

Peer Review File

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Reviewer A

This manuscript describes on “Challenges for pure uniportal robotic-assisted thoracoscopic surgery (U-RATS)”. The comparison between U-RATS and uniportal video-assisted thoracoscopic surgery (UVATS) were presented. The author emphasizes on the efficacy of U-RATS technique in the field of thoracic surgery. The content of this manuscript is basically acceptable for publication. However, there are some minor revisions.

The minor revisions are as below:

In the discussion, the author should make a few more statements about the surgical indications for this procedure. For example, please indicate if this procedure is applicable for patients with a small thoracic cavity or if it is applicable for patients with a narrow intercostal space. It seems that the surgical assistant needs more skill and experience than U-VATS for this procedure, but it is desirable that the author comments on this.

Reply: Dear Reviewer thanks for your kind suggestions, we addressed your concerns as suggested.

Reviewer B

I sincerely appreciate the opportunity to review the review article "Challenges for pure uniportal robotic-assisted thoracoscopic surgery". Diego and colleagues are world leaders in this field, having performed the world's first U-VATS lobectomy in 2010 and the largest number of U-VATS procedures in the world since then. This article is a review article of U-RATS by Diego's group, who performed the world's first U-RATS lobectomy with the Da Vinci Xi system in September 2021 and have completed 140 cases, including sleeve lobectomy and carina resection. This is a crucial report from them, which is at the forefront of the world and is highly worthy of publication. We hope that the following issues will help to further improve the paper.

Reply: Dear reviewer, thanks again for your efforts and reviewing our work, we appreciate it.

Issues:

#1. Regarding the terminology issue, there are several medical terminologies such as U-RATS, URATS, Multiportal-RATS, MRATS, etc. mixed. **Why not unify them?**

Reply: Dear reviewer, thanks again for your kind suggestion, we changed to (U-RATS, M-RATS, B-RATS) as suggested.

#2. As this is a high-quality paper, it would be better to define abbreviations such as TBC (figure 1) in abbreviations, including the above, just to be sure.

Reply: Dear reviewer, thanks again for your kind suggestion, we added the abbreviations section as suggested.

#3. Lines 57-58: The authors mention that U-RATS is more useful than multiport because it allows for more effective control of intraoperative bleeding. Is U-RATS a better technique for hemostasis compared to M-RATS, or is it a better hemostatic technique with a shorter Undock time and a faster transition to conversion to open thoracotomy? Or both? If you could elaborate a bit more, we believe the reader will not misunderstand.

Reply: Dear reviewer, thanks again for your suggestion, we added a paragraph related this as suggested.

#4. Lines 78-80: The authors mention that when compared to a thoracoscopic approach using a single port, the U-RATS technique is more suitable for anatomic segmentectomies, it is very interesting to note that the U-RATS technique is more suitable for anatomic segmentectomies, particularly those performed on the posterior segments located further posteriorly. Unfortunately, the reason for this is not stated in detail. Is it possible to add it?

Reply: Dear reviewer, thanks again for your suggestion, we edited a paragraph as suggested.

#5. Line 65: The authors perform U-RATS from a single incision of 2.5 cm (figure 1), but do they always perform at around 2.5 cm, including figure 1? To avoid misleading the reader, it would be helpful if you could show the average (min-max) of the incisions in the authors' 140 U-RATS.

Reply: Dear reviewer, thanks again for your suggestion, we edited a paragraph as suggested.

I sincerely hope that this review will help to improve this paper.

Thanks, for your time to spent with us we appreciate it.

Reviewer C

I would like to congratulate the authors with their manuscript entitled “Challenges for pure uniportal robotic-assisted thoracoscopic surgery”. It covers a very interesting and novel subject in the field of minimal invasive thoracic surgery. The senior author is an established thoracic surgeon and pioneer in development and teaching in minimal invasive thoracic surgery. I have the following minor comments:

- Please consider having your manuscript revised by a **native English speaker**. There are many language and spelling errors throughout the entire manuscript. Linguistic revisions will certainly improve quality. Uniportal RATS seems a very promising new technique in the field of minimal invasive thoracic surgery.

