Peer Review File

Reviewer A Comments:

Comment 1: The authors should be congratulated in their writing. This paper summarizes the current data for robotic thoracic surgery. Going further, it outlines a technique for implementation of a thoracic surgery robotic program.
The breadth of review required to reach the assessment and conclusion of this paper is impressive. I think the authors are clearly robotic interested which inserts some bias into the writings of the paper.
This paper would clearly be stronger with primary data from the authoring institution outlining similarities and differences between thoracoscopic and robotic approaches.
Even with the above comments this paper is an addition to the surgical literature.

Reply 1: We thank the reviewer very much for these kind comments. We have cited one of our manuscripts comparing VATS and robotic approaches for lobectomy/segmentectomy which analyzed short-term outcomes and cost (Coyan, 2022). This study found equivalent 30-day mortality, comparable direct costs, and decreased length of stay and chest tube duration in the robotic group. We have highlighted this study in the text in response to this comment. Of course, this is not the same as having more comprehensive data from our institution comparing and contrasting VATS and robotic approaches, and we agree that this would enhance the manuscript.

Changes in the text: We have added the following: "However, our group found that VATS and robotic approaches to lobectomy and segmentectomy actually have comparable direct costs (along with equivalent 30-day mortality, decreased length of stay, and decreased chest tube duration in the robotic group)." [lines 202-204]

Reviewer B Comments:

The authors present a review article focusing on the transition to the robotic surgical platform in a thoracic surgery practice. The manuscript is well-written and covers several aspects related to transition to robotic approaches.

Comment 1: The authors discuss the potential educational opportunities for trainees with respect to the platform. Obviously, there is a learning curve, as the authors mention and previous literature has suggested. Can the authors elaborate further on the learning curve associated with the transition?

Reply 1: We thank the reviewer for these comments and have added additional information on the learning curve for trainees in lines 150-158. We have also cited an additional associated reference.

Changes in the text: We have added the following: "For faculty and trainees who are new to the robotic platform, online modules should be completed for an informational foundation regarding basic set-up, port placement, and instrumentation. Subsequent simulation modules on a robotic console are essential for hands-on training. These simulations are instrument- and technique-specific, so that basic skills such as camera control, switching instruments, suturing, cauterizing, and meticulous tissue handling can be mastered prior to using the robot in the operating room. As suggested in prior reviews, we have found this to be the safest and most efficient way to overcome the learning curve required for individuals to adopt the robotic platform." [lines 150-158]

Comment 2: While the transition mentioned by the authors may be applicable to other large tertiary medical centers, is the same "plan" for transition generalizable across a broader context (e.g. community practice)? If not, are there approaches for smaller practices?

Reply 2: We thank the reviewers for raising this important question. While this manuscript focuses on the transition in a large academic medical center, the general 'plan' for transition is similar in other settings. An article by Spillane and Brooks details the successful adoption of a thoracic robotic surgical program at Cape Cod, a community hospital setting. They describe a program beginning 3 months prior to utilizing the robot in the OR, where the surgeon and a surgical nurse practitioner reviewed videos, completed the online training and exam, and then completed simulation training. Perhaps one difference they mentioned is that their program involved training at an Intuitive Surgical Practice Facility, where they practiced docking, using the equipment, completing individual tasks such as dissection and knot-tying, and even performing full operations on cadavers. The surgeon would then perform 6 procedures with a surgeon who is already trained in robotics before operating with the robot independently. They also describe training of the operating room staff which is done by the company representative and includes setup, calibration, and troubleshooting. Further team meetings were held to discuss specifics of robotic thoracic surgery.

Changes in the text: We have added the following: "While beyond the scope of this review, it is worth briefly mentioning the adoption of robotics in a smaller community hospital setting. Following online training and simulation on a robotic console, some hospitals have employed training at an Intuitive Surgical practice facility, where trainees and faculty could practice docking, using the equipment, completing individual tasks such as dissection and knot-tying, and even performing full operations on cadavers. This would precede proctored use of the robot in the operating room.[30]" [lines 219-224]

Reviewer C Comments:

This is an excellent and very comprehensive review discussing a very important topic in thoracic surgery, namely the implementation of robotic-surgery in a successful thoracoscopic/laparoscopic program. The review provides very valuable recommendations and discusses the literature regarding this topic. The manuscript is well-written and easy to follow. The video representable and helpful to understand this topic.

