

## Peer Review File

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### Reviewer A

**Comment 1:** The terminology about conversion should be limited to minimally invasive to open (conventional) surgery

**Reply 1:** Thank you for your valuable comments. I modified them because U-VATS may have additional ports.

**Changes in the text:**

Conversion criteria, Line 119–121

Comment, line 180–182.

**Comment 2:** The data about the cases used with this new detail should be mentioned in a more clear way (commonly used way, its safety or potential risk during the use)

**Reply 2:** Thank you for your feedback. As it was also pointed out by the other reviewers, the data was removed and the article type was changed to a brief report.

**Changes in the text:**

Almost the entire text

Especially, Comment, Line 169-172.

**Comment 3:** For bleeding control a bigger gauze compression might be safer to avoid increase the tearing with this relatively thin instrument connected to the suction, what do you think?

**Reply 3:** In case of severe bleeding, a bigger gauze compression is more suitable. However, the Naruke thoraco-cotton<sup>TM</sup> is effective in most cases of bleeding. If the bleeding point is obvious, a large gauze may obscure the surgical view and make subsequent hemostasis procedures difficult. The largest cotton is 12.6 mm and does not obstruct the field of view. The Naruke thoraco-cotton<sup>TM</sup> are not sold or popular outside of Japan, so it may be difficult to understand their necessity and effectiveness. So, we added them in the text.

**Changes in the text:**

Comments, line 192–197

Limitations, line 211–215

**Comment 4:** A few pictures figuring and pointing the anatomical structures might be additive

**Reply 4:**

Thank you for your suggestion. The pictures have been added.

**Change in the text:**

Figure 1B, Video 1-5

**Comment 5:** A general overview of the strengths but also weak points might occur in the discussion.

**Reply 5:** I appreciate your feedback. I have added the weak points and limitations.

**Change in the text:**

Comment, line 207–209

Limitations, line 211–217

**Reviewer B****Study Design:**

The manuscript briefly describes the design and approval of a curved cotton tip VATS instruments and then goes on to semi-quantitatively characterize its use over approximately 300 lung resections.

There are no objective measurable outcomes or statistical comparisons between pre and post implementation phases.

**Objective:**

Report experience of authors with new device.

**Comments to the Authors:**

**Comment 1:** The authors should be congratulated for the time, effort and ingenuity required to invent a new instrument specifically designed to facilitate uVATS. The manuscript reads well. However, it would still benefit from further grammatical and syntax review. Specifically, they should minimize/avoid the use of new acronyms especially in the title.

**Reply 1:** Thank you for your valuable comments. CS two-way handle is not an acronym but a product name. The trademark symbol was added and capitalizing to avoid confusion.

**Change in the text:**

Line 4, 5, 7, 41, 42, 47, 48, 50, 69, 70, 71, 73, 77, 83, 84, 88, 122, 133, 154, 161, 166, 169, 172, 178, 180, 184, 188, 189, 190, 192, 194, 201, 206, 211, 214, 220, 221, 268, 270

**Comment 2:** The author should describe the design of their study and outline the metrics that could be reflective of safety and efficacy. They only discussed conversion rates which have been demonstrated to improve with accumulating experience alone. This is a major confounding factor for the claim that this new instrument improves the probability of completion of her lung resection using uniportal VATS. I appreciated the incredible challenge in attempting to demonstrate safety and efficacy of a new surgical instrument, and I congratulate the authors in their effort to do so. However, since the authors claim that this instrument is gentler on the tissues, they could have compared the incidence of prolonged air leak before and after its introduction. Comparing patient demographics and other perioperative complications in these 2 retrospective cohorts of patients will also make sense.

**Reply 2:** Thank you for your understanding. Considering various confounding factors during this study period and the opinions of other reviewers, we decided to change the manuscript type to a brief report and exclude the results. We rewrote the manuscript with a focus on the situations where CS Two-Way Handle is effective.

**Changes in the text:**

Almost all

Especially, Comment, Line 169–172.

**Comment 3:** Perhaps a more interesting contribution to the Journal readership would be to describe a little more in detail and offer insight into the process of developing a new surgical instrument from idea to market.

**Reply 3:** Thank you for your valuable comments. We added the process of developing this instrument.

**Changes in the text:**

The development process of CS Two-Way handle, Line 83–98

**Comment 4:** The manuscript should be rewritten as a brief report and kept at less than 1000-1500 words. The video material is always interesting to readers and should remain. Instead of writing sentences to describe the review material, the authors should use the caption of each video to convey the essence to readers.

