

# Minimising patient harm whilst gaining surgical proficiency

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## Dear Editor,

We thank you for the opportunity to respond this editorial by Dr. Marino and Dr. Weksler, regarding our recently published study (1). Drs. Marino and Weksler make several important inferences from our study, which have implications when considering training in esophageal cancer surgery.

A previous study based on our national Swedish cohort study of surgery for esophageal cancer showed that surgeon experience is an important prognostic factor, even after controlling for hospital volume (2). In the present study we were able to estimate the length of proficiency gain curves in relation to mortality within various time points after surgery. A shorter length of proficiency gain curve was revealed for short-term mortality and a longer length with long-term mortality. This may be a function of the development of the individual surgeon from prioritizing surgical safety to more focus on oncological quality of the surgery as they gain more experience.

Drs. Marino and Weksler rightly suggest that our study fails to capture the level of training background prior to initiating surgery for esophageal cancer, which is an important consideration at an individual level when trying to form policy for surgical training. All surgeons participating included in this study were attending, consultant or independent practitioners, and thus had completed their training and had vast experience of other gastrointestinal cancer procedures before performing esophagectomy independently. The novelty of this study is that despite being considered fully competent in terms of completions of training, we were able to show that there still is a proficiency gain curve that adversely affects patient outcomes during the early part of their independent practice when performing esophagectomy for cancer.

To account for changes in case selection, all CUSUM analyses were risk adjusted, by potential confounders, including age, sex, tumor histologic subtype, pathological tumor stage, use of neoadjuvant therapy, and individual medical comorbidities. As Drs. Marino and Weksler rightly suggest there may have been improvements in other non-surgical areas that could have contributed to the changes seen. As case number is a function of time this cannot be distinguished using RA-CUSUM analysis. However, as the start of the different case series for each individual surgeon was evenly distributed throughout the dataset we feel it is not responsible for the proficiency gain curves demonstrated.

The focus of this editorial and our publication is open esophagectomy, however the findings of this study may have wider implications for surgical oncological training in general. In an English dataset, we were for example able to demonstrate proficiency gain curves affecting short-term mortality for the introduction of minimally invasive techniques to treat esophageal and colorectal cancer (3).

There is a growing body of evidence to suggest that there is a need for structured national training or mentorship programs in high-risk cancer surgery, to minimize the adverse effects of surgical learning upon patient outcomes. However, the exact make-up and structure of these programs is the subject of much debate and remains very challenging to design. The key issue at hand is to prevent patient harm as surgeons gain experience in new surgical techniques. The results of our study although expected are alarming given the magnitude of change in mortality as surgeons progress through their proficiency gain curve.

A good example of a structured training program is the National Training Program for Laparoscopic Colorectal Surgery in England (LAPCO) (4). In an era where many

types of oncological surgery are being increasingly performed with minimally invasive techniques, this provides an opportunity for video assessment. More sensitive techniques including Observational Clinical Human Reliability Assessment (OCHRA) can be used to identify potential errors in the surgical technique before they potentially manifest into adverse events to patients (5).

In summary, the growing weight of evidence must serve as a stimulus for regulatory bodies including government and surgical societies to ensure safeguards to prevent patient harm as surgeons gain proficiency in new techniques. The safe introduction of independent practice will include competency based training programs with nationally set standards of practice that are designed and implemented by an engaged body of surgical educationalists. Studies such as ours, that demonstrate changes in patient-mortality associated with surgical learning, should encourage and drive this process of program development forward.

Kind regards

Sheraz R. Markar and Jesper Lagergren

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### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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