



The posterior approach to robotic-assisted right upper lobectomy

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In this report, Dr. Cheng and colleagues from Shanghai Chest Hospital demonstrate a very elegant robotic-assisted right upper lobectomy and lymph node dissection in a patient who presented with lung cancer and clinically positive N2 disease, but refused staging or neoadjuvant therapy. The authors are very experienced surgeons with a high volume of robotic-assisted thoracic cases at one of the busiest thoracic hospitals in the world. Their technique utilizes the third-generation robotic platform (da Vinci S, Intuitive Surgical, Sunnyvale, California, USA) and they opt to use a three-arm technique with a utility incision for the bedside assistant in the anterior 4th intercostal space. The authors use a wound protector for this incision and do not insufflate CO₂. According to the American Association for Thoracic Surgery (AATS) consensus on robotic-assisted lobectomy nomenclature, this is an example of an RAL-3 technique (1).

The accompanying video shows a very clean and precise dissection in this challenging case and demonstrates the advantages of having wristed robotic instruments with very stable and smooth movements. In the video, one major advantage of the robotic platform that cannot be well appreciated is the three-dimensional high definition video. The choreography of the lobectomy is quite efficient by minimizing the number of times the lung is flipped back and forth, which is a major source of inefficiency during a case. As the authors note, all surgeons should strive to minimize the number of lung flips during the course of a lobectomy. Nonetheless, unlike with video-assisted thoracic surgery (VATS), a robotic approach is typically more forgiving in allowing the surgeon to approach the lobectomy from a variety of different approaches, whether from the front,

back, or fissure diving.

Dividing the bronchus before the truncus artery or superior pulmonary vein using a posterior approach to a right upper lobectomy is becoming increasingly popular amongst robotic thoracic surgeons. Even in the absence of bulky hilar nodes or previous radiation, proponents of the posterior approach believe that the truncus artery is less likely to be injured when it is oriented in a more vertical manner, as opposed to the more horizontal orientation approaching it anteriorly. In this case, the surgeons dissect precisely between the bulky nodes and the bronchus to create a plane for allowing division of the bronchus, nicely demonstrating this technique. In cases with a challenging hilum, the posterior approach is a very useful option to consider.

There is a great deal of variability in the technical nuances of robotic-assisted lobectomy. One of the major variations is in the number of arms employed. A three-arm technique is feasible when there is a reliable and skilled bedside assistant; however, for most robotic thoracic surgeons, a four-arm technique allows full control of lung retraction. Next, the use of a robotic stapler with the fourth-generation robotic platform (da Vinci X or Xi) is another option that most surgeons utilize. Again, the rationale is that surgeons who do not have a skilled bedside assistant prefer to control the stapler robotically under his or her direction. The use of insufflated CO₂ is another variation that is employed by most surgeons. The pressure setting of 6–8 mmHg is generally well tolerated by patients and has several advantages, such as increasing the space in the chest, minimizing minor oozing, and facilitating the dissection planes along the vessels or during the lymph

node dissection. An area of debate is in the choice of dissecting instrument between monopolar and bipolar cautery. The majority of surgeons prefer to use a bipolar grasper rather than a monopolar instrument due to the ability to control the energy dissection on the pulmonary artery, lack of electrical shorting as commonly happens with monopolar energy, and the ability to spread during the dissection. Finally, the location of the assistant incision is variable amongst surgeons. In contrast to the authors' technique of placing this incision high and anterior, many surgeons prefer to place an assistant port inferiorly as low by the diaphragm as possible. Generally, with the use of a zero-degree camera, there is sufficient space for the bedside assistant to work. One advantage of this assistant port location is that stapling angles are generally more favorable, especially if this is done by a bedside assistant.

In summary, Dr. Cheng and colleagues are to be commended for demonstrating an exceptionally clean and efficient robotic-assisted right upper lobectomy and lymph node dissection of a difficult case with bulky N2 disease. While there are several variations in the techniques and

instruments preferred for these procedures by different surgeons, the most important result is the outcomes for our patients, and this is ultimately dependent on surgeon experience and the upholding of sound principles of oncologic surgery.

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Footnote

Conflicts of Interest: DS Oh was employed part-time by Intuitive Surgical as an associate medical officer for research.

References

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