Reply: Dear reviewer, thanks for your kind suggestion, we appreciate your efforts to reviewing our works, the whole manuscript was checked again regarding English language.

However, superiority over other modalities like multiportal RATS or uniportal VATS simply cannot be claimed since there are no comparative studies yet available. Please try to include this nuance in your manuscript.

Reply: Dear reviewer, thanks for your kind suggestion, we added a new reference related comparative studies as suggested.

- Line 57-58: why is uRATS more effective in bleeding control? Please elaborate.

Reply: Dear reviewer, thanks again for your suggestion, we added a paragraph related this as suggested.

- Line 60-61: is uRATS really proven to be associated with a reduced infection risk compared to other approached? Please add references.

Reply: Dear reviewer, we add the reference regarding this comment.

- The Da Vinci Xi system: please add manufacturer details in brackets the first time you refer to this platform.

Reply: Dear reviewer, we added the detail as suggested.

- Figure 2 shows a surgeon using a suction device. Could you please comment on the specific roles of the table surgeon? Which actions cannot be performed by the robotic surgeon and must be carried out by a table surgeon?

Reply: Dear reviewer, we added the detail as suggested.

- Figure 3: what do you mean by “reloading of pulmonary artery”? Please rephrase.

Reply: Dear reviewer, we re-phrased as suggested.

- Consider to add a short video showing operating room setup, patient positioning and docking for uRATS.- Consider to add a short video showing uRATS view and instrumentation.

Reply: Dear reviewer, thanks for your kind suggestion, in fact, at this time we do not have a video related this but, these producers are presented in the reference 11 in detail. Please accept our comment.

- **Discussion:** I would suggest to restructure the discussion section so that the reader is naturally drawn into the message of the authors; short history of RATS, limitations of multiportal RATS and potential advantages of uniportal RATS, development and introduction of this novel technique, first institutional experiences, future perspectives and so on?

Reply: Dear reviewer, thanks for your great comment. we separated the limitations. We reported the da Vinci Xi system in a separate section, and advantages are presented in Table 1.

- Line 163-165: please explain why for example oncological outcome would significantly improve? To date, no scientific superiority of uniportal over multiportal VATS and/or RATS has been demonstrated?

Reply: Dear reviewer, we add the references regarding this comment.

- **Conclusion:** it seems sensible to tone it down a bit? Like stated earlier, the technique is very promising but still has to be proven. At least from a scientific point of view, superiority can not be claimed yet.

Reply: Dear reviewer, thanks for your kind suggestion, during revision many papers have been published to support our work and we added all these references.

Reviewer D

Very interesting discussion

I have some questions/comments:

1) I had no idea that U-RATS would be better than multiports for controlling bleeding is there a reason why? Is it because it is easier to undock if you have intraop bleeding uncontrollable?

Reply: Dear reviewer, thanks again for your suggestion, we added a paragraph related this as suggested.

2) I appreciate the complex resections using 35 cm and 17 mm vlock needle descriptions

Reply: Thanks for your comment we appreciate it.

3) Some of the descriptions of port placement in the text could be referred to more figures. It would be nice to have more figures rather than so much text.

Reply: Dear reviewer, thanks again for your kind suggestion. While we have 5 figures and 2 tables.

4) How many lung resections do the authors think are needed for appropriate level mastery of U RATS?

Reply: Dear reviewer, thanks again for your comment we added two sentences regarding this comment as suggested

Thank you for a nice detailed outline of U RATS

Reply: We appreciate it thanks again.

Reviewer E

It is my pleasure to review this review article on challenging U-RATS technique. The authors demonstrated the uniportal experience with the da Vinci system, comparing multi ports RATS and U-VATS approach in conducting various thoracic surgery with their ongoing devotion to the uniportal surgery fields.

I think this paper has minor concerns to be discussed, listed as follows:

1. In the entire manuscript, developmental history and technical comparisons between U-VATS, M-RATS, U-RATS-VATS, and finally pure U-RATS is slightly confusing that fine definitions can be positioned in the background section, instead of the discussion section, if possible

Reply: Dear reviewer, we changed as suggested

2. In the background, field of “video” can be replaced with “robotic”; Authors commented pure U-RATS in the title, but experienced thoracic assistant using VATS skills still seems required in performing this technique in fact.

