Commentary on Varban et al.: Far from Standardized: Using Surgical Videos to Identify Variation in Technique for Laparoscopic Sleeve Gastrectomy

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CONSIDERABLE VARIATION in surgical technique exists among surgeons from different training backgrounds, institutions, and specialties. Because there are always new, perhaps better techniques to learn, this variation challenges surgeons to innovate, and helps make surgery an exciting field. However, variation in technique and equipment can also make it difficult to know which techniques improve outcomes and which have no impact—or are potentially harmful. In this issue of *The Journal of Laparoendoscopic and Advanced Surgical Techniques*, Varban et al.¹ explore variation in operative techniques among a group of bariatric surgeons performing laparoscopic sleeve gastrectomy (LSG), the most commonly performed bariatric operation in the United States.² Currently, scant objective evidence exists to guide bariatric surgeons toward an optimal sleeve gastrectomy technique.

The first consensus effort to standardize the procedural aspects of LSG was published by The International Sleeve Gastrectomy Panel in 2012.³ The panel, comprising surgeons from 24 institutions across 11 countries, recommended using a bougie to create the sleeve, completely mobilizing the fundus before gastric transection, and oversewing the staple line. Although these guidelines were an important first step toward the standardization of the LSG technique, considerable uncertainty remained regarding appropriate sleeve sizing, staple height, location of first staple firing, the impact of staple line reinforcement on the leak rate, and the order of sleeve creation and hiatal hernia repair. Furthermore, the effect of these steps on postoperative outcomes, including weight loss, comorbidity resolution, and complications, remained unclear.

One compelling way to investigate these questions is by using surgical video to assess the influence of operative technique on surgical outcomes. The merits of utilizing videotaped surgical performance to objectively measure operative skill were recently demonstrated by Birkmeyer et al. in a sentinel 2013 publication, which found an association between greater surgeon skill and fewer postoperative complications in a cohort of laparoscopic Roux-en-Y gastric bypass patients.⁴ Glarner et al. have shown that it is feasible to

use surgical video to quantify technical skill in open operations.⁵ Video-based surgical review has also been studied as an educational tool for surgeons to obtain feedback on their intraoperative performance.⁶ However, quantification of the variability in technical aspects of laparoscopic surgery has yet to be investigated.

In their study of 22 unedited videos submitted by 20 bariatric surgeons in the Michigan Bariatric Surgery Collaborative, Varban et al. characterized the intersurgeon variability that existed in LSG technique and timing. Technical aspects of the case were described, including the length of time required for specific steps and the technique surgeons used when completing those steps. These steps were performed during the “pre-stapling” period (division of vasculature along the greater curve of the stomach and fundus mobilization), the “stapling period” (sleeve creation), and the “poststapling period” (staple line management). Completion and timing of a hiatal hernia repair were also described. Video analysis was performed by a single surgeon who was blinded to the operating surgeons.

Investigators found significant differences in the time it took to complete each stage of the procedure. For example, surgeons spent an average of 8 minutes on the hiatal hernia repair, but individual times ranged from 1 to 26 minutes. In addition, there was notable variation in the type of hiatal hernia repair performed. More than half of the cases involved a posterior repair (55%), whereas 27% and 18% involved an anterior repair or both, respectively. Approximately half of the surgeons performed the hiatal hernia repair before sleeve gastrectomy, whereas the other half performed it after. Ten different permutations of staple height and buttress material were used during the division of the stomach. The most common staple technique (green load with buttressing) was used only one-third of the time. Management of the sleeve staple line also varied. Approximately half of the surgeons performed an omentoplasty, one-third used fibrin sealant, and 1 in 10 oversewed the staple line. Leak testing, endoscopy, and intraabdominal drain placement were performed in various ways.

Although the striking differences in technique are well documented by Varban et al., critical questions remain. Does the

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timing and technique of hiatal hernia repair have an effect on outcomes? Does the type of staple line reinforcement technique change the bleed or leak rates? Is there an ideal staple height for patients, and does it need to be tailored to stomach thickness? What are the cost implications of each of these steps? To address these questions, prospective trials would be helpful, as well as further analysis of state collaborative and national registry data, such as the Metabolic and Bariatric Surgery Quality Improvement Program. This work may help clarify what the “gold standard” LSG should look like, or it may reinforce the notion that variation may be occurring because certain steps do not affect the important outcomes.

Although the work of Varban et al. is novel, and represents an important contribution to the literature, there are several limitations. First, only one surgeon assessed the videos. It is possible that additional reviewers would have quantified the duration of steps differently. Second, the generalizability of these findings to other settings is unknown, because surgeons in the Michigan Bariatric Surgery Collaborative may practice differently than surgeons in other settings. Finally, the authors did not assess variability in all components of the operation. Factors such as access to the peritoneal cavity, port placement, distance from the pylorus to the sleeve staple line, and specimen removal technique could also impact outcomes.

In conclusion, Varban et al. provide valuable insight into the extent to which technical variability exists in LSG. Given the widespread ability to record video in the operating room, this methodological approach is a powerful tool for studying surgical variation and its impact on patient outcomes. Although the implications for patient outcomes have yet to be determined, this work is an important first step to guide subsequent research efforts and may prompt other bariatric surgeons to review their own techniques. In an era of evidence-based medicine, surgical video review gives us the opportunity to define evidence-based surgical technique and optimize the training and education of surgeons.

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References

1. Varban O, Niemann A, Stricklen A, Ross R, Ghaferi AA, Finks JF, Dimick JB. Far from standardized: Using surgical videos to identify variation in technique for laparoscopic sleeve gastrectomy. *J Laparoendosc Adv Surg Tech A* 2017; 27:761–767.
2. Estimate of Bariatric Surgery Numbers, 2011–2015. American Society for Metabolic and Bariatric Surgery, 2016. 2017. <https://asmbs.org/resources/estimate-of-bariatric-surgery-numbers>. (accessed May 5, 2017).
3. Rosenthal RJ, Diaz AA, Arvidsson D, et al. International sleeve gastrectomy expert panel consensus statement: Best practice guidelines based on experience of >12,000 cases. *Surg Obes Relat Dis* 2012;8:8–19.
4. Birkmeyer JD, Finks JF, O'Reilly A, et al. Surgical skill and complication rates after bariatric surgery. *N Engl J Med* 2013;369:1434–1442.
5. Glarner CE, Hu YY, Chen CH, et al. Quantifying technical skills during open operations using video-based motion analysis. *Surgery* 2014;156:729–734.
6. Greenberg CC, Dombrowski J, Dimick JB. Video-based surgical coaching: An emerging approach to performance improvement. *JAMA Surg* 2016;151:282–283.

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