**Reply 4:** Thank you for your feedback. Similar comments were received from other reviewers. To address these comments, the data were removed and the article type was changed to a brief report. We added the caption in each video. According to the author instructions, a brief report should not exceed 2500 words.

**Change in the text:**

Almost the entire manuscript.

Figure 1B and Video 1–4

**Comment 5:** Straight instruments are currently being used safely and effectively to perform uVATS anatomic lung resections. The authors use them as well in their videos. New dedicated instruments may be beneficial, but they are not essential to safety. From my own personal experience, I would say that the dedicated curved thoracoscopic Yankauer suction is just as effective as this instrument nonretracting, providing compression, and smoke evacuation.

**Reply 5:** Thank you for your comment. Yankauer suction is also an effective instrument, but the biggest difference is the frictional force. The Naruke thoraco-cotton™ is less slippery. To address this, we added some more sentences.

**Changes in the text:**

Comment, Line 184–197

Limitations, Line 211–214

**Comment 6:** The authors should avoid quoting maxims or dogma other than to support or refute them with evidence.

**Reply 6:** Thank you for your valuable comment. We removed them.

**Comment 7:** The authors should consider shortening the comment section and focusing more on the process of developing new surgical instruments along with pitfalls and solutions. The vagaries of exposure and visualization during uVATS that are described by the authors are known to readers and do not constitute a significant contribution to the literature.

**Reply 7:** We appreciate your feedback. We revised them as you pointed out.

**Changes in the text:**

Development process of CS Two-Way handle, Line 83–98

Comment, Line 169–217

**Reviewer C**

I appreciate the opportunity to review this interesting paper submitted by Dr. Homma and colleagues about the use of a new device specially designed for single-port video-assisted thoracoscopic surgery.

It is a well-articulated work, with correct and well-structured language. The authors have described the device and its use well and from my point of view this device has some interest in handling tissue more carefully and probably during dissection. In addition, the videos provided I think are quite explanatory and illustrate the use of the device quite well.

However, the work presented by the authors does not cease to be the opinion of a single center during a relatively short period of time. The authors justify their work and the use of the device by arguing that the conversion rate from uniportal-VATS to multi-VATS decreased when this device was introduced at a later stage after UVATS implantation and therefore this would be an important confusion bias so this argument, in my opinion, is invalid.

A fundamental aspect of the work is that it does not provide a biography or I have not been able to verify it in the PDF during the review, so I cannot accept this work to be published in the journal.

**Reply:** Thank you for your valuable comments. Similar comments were received from other reviewers. To address these comments, the data were removed and the article type was changed to a brief report. And we added the caption in each video. By the way, the author instruction is written a brief report as 2500 words or less.

**Change in the text:**

Almost all.

**Reviewer D**

Thank you for a very well written manuscript that presents a novel device developed for uniportal surgery. Even though I do not share your enthusiasm and believe that your improving results are attributable to natural evolution over time and not directly related to your device, reports on novel tools are always welcome. As I saw you utilizing a conventional Yankauer suction as well, I would appreciate a more detailed description of advantages your device has

in respect to this standard tool.

**Reply:** Thank you for your valuable comments. Yankauer suction is also an effective instrument, but the biggest difference is the frictional force. The Naruke thoraco-cotton™ is less slippery when deploying the lungs. To address this, we added some more sentences.

**Changes in the text:**

Comment, Line 186–197

Limitations, Line 211–217

## **Reviewer E**

In general, the piece is well-written and has clear videos in the supplemental material to show the function of the new instrument.

I can imagine that the CS two-way handle indeed improves exposures, facilitate lymph node dissection and can facilitate bleeding control.

However, one major comment that I have is the lack of clinical data. You hint towards fewer conversions after implementing this device, but don't show any other data about the procedures. The effect may well be an effect of the learning curve as also described in the article. In addition, in the comments section you state that the CS two-way handle leads to shorter operative times and a safer and more effective procedure, but again no data is shown and the effect of the learning curve is not mentioned.

A minor comment is that in Europe we mainly use gauze and we have limited experience with cotton.

**Reply:** Thank you for your understanding. Considering various confounding factors during this study period and the opinions of the other reviewers, we decided to change the manuscript type to a brief report and exclude the results. We rewrote the manuscript with a focus on the situations where CS two-way handle is effective.

