

LETTER TO REVIEWERS

Manuscript No: 90932, invited editorial.

Title: Quality Assessment of surgery for colorectal cancer. Where do we stand?

Dear Editor,

Thank you for giving us the opportunity to submit a revised manuscript in your esteemed journal. We appreciate the time and effort that you and the reviewers dedicated to our study, and we are grateful for the interesting comments and valuable suggestions you have made to the paper.

In this revised manuscript we have incorporated most of the comments made by the reviewer and highlighted the changes to the text in yellow. Please find below our point-by-point replies and changes to the reviewers' suggestions.

REVIEWER 1

Comment 1: Please talk a little about intraoperative and postoperative outcomes of CME, e.g. one report shows higher overall complication rates with CME and increased intraoperative blood loss.

Answer: Thank you for this remark. Indeed, we should have emphasized more on the perception of increased morbidity and mortality associated with CME as a few reports and a meta-analysis have concluded in the past. Current studies, including three meta-analyses showed however comparable morbidity between CME and non CME surgery, likely due to the fact that from then to now surgeons have become more familiar with CME surgery and probably have better confidence in taking dissection a step forward to the root of the SMV or IMA. We have added a new paragraph describing the above:

A few past reports^{21,22} including a meta-analysis²³, published at the early stages of CME implementation, concluded that CME is associated with more intraoperative blood loss and higher overall morbidity and mortality. These results have been counterargued by updated meta-analyses²⁴⁻²⁶. This shift might be explained by the experience many surgeons have gained over time in the proper technique of CME through published technical notes, books, video-vignettes and courses. Even if CME is associated with more complications, if one does not perform CVL in early cancers to gain confidence, he will likely have difficulty performing CVL in more advanced cancers with positive apical lymph nodes where oncological quality surpasses risks of complications.

Comment 2: Besides these familiar surgical procedures, how about other emerging perspectives, e.g. applying artificial intelligence (AI) and computer vision (CV) for quality assurance.

Answer: Thank you for your suggestion. In the revised version we have added a new full paragraph discussing the implication AI could have in increasing surgical quality through computer guided surgery, mapping of vascular networks, guiding lymph node dissection and color-coding of dissection planes:

More so, as minimally invasive surgery is evolving, once it becomes more accessible, we will surely witness a wide adoption of robotic surgery over laparoscopy as it has clear benefits and it may increase the confidence of surgeons to adopt CME²⁷, when operating with a more comfortable and precise platform. Robotic surgery seems to have better lymph node yields, and this can be explained by the more stable and precise dissection one can maintain over the SMV when performing CVL compared to standard laparoscopy²⁸. Another major advantage of robotic surgery is the ease of artificial intelligence (AI) integration within its software. AI will naturally make its way into colorectal surgery and a main contribution would be to encompass quality markers into an AI guided robotic surgery module. Defining embryological planes through color-coding is already proven to aid in CME dissection²⁹. Indocyanine-green (ICG) is becoming a standard approach for assessing micro-perfusion³⁰ and has been used with plausible results for guiding extended lymphadenectomy in CME colectomies in the GREENLIGHT trial³¹. Preoperative anatomical mapping of SMA and SMV branches on CT scans is a strong recommendation for improving operative time and reducing the risk of intraoperative vascular injuries^{4,32}. Why not have all these tools mixed in a state-of-the-art AI software that can provide real-time integrated mapping of dissection planes, vasculature, and lymph node distribution, thus boosting surgeons' performance in terms of surgical quality? It is early to say, but realistic indeed.