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Editorial

Prehabilitation: Another Step Towards the Optimization of Surgical Patients[☆]



La prehabilitación, un paso más en la optimización del paciente quirúrgico

The biological response of the body to an aggression, controlled or otherwise, will depend on its physiological reserve. This physiological reserve, which varies widely among individuals, depends on different factors that are more or less inherent to the patient, such as patient age, associated diseases, reserve of muscle mass and albumin levels.

Although it is a well-known concept presented in the first chapter or so of surgical texts, laparoscopic approaches have made us more aware of its significance. Laparoscopy opened our eyes to a new reality in postoperative patient recovery, with a lower inflammatory reaction and faster postoperative recovery.

This has meant not only a change in the approach of surgeons; anesthesiologists have also faced the challenge of intraoperative changes brought on by laparoscopy. Furthermore, in one way or another, we have all understood the need for closer collaboration for the sake of greater patient benefits.

Since then, we have not stopped investigating and applying perioperative changes that have allowed us to advance towards achieving a common goal: better and faster recovery of our patients.

Since Henrik Kehlet of Denmark introduced the fast-track concept in the 1990s, we have incorporated this concept with progressive acceptance by all healthcare professionals directly or indirectly involved in the surgical process. The perioperative changes that this concept has introduced have allowed us to obtain better postoperative results that most definitely translate into a faster recovery of the patient's baseline situation.

But the increase in life expectancy of the general population also entails the progressive increase in the average age of our patients. Consequently, there is a higher percentage of elderly patients with 'fragility' criteria or multiple associated diseases requiring major surgery, resulting in greater

postoperative morbidity and mortality¹ and a notable reduction in physiological and functional capacity.²

In 1992, Buchner and Wagner³ defined frailty as a syndrome of weakness, declining mobility and reduced reserve capacity, which determine a greater risk of disability and death when faced with minor external stress when homeostasis is not maintained.

Thus, frail patients undergoing elective surgery have more postoperative complications, longer hospitalizations and a greater number of discharges to rehabilitation centers instead of their homes.^{4,5}

In these patients, the application of different fast-track components could provide obvious benefits, although not sufficient. We need better preoperative optimization of their baseline state, beyond minimizing the aggression implicit in surgery. To achieve this, it is necessary to improve the functional status score of these patients (physical, nutritional and psychological status), since it is one of the factors involved in the poor postoperative evolution and on which we can act.⁶

Thus, the concept of pre-rehabilitation emerged as a program designed to improve patient functional capacity before surgery, with recommendations for physical activity, adequate nutrition and reduced anxiety and frustration. This preparation requires very active patient participation, and it is essential for the patient to understand the importance of his/her effort.

Prehabilitation models have been preferentially described in cardiovascular and thoracic surgery. In recent years, certain publications have provided data for models applied to abdominal surgery, including for cancer, although there have been mixed results in terms of the benefits obtained with these programs. These results can be explained by the variability in the patient inclusion criteria, as well as the heterogeneity of the proposed programs.

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In this regard, all studies agree that the patients in whom the benefits of these programs is significantly observed are those at high risk (ASA III and IV), as well as those with a preoperative study showing evidence of functional decline. Similarly, in a prospective randomized study with an intensive exercise program in ASA III and IV patients undergoing major abdominal surgery, Barberan-Garcia et al.⁷ observed a significant reduction in postoperative complications compared to the control group.

This highlights the importance of standardizing the inclusion criteria and the tests to be performed to establish those criteria.

Several studies have shown that the preoperative functional reserve, assessed with the 6-minute walk test (6MWT) is a predictive factor for postoperative morbidity and mortality.⁸⁻¹⁰ It is a simple, cheap and reproducible test. A test value of less than 400 m is an indicator of reduced mobility, limited independence and worse postoperative results.^{7,11,12} Recent studies show that this limit could be used to identify patients with indications to be included in a prehabilitation program.¹³

Although there is variability in times and exercises to be performed, most groups establish a 4-week training program because this period is able to obtain an evident increase in patient functional capacity, shown by a significant increase in the meters walked in the 6MWT.¹⁴ There are also coinciding criteria for recommendations of the exercise to be performed, which usually consists of a daily aerobic activity associated with weightlifting exercises at least 3 times per week. Of course, they must be appropriate for the capabilities of each patient and, above all, simple if we want to achieve patient compliance.¹⁵

Regarding the third aspect that makes up the trimodal therapy, aimed at reducing the patient's state of anxiety and depression, different techniques have been proposed. Mindfulness therapies are widely accepted and offer obvious benefits. Unfortunately, on many occasions the patients themselves give up on group therapy.

