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CORRESPONDENCE

Increased long-term mortality after open colorectal cancer surgery: a multicentre population-based study. Response to the letter of Mroczkowski et al.

Mroczkowski et al. question whether our claim of increased mortality after open surgery can be made based on the presented data. In the following paragraphs we respond to the points of criticism and elaborate on why the data do, in fact, support the conclusion of this study.

It is true that in the final year of the study the percentage of open surgery was very low. However, this study spanned a period of almost 10 years and the analysis was conducted on the entire cohort of 1298 patients in the open group and 3233 patients in the laparoscopic group. On the whole we believe that the analysis is adequate due to the extensive exclusion criteria, adjustment for confounders and the use of several statistical models and sensitivity analyses. Of course, limitations will always remain in a retrospective study, such as surgeon judgement as a factor in decision-making which can lead to confounding by indication and is extremely difficult to account for in a retrospective manner.

We agree that the competency in open surgery should be preserved as conversion to open surgery or primary open surgery is necessary under certain circumstances, but it should not come at the cost of increased mortality and morbidity and a middle ground should be found.

Mroczkowski et al. [7] state that the paper does not describe the process of adjustment for confounders; however, this is clearly stated in the statistical paragraph and involves a multivariable Cox regression model and a mixed-effects Cox regression model with variables that were chosen based on known risk factors from the literature [1–3]. As is the case in many retrospective studies, the cohorts have significant differences, which is why we used two different statistical models as well as a sensitivity analysis. The results of these analyses were statistically significant and comparable.

Contrary to the statements of the authors, short-term adverse effects of open surgery have been extensively reported in randomized controlled trials in the *British Journal of Surgery* and in nationwide registries [4–6]. Unfortunately, we did not have data regarding disease-free survival and the mechanism behind the difference in observed long-term mortality cannot be elucidated based on our data.

Mroczkowski & Zajdel [7] question the plausibility of the presented data; however, the authors misinterpreted the Kaplan–Meier

graph. The numbers at risk stated in Figure 2 only slightly decrease after each time interval due to death of patients. They primarily decrease due to loss of follow-up. To clarify, after 3 years 927 patients in the open group were alive and not lost to follow-up. Therefore, conclusions with regard to survival can only be made from the graph itself and the stated percentages of 37% and 22% mortality in the text are accurate.

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