



More power, less complications?—clinical and economic outcomes of new powered endoscopic staplers

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Comment on: Miller DL, Roy S, Kassis ES, *et al.* Impact of Powered and Tissue-Specific Endoscopic Stapling Technology on Clinical and Economic Outcomes of Video-Assisted Thoracic Surgery Lobectomy Procedures: A Retrospective, Observational Study. *Adv Ther* 2018;35:707-23.

Received: 21 August 2018; Accepted: 04 September 2018; Published: 12 September 2018.

doi: [10.21037/vats.2018.09.02](https://doi.org/10.21037/vats.2018.09.02)

View this article at: <http://dx.doi.org/10.21037/vats.2018.09.02>

The use of surgical tissue stapler is so widespread that is difficult to imagine a thoracic surgery procedure without using one. The growth of minimally invasive surgery has gone hand in hand with the development of new stapling devices. The Hungarian Hümer Hütl, the “Paganini of the Knife”, was the first surgeon who in 1908 used a stapler in the operating room during a gastric surgery procedure (1). Nevertheless, the current staplers arise from Russian models developed during the Second World War when military surgeons needed devices that could facilitate surgery reducing the operating time.

Staplers, indeed, are very useful in order to perform transection of lung parenchyma, blood vessels or bronchi but, even in expert hands, it is possible to develop complications such as air leak or bleeding. The development of new technologies in the last decade has led to the creation of powered staplers, which incorporate a generator for both firing and cutting, in order to provide more reliability during staple line formation, not relying on surgeons' firing time, and stability, especially during thoracoscopic procedures. A lower percentage of complications would lead to better outcomes and patient satisfaction, decreased hospital length of stay associated with reduced healthcare costs. Nevertheless, the supposed cause-and-effect relationship between powered staplers and outcomes has not been established.

We read with great interest the study of Miller and colleagues published in April 2018 in “Advances in Therapy”. The authors conducted a retrospective, observational study comparing hospital resource use, costs, and complications

of video-assisted thoracoscopic surgery (VATS) lobectomy where powered versus manual endoscopic surgical staplers were used. They reviewed 3,759 patients who underwent an elective VATS lobectomy during a period of 57 months (from 2012 to 2016). The study is well designed presenting a very large number of patients from the Premier Healthcare Database. The authors reported that the use of powered staplers was associated with a shorter length of stay (LOS), lower rates of hemostasis-related complications and reduced hospital costs.

Even if the authors suggest that the shorter LOS could be related to the lower rates of bleeding complications (these linked, in turn, to the use of the powered staplers according to the authors), there are many factors that can influence it but they are not clearly reported between the two groups. In the air leak complications group, results are reported as ongoing leak and/or postoperative pneumothorax. Such classification, in our opinion, is misleading as small postoperative pneumothorax is pretty common after surgery and not really a contraindication to discharge.

The rate of hemostasis-related complications is pretty high (between 8.5% in the powered staplers' group and 16% in the manual staplers' group) when compared to the published literature (2,3). It is unclear whether the bleeding is from vascular stumps or from torn branches during firing. In the latter case powered staplers might help to reduce such eventuality.

Last but not least, especially in a time of particular focus on healthcare costs, the use of powered staplers was not associated

with higher hospital costs. At first sight, the higher cost of powered staplers might induce some administrators to force the use of cheaper alternatives. In fact, the opposite is true: in spite of higher costs powered staplers deliver more reliable results. Correct staple line formation is always guaranteed, as the machine provides the correct speed for staples to open and if the tissue is too thick for the reload the machine won't fire, alerting the surgeon of the need to use a thicker reload. Moreover, powered staples allow single hand use, more stability and control versus manual staplers, thus reducing the risk of iatrogenic injuries. Lastly newer models come with a display that shows tissue stress, thus alerting the surgeon of potential weak areas which could be repaired during the initial surgery, rather than with a second procedure.

Besides some limitations caused by the design of the study (retrospective and non-randomized), this paper is a great contribution in order to start a critical discussion by focusing the impact of using new technology devices on clinical and economic outcomes after thoracic procedures.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned and reviewed by the Section Editor Federico Raveglia (Department of Thoracic Surgery, ASST - Santi Paolo e Carlo, University of Milan Medical School, Milan, Italy)

Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/vats.2018.09.02>).

doi: 10.21037/vats.2018.09.02

Cite this article as: Minervini F, Scarci M. More power, less complications?—clinical and economic outcomes of new powered endoscopic staplers. *Video-assist Thorac Surg* 2018;3:39.

[org/10.21037/vats.2018.09.02](http://dx.doi.org/10.21037/vats.2018.09.02)). MS serves as an unpaid editorial board member of *Video-Assisted Thoracic Surgery* from Mar 2017 to May 2019. The other author has no 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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