

Peer Review File

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Reviewer A

The authors used Chinese domestic surgical robot Toumai® for lung cancer surgery and compared its short-term results with surgery using the currently mainstream da Vinci®. As a result, they showed that the Toumai® group was comparable to the da Vinci® group in terms of surgical and postoperative outcomes.

Major comments

1. It is difficult to understand Toumai®'s performance and features from photos of its appearance and surgical field. In order to better understand the results of this paper, I recommend that you upload an intraoperative video as a supplement file so that readers can see the movement of the forceps, etc.

Reply: Thank you for your advice. We think it is necessary and will upload representative videos as a supplement file.

2. Please tell us about the differences in the energy devices used in each robot. I think it is necessary to consider the fact that there are slightly more cases in the Toumai® group with a large amount of intraoperative blood loss and that the amount of drainage in the Toumai® group is large.

Reply: The energy devices used by both robots were double-handed energy graspers, such as electric hooks and Maryland forceps, and the assistant can use high intensity focused ultrasound and argon plasma coagulation to assist in hemostasis. No serious intraoperative bleeding or postoperative complications occurred in both groups, so we think that these energy devices are safe and will be more familiar to surgeons in the future. In addition, as clinicians were cautious to this new robotic platform, the chest tube duration and length of stay may have been extended. Whether the amount of blood loss and drainage has a statistical difference needs to be discussed in further studies with large sample sizes.[see line 264-277]

Minor comments

1. Were there any cases excluded during the period? If any cases were excluded, please state the number and reason for each group.

Reply: These 19 patients are consecutive between November 2021 and December 2021 in our center, and they all meet the inclusion and exclusion criterias. Although it was not a strict prospective study, robot-assisted lobectomy was firstly considered suitable for these 19 patients

and then a random draw was used to determine the type of robot(da Vinci or Toumai®). The initial plan was to perform a small cohort comparison within a month. [see line 126-133]
In addition, a prospective study of Toumai® is currently underway.

2. How cheap is the price of Toumai® compared to da Vinci®?

Reply: There is currently no official price for Toumai® (it is still in clinical trials), but part of the surgical cost is possible to be reimbursed by Chinese medical insurance in the future. Toumai® has completed some 5G remote surgeries in other disciplines(urology, gynecology), patients in distant regions will be able to reduce the cost of treatment.

The cost of starting up a da Vinci robot is about \$4000 in China, and it's not covered by medical insurance. The specific comparison will be conducted after the wide application of Toumai® in the future.

3. I think it would be better to list the total operation time. Also, please write the operation time in the abstract.

Reply: Yes, we have revised it in the article.[see line 49-50,table 2]

4. In blood loss in Table 2, the meaning of 100-200 histologic

Reply: In our center, the amount of blood loss is recorded very briefly (we will improve it). For operations with almost no bleeding, it is difficult to calculate the blood loss. The weight of surgical gauze is not weighed, and the blood loss is recorded as less than 100ml. For operations with a certain amount of bleeding, intervals will be divided in units of 100ml, combined with the situation of gauze and drainage bottle.

This statistical method was not rigorous in the early stage, and we will be more precise in future studies.

Reviewer B

I would like to thank you for your contribution with the new Chinese Robot experiences. My questions, concerns and recommendations are as follows:

1-Have any other disciplines used Toumai before and reports related to them needed.

Reply: Yes. In the past two years, Toumai robots have participated in more than 1,000 robot-assisted surgeries in more than 40 hospitals in China, such as radical resection of prostate cancer (2019-11), total hysterectomy and oophorectomy (2021-11), radical resection of gastric cancer (2021-11), and 5G-assisted urology surgery (2022-06; 5000 km). Many clinical trials have been completed or are in progress

2-Is the operational system exact same. To understand this please create a chart to be filled out by surgeons to compare these two robots.

Reply: Thank you very much for your suggestion, and the scale can reflect the difference more accurately. But at present I think there are two difficulties. Firstly, due to the small number of cases, these 19 patients were completed by only a chief surgeon. If more doctors can participate in large sample studies in the future, it seems easier to know the views of multiple surgeons. Secondly, due to the requirements of the research and development company, we cannot know the specific principles and mechanisms of the system of both robots, and can only analyze them from the perspective of the user. According to the experience of the surgeon, the operation process is almost the same, which may be subjective to some extent. We need more doctors to participate in similar operations in the future (no matter which kind of new robot platform).

