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Charting the learning curve: enhancing robotic gastrectomy outcomes over 5 years

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Dear Editor,

Robotic gastrectomy is an emerging modality in the management of gastric cancer[1–6]. A recent study by Xue *et al.*[7] published in the *International Journal of Surgery* presents an in-depth analysis of the learning curve and optimization of robotic gastrectomy. This study conducted over 5 years with a substantial cohort, offers valuable insights into the evolving landscape of minimally invasive surgery for gastric cancer.

One of the pivotal findings of the study is the significant improvement in short-term outcomes with the advancement of the learning phase[7]. The authors divided the learning curve into three phases: patients 1–100, 101–250, and 251–527. They observed a marked decrease in complication rates, shorter recovery times, and reduced medical-related costs as surgeons gained more experience[7]. This trend underscores the importance of surgical experience and the potential benefits of centralizing complex surgical procedures in high-volume centers. Also, the study introduces an optimized 10-step robotic lymphadenectomy procedure, which appears to contribute to better perioperative outcomes[7]. The detailed procedural enhancements provide a valuable framework for new surgeons entering the field of robotic gastrectomy. This optimized technique could serve as a reference, particularly in regions with high gastric cancer prevalence, such as China, Japan, and Korea. The precise steps and technical adjustments outlined in the study can help standardize robotic gastrectomy and enhance the reproducibility of successful outcomes. Another significant finding is the increase in the number of examined extraperigastric lymph nodes with the progression of the learning curve[7]. Accurate lymph node dissection is crucial for staging and prognosis in gastric cancer. The study demonstrates that thorough lymphadenectomy improves with surgical experience, which is essential for achieving oncological efficacy. This insight highlights the need for meticulous surgical training and continuous evaluation of technique to ensure comprehensive cancer treatment.

Despite the promising evidence from this study, there are few limitations. First, one of the primary limitations of the study is its retrospective design, which inherently introduces potential biases and confounding factors. Future studies should aim for a prospective design to minimize these biases and provide a more robust evaluation of surgical outcomes. Second, the study's patient population consisted of individuals treated by surgeons with extensive laparoscopic experience. This selection may not fully represent the learning curve for surgeons without such a background. Including a more diverse group of surgeons in future research could provide a broader perspective on the learning curve and its implications. Third, the study primarily focuses on short-term outcomes, such as complication rates and hospital stay. While these are important metrics, long-term outcomes, including survival rates, quality of life, and functional recovery, are crucial for a comprehensive assessment of surgical efficacy. Future studies should incorporate longer follow-up periods to evaluate the sustained benefits and potential drawbacks of robotic gastrectomy. Fourth, the patient cohort in this study had a relatively low mean body mass index (BMI), typical of East Asian populations. Given the higher BMI prevalent in Western populations, the findings may not be directly applicable. Future research should include diverse populations with varying BMIs to assess the generalizability of the optimized techniques and outcomes observed in this study.

Robotic gastrectomy can be integrated into routine surgical practice through careful consideration and meticulous planning. First, the study's findings emphasize the importance of structured training programs for robotic surgery. Surgical education should incorporate the optimized 10-step lymphadenectomy procedure and provide hands-on training to help new surgeons overcome the initial learning curve. Simulation-based training and mentorship from experienced surgeons can further enhance the proficiency of surgeons in robotic gastrectomy. Second, given the correlation between surgical volume and improved outcomes, there is a compelling case for centralizing complex procedures like robotic gastrectomy in high-volume centers. Such centers can provide the necessary infrastructure, expertise, and support for surgeons to perform these procedures safely and effectively. Centralization can also facilitate better data collection and

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continuous improvement of surgical techniques. Third, implementing a system for continuous evaluation and feedback is crucial for sustaining high standards in surgical practice. Surgeons should regularly review their outcomes, compare them with established benchmarks, and identify areas for improvement. Multidisciplinary team meetings and peer reviews can foster a culture of continuous learning and quality enhancement. Fourth, the benefits of robotic surgery, such as enhanced precision and better ergonomic conditions for surgeons, should encourage broader adoption of this technology. Hospitals and surgical centers should invest in robotic systems and provide the necessary training for their staff. As the technology evolves, staying updated with the latest advancements and integrating them into practice will be essential for maintaining surgical excellence.

In conclusion, robotic gastrectomy can be successfully employed in management of gastric cancer. By addressing the limitations and incorporating the findings into surgical practice, we can improve the care for patients with gastric cancer. Future research should continue to explore the long-term benefits and expand the applicability of these techniques across diverse populations.

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