chest wall chest cavity

Initially, our surgical team uses the same method to retrieve the tissue from chest cavity like multiport VATS. Two ring forceps with plastic tissue bag were introduced in single port wound. But it is time wasting and uncomfortable because all of the instruments and camera might hinder with each other. Then, we use some commercial kit l, such as Endo Catch™, it is very useful and could help the operator to shorten the retrieving time of specimen. If operator wants to send specimen for frozen first, it might need two Endo Catch™ during one operation. Thus, we try to modify and simplified our specimen retrieving technique: we use the Endobag™ and fix it to the long ring forcep, we called it Ching's bag (*Figure 1*). The functions of the specimen retrieving bag is similar to Endo Catch™ and reduce the numbers of instruments introduced in single port wound so that we could take out the specimen easily without time wasting.

How to deal with the bleeding episode during singe port VATS lung resection

The best policy for treating with bleeding complications is to prevent them before happening. It could be reduced the possibility by an appropriate preoperation preparation and patient selection. Vascular injury might be encountered during single port surgery, especially in stacked lymph node or post chemoradiotherapy patients. Although the single port VATS provided a more ergonomic operation views, bleeding episodes still could happen. Unfortunately, if bleeding happened during surgery, try to compress

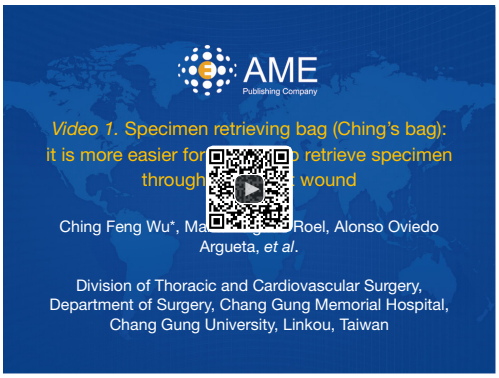

Figure 1 Specimen retrieving bag (Ching's bag): it is more easier for surgeon to retrieve specimen through singe port wound (8). Available online: http://www.asvide.com/articles/1144

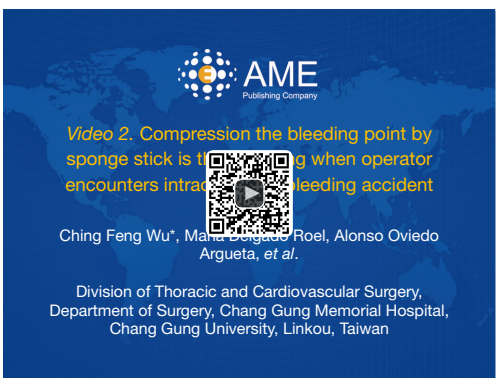

Figure 2 Compression the bleeding point by sponge stick is the first thing when operator encounters intraoperation bleeding accident (9). Available online: http://www.asvide.com/articles/1145

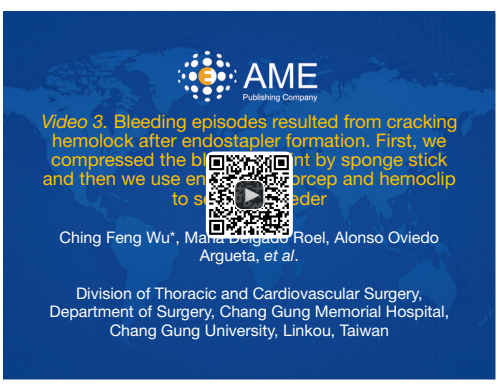

Figure 3 Bleeding episodes resulted from cracking hemolock after endostapler formation. First, we compressed the bleeding point by sponge stick and then we use endoscope forcep and hemoclip to seal the bleeder (10).
Available online: http://www.asvide.com/articles/1146

Figure 4 We injured a small branch of superior segmental artery of right lower lobe. We still compressed the bleeding point by sponge stick and repaired the small hole by simple suture (11).
Available online: http://www.asvide.com/articles/1147

the bleeding point first by sponge sticks to control the hemorrhage (*Figure 2*). It is the most important thing you have to do immediately. With the temporally controlled hemorrhage, one decision should be made. Shift to open surgery or resolved the problem through single port VATS procedure. The decision is based on the surgeon's experience. Keep calm and compress the bleeding point immediately could help operator to recall what kinds of vessels injury and think about what to do in the next step. For small vessels injury, most of the hemorrhage could be overcome only by compression. In such kind of vessel injury, operator could have time to do the proximal vessels control without shifting to open surgery or multiport port VATS. For pulmonary artery injury, it could happen due to anomaly artery or fragile inherent nature by advanced case, such as post chemoradiotherpay patients. Anomaly artery injury could be prevented by carefully inspection of contrasted pre operation CT. No matter what kinds of vessel injury, the first step of vessel control is still to compress the bleeding point and to see whether the surgeon could dissect around the proximal root of the involved artery. Then, using clips (*Figure 3*), hemolock, or artery suture (*Figure 4*) to control the bleeding.

For major trunk injury of pulmonary vessels, compression it first to see if the bleeder could be controlled. If it is still very hard to control the bleeding, don't hesitate to shift to open surgery. If the bleeder could be temporally controlled, we could have time to prepare the blood transfusion and try to think of next step. Could I control the root of pulmonary trunk? If the answer is no, shift to

open surgery. If the operator has the confidence on doing it, dissect the proximal portion of pulmonary trunk and sling it up by vascular loop or clamp it by vascular clamp, it could help the operator to deal with the bleeding.

Conclusions

Owing to the advances in single port VATS, the majority of pulmonary resections could be achieved with a lower level of mobility and mortality, even we encounter an unexpected major bleeding episode during operation. However, most of the complications could be avoided with correct preoperative planning and careful pulmonary dissection. How to coordinate your surgical team when you confront a major bleeding is an important thing in learning process even if the final result is to convert to open surgery. Conversion to open surgery should not be thought as a failure because it would become the base of the next successful trial. How could we learn the lesson and remember it from the process of mistakes is a good surgeon should do in his career life.

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None.

Footnote

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

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