Can J Anesth/J Can Anesth (2013) 60:208–209
DOI 10.1007/s12630-012-9830-5

CORRESPONDENCE

The next step: optimizing preoperative functional fitness and nutritional intervention

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Received: 10 October 2012 / Accepted: 9 November 2012 / Published online: 1 December 2012

To the Editor,

I read with great interest the recent case report by Dr. Franco Carli *et al.* describing the prehabilitation and surgical outcome of a frail 88-yr-old patient who underwent a robotic-assisted hysterectomy.[1]

Significant factors in this case included (i) existing mild cognitive impairment; (ii) physical frailty requiring use of a walker for ambulation, only 24% of normal for age with six-minute walk test; (iii) documentation of two previous episodes of postoperative cognitive dysfunction (POCD); and (iv) previous myocardial infarction with ejection fraction $> 60\%$.

In this case, a three-week preoperative intervention consisted of nine home visits by a kinesiologist and two visits each by a nutritionist and a psychologist. This intervention was reported to have contributed to an absence of POCD, a favourable and brief (two-day) postoperative hospital length of stay (LOS), and continued improvement of the patient's physical and psychological status at eight weeks postoperatively.

For the authors to present a more conclusive report, it is important that they elaborate on the following issues:

1. Place an estimate on the dollar figure for the preoperative intervention (nine kinesiologist + two nutritionist + two psychologist visits);
2. Re-evaluate the traditional role of the preoperative assessment unit from preoperative assessment only to preoperative assessment and intervention, especially regarding functional fitness and nutritional status as suggested in the case report and other studies.[2–4]
3. Re-evaluate the traditional requirement of an exercise capacity of four metabolic units (METs) as being adequate for our preoperative patients, not because patients will not survive the surgery, but because they will recover more optimally and potentially with fewer complications. Weinstein *et al.*[2] showed the existence of an inverse correlation between objective exercise capacity and LOS following thoracic cancer surgery. They found that 93% of cases of prolonged LOS were in patients whose exercise tolerance failed to exceed seven METs. In that study, subjects were grouped according to exercise capacity into: poor (< 4 METs), fair (4-7 METs), good (7-10 METs), and excellent (> 10 METs);
4. Preoperative intervention should apply not only to the frail and elderly but also to younger patients with comorbidities who are aerobically unfit. As was shown by McCullough *et al.* in 109 bariatric surgery patients[3] (mean age 46, standard deviation 10) undergoing Roux-en-Y gastric bypass, individuals whose exercise capacity was < 4.5 METs (15.8 $mL \cdot kg^{-1} \cdot min^{-1}$) for maximal oxygen consumption had 16.2% complications perioperatively *vs* 2.8% if capacity was > 4.5 METs.

Funding No funding.

Competing interests None declared.

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Reply

We were greatly interested in reviewing the letter by Dr. Daniel Botha regarding our recent case report entitled "*Prehabilitation to enhance postoperative recovery for an octogenarian following robotic-assisted hysterectomy with endometrial cancer*". He raises several interesting points that we expand on below.

Regarding the actual direct costs of the prehabilitation intervention, it remains important to recognize that hourly fees will likely vary depending on province or territory. Even so, costs for our purposes were as follows: kinesiologist: nine sessions at $45 each; nutritionist: two sessions at $50 each; psychologist: two sessions at $70 each. Hence, the total cost of our intervention was approximately $650. Clearly, there are beneficial effects on functional capacity despite these costs.[1] An important next step in determining costs includes assessing whether these improvements in patient health lead to actual cost savings through such things as reductions in length of hospitalization or burden of care required to manage postoperative delirium.

Preadmission clinics have become commonplace in today's hospitals, and they have reduced the number of cancellations and improved surgical patient flow.[2] Further, similar to the issues with preoperative smoking and alcohol cessation, which ideally occur four to eight weeks prior to surgery, prehabilitation also needs to be carried out a minimum of a few weeks prior to surgery and may require the support of other health care providers, including general practitioners.[3] Although the studies to date are merely proof of concept, eventually, we may need to modify the current preanesthesia clinical model to include earlier assessments so that we can identify and counsel at-risk patients in order to optimize their preoperative status.

Without a doubt, preoperative exercise tolerance < 4 METS is associated with significant morbidity and mortality.[4] Perhaps this cut-off should also be reconsidered. As we continue to optimize patient care by limiting surgical complications, emerging evidence suggests that even greater exercise tolerance is associated with significant reductions in morbidity and mortality and with shortening hospital length of stay.[5]

A final question still surrounds which surgical populations will likely benefit from prehabilitation. Although we have already reported on a single elderly patient and on patients with colorectal cancer, undoubtedly, there are a number of other deconditioned surgical populations that may benefit from our prehabilitation protocol. Nevertheless, these studies are merely proof of principal and will obviously need to be replicated in much larger cohorts.

Despite the promising data from the preliminary prehabilitation studies suggesting substantial health benefits, many questions remain, which reaffirms the need for further investigations.

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Competing interests None declared.

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