

Letters

COMMENT & RESPONSE

Prehabilitation vs Postoperative Rehabilitation for Frail Patients

To the Editor Interest in surgical prehabilitation programs to improve postoperative patient-related and treatment-related outcomes is growing since our 2006 *JAMA* publication.¹ Despite accumulating evidence about its effectiveness to improve preoperative physical fitness, there seems to be inconclusive and opposing evidence concerning its effect on postoperative outcomes.² The trial of Carli et al³ significantly adds to this literature by demonstrating that prehabilitation in (pre)frail patients opting for resection of colorectal cancer did not reduce postoperative complications. Although suitably focused at including less physically fit (prefrail and frail) patients undergoing colorectal cancer resection, an alternative strategy might be more appropriate to select those patients who really need prehabilitation. Because preoperative aerobic performance has consistently been reported to be independently associated with complications following elective colorectal surgery,⁴ performing a cardiopulmonary exercise test to objectively measure preoperative aerobic fitness would probably be the superior risk screening strategy. Perioperative metabolic demand is significantly increased depending on the magnitude of the surgical procedure, which needs to be met by the oxygen transport and use system. Patients undergoing major abdominal surgery with a low preoperative aerobic fitness (oxygen uptake <11 mL/kg/min at the ventilatory anaerobic threshold and/or <18 mL/kg/min at peak exercise) have a higher risk of postoperative complications. These patients should therefore be persuaded to participate in preoperative preventive interventions. To maximize participation rate, adherence, and effectiveness in high-risk patients, a preoperative exercise program must be integrated in the perioperative trajectory and performed in the patient's preexistent living context, thereby (partly) supervised by a competent community physical therapist and involving the patient's informal support system. Sufficient progress in aerobic fitness should be the main outcome parameter. Hence, frequent monitoring of training progress is important to motivate responders, to timely identify nonresponders, and to subsequently make necessary program adjustments concerning training frequency, intensity, and duration. Regarding the often short time before surgery, high-intensity interval training seems an effective method to preoperatively improve aerobic

fitness.⁵ Simultaneously, maintaining or even increasing normal daily physical activity levels and meeting other potential needs, such as nutritional and psychological support, appears essential. Future prehabilitation trials must focus on patients with a low preoperative aerobic fitness based on evidence-based cutoff values, and should aim for (partly) supervised high-intensity prehabilitation programs in the living context of these high-risk patients to lower the hurdle to preoperatively optimize their physical status and to demonstrate the potential of prehabilitation to improve patient-related and treatment-related outcomes.

Bart C. Bongers, MSc, PhD

Joost M. Klaase, MD, PhD

Nico L. U. van Meeteren, PT, PhD

Author Affiliations: School of Nutrition and Translational Research in Metabolism, Department of Nutrition and Human Movement Sciences, Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, the Netherlands (Bongers); Division of Hepato-Pancreato-Biliary Surgery and Liver Transplantation, Department of Surgery, University Medical Center Groningen, Groningen, the Netherlands (Klaase); Care and Public Health Research Institute, Department of Epidemiology, Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, the Netherlands (van Meeteren).

Corresponding Author: Bart C. Bongers, MSc, PhD, Department of Nutrition and Human Movement Sciences, Maastricht University, UNS50, Room G.2.224, PO Box 616, 6200 MD Maastricht, the Netherlands (bart.bongers@maastrichtuniversity.nl).

Published Online: June 17, 2020. doi:10.1001/jamasurg.2020.1801

Conflict of Interest Disclosures: None reported.

1. Hulzebos EH, Helders PJ, Favié NJ, De Bie RA, Brutel de la Riviere A, Van Meeteren NL. Preoperative intensive inspiratory muscle training to prevent postoperative pulmonary complications in high-risk patients undergoing CABG surgery: a randomized clinical trial. *JAMA*. 2006;296(15):1851-1857. doi:10.1001/jama.296.15.1851
2. Thomas G, Tahir MR, Bongers BC, Kallen VL, Slooter GD, van Meeteren NL. Prehabilitation before major intra-abdominal cancer surgery: a systematic review of randomised controlled trials. *Eur J Anaesthesiol*. 2019;36(12):933-945. doi:10.1097/EJA.0000000000001030
3. Carli F, Bousquet-Dion G, Awasthi R, et al. Effect of multimodal prehabilitation vs postoperative rehabilitation on 30-day postoperative complications for frail patients undergoing resection of colorectal cancer: a randomized clinical trial. *JAMA Surg*. 2020. doi:10.1001/jamasurg.2019.5474
4. West MA, Asher R, Browning M, et al; Perioperative Exercise Testing and Training Society. Validation of preoperative cardiopulmonary exercise testing-derived variables to predict in-hospital morbidity after major colorectal surgery. *Br J Surg*. 2016;103(6):744-752. doi:10.1002/bjs.10112
5. Dunne DF, Jack S, Jones RP, et al. Randomized clinical trial of prehabilitation before planned liver resection. *Br J Surg*. 2016;103(5):504-512. doi:10.1002/bjs.10096