Reply: Dear reviewer, thanks for your kind suggestion, we changed the word video to robotic and added on sentence related performing this technique.

3. In line 64; simple subtitle of ‘da Vinci XI System’ can be replaced with “Instrumentation and advantages of U-RATS using da Vinci XI System.

Reply: Dear reviewer, we changed as suggested.

4. In line 77; subtitle of “complex resection” can be supported with “feasible anastomosis or dissection” using U-RATS comparing U-VATS.

Reply: Dear reviewer, thanks for your kind suggestion, we reported in the paragraphs instead of subtitle.

5. In line 127~133, sentences about “lymph node dissection” can be merged. And several descriptions in discussion section seem not well organized in orders.

Reply: Dear reviewer, thanks for your kind suggestion changed as suggested.

6. In line 164, oncological outcomes seem not yet established using U-RATS.

Reply: Dear reviewer, we add the references regarding this comment.

7. In line 185-186, this sentence seems not required in this article.

Reply: Dear reviewer, we deleted this sentence as suggested.

8. In limitation section, evolution of an SP system can be inserted for future perspective.

Reply: Dear reviewer, we think it is different from our paper.

Reviewer F

Thank you for inviting me to be reviewer for this nice article. I have a few suggestions:

1) Abstract:” In terms of feasibility, safety, oncological outcomes, and the postoperative recovery period, the pure uniportal approach utilizing robotic technology would be a significant improvement.” Needs to be toned down as no evidence to support these claims (or please provide references of comparative studies)

Reply: Dear reviewer, we add the references regarding this comment.

2) Background: “ U-RATS is more useful than multiport because it allows for more effective control of intraoperative bleeding.” Again this is not substantiated by any data or studies. (or please provide references of comparative studies)

Reply: Dear reviewer, we add the references regarding this comment.

3) Background: “ U-RATS is very important in lung resection and airway reconstruction with less infection in comparison to other approaches”. Please provide data/ references in support.

Reply: Dear reviewer, we add the references regarding this comment.

4) Table 1. Legend “Shows the advantages and disadvantages of U-RATS.” Is this compared with multiport RATS? This needs to be made clear in the title. There are also claims in the advantages that are “possibles” and “potentials” but are not evidence based, and only of opinion from the authors. These should be toned down.

Reply: Dear reviewer, thanks for your kind suggestion, we did not compare to MRATS it was advantages and disadvantages of URATS only. We added two comparative studies as evidence.

5) throughout the article , there are strong claims of outcomes benefits over other techniques that are not evidence based.

Reply: Dear reviewer, we add the references regarding this comment.

Reviewer G

Dear authors,

Thank you for giving me the opportunity to review your work, I have some comments - I have a concern about the definition "pure uniportal RATS". I have seen several videos of this technique and interestingly, I observed that part of the exposure and the dissection was facilitated by the suction (which is not a robotic instrument?). I still believe that the technique remains assisted by the robot but not entirely.

Reply: Dear reviewer, thanks again for your kind suggestion. In fact, this suction is used by assistant for excellent exposure.

- it is not mentioned in the manuscript if the surgeon needs previous experience on Uniportal VATS. That said, as an uniportal VATS surgeon, the main difficulty of the operation is not the dissection but the exposure and the different sequences and safe introduction of staplers. You should have probably already passed the learning curve for UVATS before starting such demanding procedure. I think that this technique is rather a next step for Uniportal surgeon that are already mastering the UVATS technique than for all VATS surgeon... what is your opinion?

Reply: Dear reviewer, thanks for your kind suggestion, we added two sentences related this comment as suggested.

Another issue, is that to my knowledge, the U-RATS is an off-label use of the Da Vinci robot and this approach is not validated by Intuitive, can you comment on that point? and why do you think?

Otherwise, congratulation for your pioneer work!

Reply: Dear reviewer thanks again for your comment, it is related to the company, we cannot speak about their decisions.