Editorial

Digital chest drainage systems are beneficial for robotic-assisted lung resections

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In the modern era of rapid innovation and product development, medical device companies put forth to physicians and surgeons a myriad number of novel technologies with varying degrees of usefulness. In particular, technologies which complement video-assisted thoracoscopic surgery (VATS) procedures have had significant investment in research and development. Those products that survive the market are usually ones that either improve patient outcomes, reduce the burden of work on the physicians, and/or offer a considerable cost-savings to the health institutions. The digital chest drainage system is one such attempt at addressing all three of these points.

While traditional chest drainage systems rely on intermittent qualitative judgements from the surgeons regarding the appropriateness of chest tube removal, digital drainage systems offer continuous quantitative assessments of both drainage amount and air leak severity. These quantitative assessments purportedly allow for more informed decisions on the timing of chest tube removal and offer a streamlined approach to removal that can be performed by trained, non-surgeon staff. Prior studies have found that in video assisted thoracoscopic lung resections, digital chest drainage systems have allowed for shorter duration of chest tube drainage, which in turn leads to shorter length of stay (1,2). The significantly higher upfront cost of a digital drainage system is offset by the reduced hospital cost incurred from shorter postoperative stay. In our practice, the digital drainage system has been helpful in reducing the length of stay by one day in select patients. The absence of air leak has even allowed for chest tube removal on the afternoon or evening or surgery in some lower risk cases, such as limited wedge resections. Thus, utilizing digital drainage systems following VATS lung resection achieved all the goals of improving patient outcomes by reducing length of hospitalization, reducing the burden on surgeons by providing quantitative assessments streamlining tube removal, and lowering overall cost to the health system by significantly reducing length of stay.

Given the increased upfront cost of lung surgery performed with robotic assistance compared to either non-robotic thoracoscopic or thoracotomy approaches, the need to offset these increased costs is even more critical. In this issue of the *Journal of Thoracic Disease*, Jacobsen *et al.* (3) aimed to examine the utility of digital chest drainage systems after robotic-assisted pulmonary lobectomy. Similar to studies on non-robotic VATS procedures, the authors found that they had a nearly one day decrease in chest tube duration and one day reduction in overall length of stay. The strength of this study is in the specific focus on robotic procedures, which has not been previously published. As the authors state, the incidence of robotic lung surgery is increasing rapidly. The significant investment into robotic systems and increased cost of disposables create considerable cost increase but with similar outcomes to standard VATS procedures (4). In order to remain sustainable from a cost perspective, robotic surgery needs innovations such as those offered in this study to reduce the overall monetary impact

of these procedures.

The current study suggests digital drainage systems are a safe and effective adjunct to robotic assisted lung surgery, but the generalizability of its findings is limited by the single surgeon and single center design. Furthermore, many thoracic surgeons are comfortable discharging patients home with chest tubes if air leaks persist post operatively, and it is possible this practice could offset any cost benefit from a digital drainage system. Regardless, cost savings in the context of quality outcomes is an issue of which thoracic surgeons are acutely aware. It will be interesting to see if results following utilization of digital drainage systems after robotic surgery in the setting of a prospective trial will concur with the current study's findings.

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Footnote

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References

1. Miller DL, Helms GA, Mayfield WR. Digital Drainage System Reduces Hospitalization After Video-Assisted Thoracoscopic Surgery Lung Resection. Ann Thorac Surg 2016;102:955-61.
2. Zhou J, Lyu M, Chen N, et al. Digital chest drainage is better than traditional chest drainage following pulmonary surgery: a meta-analysis. Eur J Cardiothorac Surg 2018;54:635-43.
3. Jacobsen K, Talbert S, Boyer JH. The benefits of digital drainage system versus traditional drainage system after robotic-assisted pulmonary lobectomy. J Thorac Dis 2019;11:5328-35.
4. Swanson SJ, Miller DL, McKenna RJ Jr, et al. Comparing robot-assisted thoracic surgical lobectomy with conventional video-assisted thoracic surgical lobectomy and wedge resection: results from a multihospital database (Premier). J Thorac Cardiovasc Surg 2014;147:929-37.