Using gauze sandwiched between forceps is also effective, but the size is different from that of the cotton. The Naruke thoraco-cotton™ is the minimum necessary size, so it does not interfere with the surgical view. In case of catastrophic bleeding, a bigger gauze compression is more suitable. However, the Naruke thoraco-cotton™ is effective in most cases of bleeding. If the bleeding point is obvious, a large gauze may obscure the surgical view and make subsequent hemostasis procedures difficult. The largest cotton is 12.6 mm and does not obstruct the field of view. To address this, we added some sentences.

**Changes in the text:**

Brief report, almost all

Comment, Line 191–197

Limitations, Line 211–217

## **Reviewer F**

The author reported surgical instrument of novel cotton device connected with curved suction body. The author suggested its efficacy in conducting U-VATS with variable advantages.

I also think this instrument could provide lots of benefits in performing VATS, regardless of port numbers. In this paper, the author well-focused technical experiences and improved outcomes accepting U-VATS.

This paper has minor concerns to be discussed, listed as follows:

**Comment 1:** In the title, does “CS” mean “chest surgery”? or commercial name? Abbreviation seems not proper that could be avoided or explained in the manuscript.

**Reply 1:** Thank you for your valuable comments.

CS two-way handle is not an acronym but the product’s name. I added the trademark symbol and capitalized it to avoid confusion.

**Change in the text:**

Line 4, 5, 7, 41, 42, 47, 48, 50, 69, 70, 71, 73, 77, 83, 84, 88, 122, 133, 154, 161, 166, 169, 172, 178, 180, 184, 188, 189, 190, 192, 194, 201, 206, 211, 214, 220, 221, 268, 270

**Comment 2:** In bleeding control section, does a thicker cotton based two-way handle (other prototype) also developed?

**Reply 2:** Thank you for your question. The cotton we used was the Naruke thoraco-cotton™ (Japan Cotton Buds Industry, Tokyo, Japan) with a tip diameter of 5.6 mm and 12.6 mm. Both have a diameter of 3.2 mm, although the tip size is different.

**Changes in the text:**

The development process of CS Two-Way Handle, Line 89-90

Bleeding control, Line 146–152

Comment, Line 193–197

**Comment 3:** In line 199 and 202, “U-VATS” may be incorrect; "U-VATS" to “CS two-way handle”

**Reply 3:** Thank you for your valuable comment. We deleted the sentence. Considering various confounding factors during this study period and the opinions of other reviewers, we decided to change the manuscript type to a brief report and exclude the results.

## **Reviewer G**

**Comment 1:** Abstract: The comment that the CS two-way handle had significantly reduced the conversion rate is not highly subjective and not backed by objective evidence. Moreover, I cannot believe that the conversion rate decreases with its use.

**Reply 1:** Thank you for your understanding. Considering various confounding factors during this study period and the opinions of the other reviewers, we decided to change the manuscript type to a brief report and exclude the results. We rewrote the manuscript with a focus on the situations where CS two-way handle is effective.

**Changes in the text:**

Brief report, almost all

**Comment 2:** Why not simply use a peanut on an angled pulmonary grasper? And what did cause these graspers to damage the lung parenchyma? Is this due to the graspers configuration or its misuse by the operating surgeon?

**Reply 2:** Thank you for your valuable comment. Although lung grasping forceps were used as a substitute for the cotton, lung parenchyma damage was sometimes noted when the forceps were handled carelessly or with excessive force. For this reason, a curved cotton instrument for U-VATS was necessary. Using a gauze sandwiched between forceps is also effective, but the size is different from that of cotton. The Naruke thoraco-cotton™ is the minimum necessary size, so it does not interfere with the surgical view.

**Changes in the text:**

Introduction, Line 74–76

Comment, Line 191–197

Limitations, Line 211–214

**Comment 3:** The article seems to be a mix between describing a novel device and a retrospective analysis. Please choose one study design, because for a retrospective observational study, critical components are missing. Please refer and adhere to the specific reporting guidelines.

**Reply 3:** Thank you for your comment. Similar comments were received from other reviewers. To address this, the data were removed and the article type changed to a brief report. We rewrote the manuscript with a focus on situations where CS two-way handle is effective.

**Changes in the text:**

Brief report, almost all

**Comment 4:** Overall, the paper is highly subjective. Try to be so objective as possible. Statements such as “very useful” may apply for the authors, but may for example not be true for any future users.

**Reply 4:** Thank you for your valuable comments.

We removed the subjective sentences.

**Comment 5:** Line 157–158. Fewer instruments in and out takes less surgical time to which I agree. However, do you switch instruments to suction smoke?

