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Du, Jing; Plas, Matthijs; Absalom, Anthony; Leeuwen, Barbara; Bock, Geertruida de

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The association of preoperative anxiety and depression with neurocognitive disorder following oncological surgery

We appreciate the interest in our work and the opportunity to respond to the comments and matters raised by Xiao et al.¹ In this study, we evaluated the association between preoperative anxiety and depression with neurocognitive disorder following oncological surgery.² We defined neurocognitive disorder as a $\geq 25\%$ decline in the performance scores 3 months after surgery, compared with the baseline score (in at least two of the five cognitive performance tests). Xiao et al are correct that the research criteria used in our study for the postoperative neurocognitive disorder (NCD) are not the same as in the Diagnostic and Statistical Manual of Mental Disorders, Fifth edition (DSM-5) criteria. The possible contrast between research criteria and the DSM-5 is the requirement for a cognitive concern in the latter and evidence of functional ability.³ Applying the criteria of DSM-5 might miss high functioning individuals despite the presence of symptoms of cognitive dysfunction.

To adjust for potential confounders, we did a multivariable analysis. Next to preoperative factors (education, comorbidities, etc.), it is known that surgical factors are of great importance in the development of postoperative NCD. In a previous study of our group, it has been shown that surgical procedures with an anesthesia duration of 210 minutes or more (major surgery) are predictive for cognitive decline at 3 months postoperatively.⁴ Furthermore, surgical procedures performed for tumors located intraabdominally are strongly associated with adverse outcomes when compared to less invasive procedures.⁵ Therefore, these risk factors were used reflecting surgical intensity. Still, we agree that a widely used risk factor score reflecting surgical intensity is of surplus-value, once validated in older patients with cancer.

The delirium observation screening scale (DOS) was used to screen for signs of postoperative delirium and patients with a score ≥ 3 until 7 days after surgery were indicated as delirious. When a patient was indicated as delirious by this scale, the patient would be seen by a geriatrician or consultant psychiatrist to apply the DSM-5 criteria. Xiao et al criticized that the criteria for postoperative delirium (POD) should meet the DSM-5 criteria. We feel that as signs of delirium fluctuate throughout the day, using the DSM-5 criteria and depending on the availability of a psychiatrist, delirium is underdiagnosed in clinical practice. The DOS was used as part of regular care in the surgical oncological ward in the UMCG, which holds the advantage of broad coverage and early recognition of delirium. In the research setting, we aimed to evaluate whether these early recognized signs of delirium would be associated with postoperative cognitive decline.

Finally, Xiao et al mentioned that postoperative factors were not included in the models for postoperative NCD and therefore might have influenced results. Due to the sample size and statistical power considered choices for analysis were made and the focus of the current study was mainly on preoperative signs of anxiety and depressions and not necessarily on per- and postoperative factors. Besides, in a previous study of our group, we observed that POD was associated with postoperative NCD while other postoperative complications were not.⁴ Therefore the recognized signs of delirium after surgery were of higher interest. None of the patients in the current study experienced POD as well as postoperative NCD at 3 months after surgery, thus this factor was not included in the analysis.

In summary, it is our hope that further well-designed studies will be conducted to advance our knowledge of risk factors of postoperative NCD and to improve the cognitive outcome of oncological patients after surgical treatment.

Jing Du MSc¹

Matthijs Plas MD²

Anthony Absalom MBChB, FRCA, MD³

Barbara van Leeuwen MD, PhD²

Geertruida H de Bock PhD¹

¹Department of Epidemiology, University of Groningen, University Medical Center Groningen, Groningen, Hanzeplein, The Netherlands

²Department of Surgery, University of Groningen, University Medical Center Groningen, Groningen, Hanzeplein, The Netherlands

³Department of Anesthesiology, University of Groningen, University Medical Center Groningen, Groningen, Hanzeplein, The Netherlands

Correspondence

Barbara van Leeuwen, MD, PhD, Department of Surgery, University of Groningen, University Medical Center Groningen, HPC BA31, P.O. Box 30.001, 9700 RB Groningen, The Netherlands.

Email: b.l.van.leeuwen@umcg.nl

ORCID

Matthijs Plas <http://orcid.org/0000-0002-3994-7213>

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