Reply: We thank the reviewer very much for these comments.

Reviewer D Comments:

This review logically and clearly explains the importance of robotic surgery and clarifies its advantages compared to VATS or open approaches. Further, the authors list the obstacles that will be faced in achieving the transition to a robotic thoracoscopy program and share their institution's experience with the transition. I only have a few minor suggestions:

Comment 1: In addition to highlighting the advantages of robotic surgery, I suggest the authors also report on its potential limitations, which will help readers gauge whether it is worthwhile or when it is appropriate to begin the transition.

Reply 1: We thank the reviewer for this comment and agree that it is important to highlight potential limitations. We have added a few sentences on limitations at the end of the 'Why do it?' section.

Changes in the text: We have added the following: "While there are many reasons for adopting a robotic thoracic program, there are a few notable limitations. Perhaps the most important limitation of the robot is the lack of tactile feedback during an operation. This is one of the reasons that tissue handling must be practiced on a console prior to using the robot. Additionally, the cost of implementing a robotic platform may be excessive, particularly in low volume centers, as detailed later in the review. Nevertheless.." [lines 131-143]

Comment 2: As the authors state, "it is not the 'why', but the 'how' that remains an obstacle for many programs" (line 131). But I think lines 134-160 list more of the influence factors than the barriers to successfully achieving this transition. The barriers should be, for example: For "must have an adequate volume of cases to do so"- what if there is not an adequate volume of cases: what kind of patients are more likely to be recommended for robotic surgery? What are the reasons why patients do not accept robotic surgery and what are the solutions or recommendations?

Reply 2: The patients who are considered for robotic surgery depend on the surgeon and his/her level of experience and comfortability with using the robot for various operations. Given the advancements in the platform, robotic surgery can now be offered to even the most complex patients. Patients are also often inclined to request the use of the robot when it is offered. When a patient is referred to a thoracic surgeon, the surgeon should spend time discussing use of the robot among the various options for surgical approach.

Changes in the text: We have added the following: "Given the advancements in the platform, robotic thoracic surgery can now be offered to even the most complex patients. As surgeons adopt the platform and become more comfortable using the robot for various operations, they can increase their volume of cases by offering robotic surgery to an expanding pool of patients. Of course, there should be buy-in from the institution to allow the operating room time for this platform to grow." [lines 150-154]

Reviewer E Comments:

Overall this as an excellent overview of how their program transitioned from a successful VATS to a robotic program. I have a couple of questions:

Comment 1: The authors touch on the issue of credentialing for different procedures. Can they discuss how credentialing may or may not be different for the experienced MIS surgeon adopting RATS in their program, or a graduating fellow, who had trained in robotics?

Reply 1: We thank the reviewer very much for these comments. The same pathway of credentialing (online training, simulation modules, and proctored cases) applies to all individuals, whether they be experienced MIS surgeons or graduating fellows. The number of required proctored cases, however, may differ depending on the individual's overall surgical experience.

Changes in the text: We have added the following: "While the same credentialing pathway of online training, simulation modules, and proctored cases applies to all who are adopting the robotic platform, the number of required proctored cases may differ depending on overall surgical experience (e.g. an experienced minimally invasive surgeon versus a graduating fellow)." [lines 178-181]

Comment 2: The very last sentence before the conclusions, implies that robotic lobectomy may reduce pain compared to VATS, do either of the two papers you reference, or any other study actually demonstrate this?

Reply 2: We appreciate this issue being brought to attention. Indeed, the papers referenced do not actually demonstrate reduced pain with robotic lobectomy compared to VATS, and many papers seem to report similar postoperative pain between the two approaches. We have omitted this statement.

Changes in the text: We have removed the following: "..and when coupled with optimizing postoperative pain management." [line 260]