3-How were the patients selected for each type of robot.

Reply: Although it was not a prospective study, robot-assisted lobectomy was firstly considered suitable for these 19 patients and then a random draw was used to determine the type of robot (da Vinci or Toumai®). The initial plan was to perform a small cohort comparison within a month. All these 19 patients met the above criterias, and were willing to undergo surgery with the help of any robotic platform and signed informed consents after preoperative introduction.

[see line 126-133]

4-NO CO2 are used and VATS based approach was preferred. Generally experienced surgeon is required on the table, please indicate the experience of both Robot's table surgeons.

Reply: A chief surgeon and an expert assistant who were well trained in animal tests for Toumai® surgical robot participated in the whole trial. They also have collaborated on more than 300 da Vinci robot-assisted surgeries in recent 2 years. The chief surgeon (both Robot's table surgeons) has the experience of more than 1500 da Vinci robot-assisted surgeries.

[see line 140-143]

5- Are staplings from outside. What type of staplers were used please indicate.

Reply: Yes, from the auxiliary port (by the assistant). The staplers in both groups were produced by Johnson & Johnson. [see line 152]

I believe more precise definitions are required. Additionally, a table to compare both robots' characteristics could be developed and surgeons experienced both can compare them. I think this will be useful to understand the differences.

My other questions and concerns were listed above.

Reply: Thank you for your valuable advice, and the definitions that need to be supplemented have been added in the article. Your suggestions on the robot function evaluation scale and

surgeons' experience scale are very valuable, and I think they are of great significance for the standardized development of surgical robots in the future. Because da Vinci robot is currently the most widely used, other surgical robots are still under development, and only some surgical robots have thoracic surgery indications. According to my research, there is few authoritative evaluation scale for surgical robots. In the future, I will learn more about surgical robots, such as CMR, Hugo, as well as Chinese robots (master S, MP1000 and SR1000), and strive to sum up a reasonable evaluation standard. Thanks again for your suggestions.

Reviewer C

I really applauded the successful results of robotic lobectomies via both approaches.

I hope Toumai will emerge all over the world in the future.

After reading this manuscript, I have some comments.

1. Almost three years have passed as an observation period. Why did not the author describe the long-term results including DFS or OS?

Reply: Thank you for your advice. Two years have passed since the surgery (2021-11 to 2023-11), we will pay attention to the follow-up data and carefully analyze the results of the 3-year DFS or OS next year.

2. Left upper lobectomy was not included in the performed surgical procedures. Was it contraindication for robotic approach?

Reply: Due to the popularity of CT screening, many tumors were detected at an early stage, and tumors located in the upper left lobe were treated with pulmonary segmentectomy(S1+S2+S3 or S4+S5) for maximum preservation of lung function in our center(such as upper right lobe and middle right lobe). Lobectomy was included in this study, so there were no cases of the upper left lobe.

According to the previous experience of our center, RATS of upper left lobe is more difficult than that of other lobes. Although this is not a contraindication for robotic surgery, our previous retrospective studies also showed that the proportion of RATS of upper left lobe is relatively low, which is related to the decision of the surgeon in clinical practice.

In the future, with the promotion of domestic surgical robots, RATS will be further popularized. We hope that more optimized methods will be summarized.

3. I expected that other many patients underwent VATS lobectomy. Please describe the indication of RATS and VATS lobectomy.

Reply: Yes, we also performed the VTAS lobectomy at that time. In our center, for a new surgical patient, after assessing the difficulty of surgery, we firstly determine whether

minimally invasive surgery (VATS or RATS) is possible. On this basis, the characteristics of VATS and RATS were explained to the patients, and the surgical method was decided by the patients themselves. (For patients undergoing wedge-shaped resection, we generally recommend VATS because there is no need for complex anatomical procedures.) Overall, robot-assisted surgery was performed on patients who underwent lobectomy and complex segmentectomy. In our previous studies, VTAS and RATS had similar results, so the surgical method of lobectomy was mainly based on patients' own willingness and economic status.

4. I think limitations section is necessary after the discussion section. In this study, single institution, retrospective, small number of the patients, and lack of the long-term results including oncological prognosis are applicable.

Reply: Yes, we will add it in the article. Thank you for your suggestions. [see line 287-291]
