Overview of robotic surgery for lung cancer

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Robotic-assisted thoracic surgery began in 2002 utilizing the da Vinci Surgical System (Intuitive, Sunnyvale, California) and has since increased in adoption (1). In 2017, 17.5% of lobectomies were performed robotically up from 3.4% in 2010 (2,3). Although some controversy remains on the specific improved benefit of robotic-assisted thoracic surgery over video-assisted thoracoscopic surgery (VATS), it has demonstrated non-inferiority (2). When robotic surgery was compared to a VATS cohort, it demonstrated similar intraoperative complications, postoperative complications, 30-day mortality, hospital length of stay, and patient discharge condition (2). Although robotic lobectomies are longer, they also carry a significantly decreased conversion rate to open at 6.3% (2). Some of the published discrepancy in operative time may be attributed to the learning curve of surgeons adopting robotic-assisted thoracic surgery. Additionally, there is a paucity of data covering robotic-assisted thoracic surgery and most of the present single institution data is not generalizable. Similarly, national data sets capturing robotic-assisted thoracic surgery operations may exclude or be missing details needed for appropriate comparisons also contributing to the discrepancy. Cost of use of robotic-assisted thoracic surgery often seems to be the main concern by many institutions over its individual adoption into practice. Regardless of the above factors, since its utilization for chest surgery, robotic-assisted thoracic surgery has only been increasing.

VATS traditionally has limitations during the operation due to the two dimensional camera as well as non-articulating instrumentation (3). Due to these operative restrictions of VATS, robotic-assisted thoracic surgery has increased in popularity due to its improved manual dexterity and three-dimensional optics. These advances permit faster minimally invasive innovation in thoracic surgery. Not only does it allow standard thoracic operations to be minimally invasive, it also pushes the envelope on what advanced operations can be performed with minimally invasive techniques. Patient interest in robotic-assisted thoracic surgery is on the rise as the novelty of technique and integration of a robot into surgery is both attractive to patients and marketable. Although the use of the da Vinci robot can be incorporated into all areas of thoracic surgery, this issue will focus on its utilization in lung cancer.

This focused issue is directed to thoracic surgeons who are interested in starting a robotic practice or are currently using the da Vinci robot as part of their practice. Due to the breadth of literature on robotic-assisted thoracic surgery, experts in the field of robotic thoracic surgery were selected to consolidate applicable knowledge for the practicing surgeon. Each topic will concisely, yet comprehensively, summarize our current literature on each topic. The goal is for these chosen topics to serve as a compilation and guide, navigating surgeons through our current robotic knowledge in one series of publications. To address this focus, topics related to robotic surgery include: specific techniques, access to robotic surgery, oncologic outcomes, cost, transitioning to a robotic practice, resident education, ethics of robotic surgery, and anesthetic considerations.

Footnote

Provenance and Peer Review: This article was commissioned

by the editorial office, *Video-Assisted Thoracic Surgery* for the series "Robotic Surgery for Lung Cancer". The article did not undergo external peer review.

Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/vats.2020.01.08). The series "Robotic Surgery for Lung Cancer" was commissioned by the editorial office without any funding or sponsorship. SCW and NSL served as the unpaid Guest Editors of the series. SCW and NSL reports non-financial support from Intuitive Surgical, outside the submitted work. The authors have no other conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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