**Reply 5:** Thank you for your question. The CS Two-Way Handle™ can be used as suction simply by connecting the wall suction tube.

**Changes in the text:**

Comments, Line 202–203

**Comment 6:** Line 166: better instruments lead to better surgery. This sounds as: better shoes make football players better. I think the most important is: in experienced and trained hands.

1. Again: “We believe that the CS-two-way handle has contributed to a decreased need for conversion to M-VATS or thoracotomy” is not constituted by the paper itself and is misleading.

**Reply 6:** Thank you for your valuable comments. We removed that part.

**Comment 7:** What are the costs of these cottons, compared to conventional peanuts?

**Reply 7:** Thank you for asking, the price is about 100–140 yen.

**Change in the text:**

Development process, Line 90

**Comment 8:** How about CE marking in different countries?

**Reply 8:** In Japan, approval by the Ministry of Health, Labor and Welfare is required by the law. The CE mark is a European standard and is not required in Japan.

**Change in the text:**

Limitations, Line 214-217

**Comment 9:** Any conflicts of interest?

**Reply 9:** We have no COI.

**Comment 10:** It is stated that different devices were developed, but only the CS two-way handle is described based on the fact that it was “best”. However, what made it superior to the other devices/instruments developed? This may be interesting, also to direct future improvements.

**Reply 10:** Thank you for your comment. Similar comments were received from other reviewers. To address this, the data and the subjective sentences were removed and the article type was changed to a brief report. We rewrote the manuscript with a focus on situations where CS two-way handle is effective.

**Changes in the text:**

Brief report, almost all

**Comment 11:** The cotton is applied to the suction device. Doesn't the cotton immediately get saturated with blood/fluids? This may alter the properties of the cotton?

**Reply 11:** Thank you for your valuable comments. The Naruke thoraco-cotton™ is less slippery when deploying the lungs. However, when it gets wet, the frictional force decreases, so it needs to be replaced. In preparation for changing the cotton, the CS two-way handle developed so that it can be easily inserted and removed. It is tightly woven so that it does not unravel and does not remain as a foreign object.

**Changes in the text:**

Comments, Line 185–191

## **Reviewer H**

I have some questions:

**Comment 1:** How were the 300 cases identified that used the CS instrument? was it in opnotes, and how was that seen?

**Comment 2:** Did you notice any differences in the length of cases from 2019 to more recently?

**Reply 1, 2:**

Thank you for your comment. Similar comments were received from other reviewers. To

address this, the data were removed and the article type was changed to a brief report. We rewrote the manuscript with a focus on situations where CS Two-Way Handle is effective.

**Changes in the text:**

Brief report, almost all

**Comment 3:** Did all your surgeons agree to this and thought it's use was worthwhile?

**Reply 3:** We appreciate your comment. The surgical instruments are preferred by the surgeon. The Naruke thoraco-cotton™ are not sold or popular outside of Japan, so it may be difficult to understand their necessity and effectiveness. However, it is a very popular device that continues to be traditionally used in Japan, and it is favored by many surgeons regardless of the surgical approach.

**Changes in the text:**

Limitations, Line 211–217

**Comment 4:** Is there a patent on this and is it sold commercially yet?

**Reply 4:** The CS Two-Way Handle™ is also currently sold only in Japan. At the time of writing this paper, the approval of the Ministry of Health, Labour Standards in Japan has been obtained, but the CE mark has not been obtained.

**Changes in the text:**

Limitations, Line 214–217

**Comment 5:** Any foreign object issues with the cotton tip being dislodged? or the cotton tip being too rigid for vessels like PA and Pulm vein?

**Reply 5:** Thank you for your comment. Because the Naruke thoraco-cotton™ is soft and elastic, and has effective frictional force, it enables gentle lifting or pressing of the tissues. The Naruke thoraco-cotton™ is less slippery when deploying the lungs. However, when it gets wet, the frictional force decreases, so it needs to be replaced. In preparation for changing the cotton, the CS Two-Way Handle was developed so that the cotton can be easily inserted and removed. It is tightly woven so that it does not unravel and does not remain as a foreign object. Of course, handling it carelessly or with strong force can damage the organs.

**Changes in the text:**

Introduction, Line 74–76

Comments, Line 184–197

**Comment 6:** Any thoughts in RATS usage for this?

**Reply 6:**

We also developed and sold two versions for robot-assisted thoracic surgery and subxiphoid U-VATS approach, there are two long types with different curvatures.

**Changes in the text:**

Development process, Line 100–101