In short, an interesting aspect that emerges from the use of prehabilitation that we should also consider is that patients who have followed the preparation guidelines are more 'obedient' when it comes to complying with postoperative rehabilitation instructions, and they are more active in their recovery.¹⁶ One possible reason is that many of them had internalized that there are tasks that they were no longer able to perform and, during the pre-rehabilitation process, they observed that they were able to partially or totally recover some of these capabilities. They become aware that progress is up to them, and they come to 'enjoy' the process. They also do not want to lose any progress made and, consequently, want to recover it after surgery. Thus, this process not only prepares patients to better overcome surgery, but they also to learn to acquire healthy lifestyle habits that are maintained over time.

Likewise, the introduction of prehabilitation in cancer patients requires a new consideration of the period transpired between diagnosis and the start of treatment, as prehabilitation should be considered part of the treatment process. Meanwhile, we must correctly select patients who will benefit from preparation.

Of course, the challenge of prehabilitation must be approached from a multidisciplinary model where nutrition,

rehabilitation, surgery, anesthesia, psychiatry, psychology and nursing units are currently involved. It is probably also advisable to add the geriatric unit to the equation, which would provide a global vision for a process in which most of the protagonists are elderly patients.

REFERENCES

- Schilling PL, Dimick JB, Birkmeyer JD. Prioritizing quality improvement in general surgery. *J Am Coll Surg*. 2008;207:698-704.
- Christensen T, Kehlet H. Postoperative fatigue. *World J Surg*. 1993;17:220-5.
- Buchner DM, Wagner EH. Preventing frail health. *Clin Geriatr Med*. 1992;8:1-17.
- Makary MA, Segev DL, Pronovost PJ, Syin D, Bandeen-Roche K, Patel P, et al. Frailty as a predictor of surgical outcomes in older patients. *J Am Coll Surg*. 2010;210:901-8.
- Garzón H, Restrepo C, Espitia E, Torregrosa L, Domínguez LC. Fragilidad quirúrgica: un factor predictor de morbilidad y mortalidad posoperatoria en adultos mayores sometidos a cirugía abdominal de urgencia. *Rev Colomb Cir*. 2014;29:278-92.
- Lawrence V, Hazuda H, Cornell J, Pederson T, Bradshaw P, Mulrow C, et al. Functional independence after major abdominal surgery in the elderly. *J Am Coll Surg*. 2004;199:762-72.
- Barberan-Garcia A, Ubré M, Roca J, Lacy AM, Burgos F, Risco R, et al. Personalised prehabilitation in high-risk patients undergoing elective major abdominal surgery: a randomized blinded controlled trial. *Ann Surg*. 2018;267:50-6.
- Hennis PJ, Meale PM, Grocott PMW. Cardiopulmonary exercise testing for the evaluation of perioperative risk in non-cardiopulmonary surgery. *Postgrad Med J*. 2011;87:550-7.
- Carlisle J, Swart M. Mid-term survival after abdominal aortic aneurysm surgery predicted by cardiopulmonary exercise testing. *Br J Surg*. 2007;94:966-9.
- Smith TB, Stonell C, Purkayastha S, Paraskevas P. Cardiopulmonary exercise testing as a risk assessment method in non cardio-pulmonary surgery: a systematic review. *Anaesthesia*. 2009;64:883-93.
- Pahor M, Guralnik JM, Ambrosius WT, Blair S, Bonds DE, Church TS, et al. Effect of structured physical activity on prevention of major mobility disability in older adults: the LIFE study randomized clinical trial. *JAMA*. 2014;311:2387-96.
- Sinclair RC, Batterham AM, Davies S, Cawthorn L, Danjoux GR. Validity of the 6 min walk test in prediction of the anaerobic threshold before major non-cardiac surgery. *Br J Anaesth*. 2012;108:30-5.
- Rolland YM, Cesari M, Miller ME, Penninx BW, Atkinson HH, Pahor M. Reliability of the 400-m usual-pace walk test as an assessment of mobility limitation in older adults. *J Am Geriatr Soc*. 2004;52:972-6.
- Chen BP, Awasthi R, Sweet SN, Minnella EM, Bergdahl A, Santa Mina D, et al. Four-week prehabilitation program is sufficient to modify exercise behaviors and improve preoperative functional walking capacity in patients with colorectal cancer. *Support Care Cancer*. 2017;25:33-40.
- Carli F, Charlebois P, Stein B, Feldman L, Zavorsky G, Kim DJ, et al. Randomized clinical trial of prehabilitation in colorectal surgery. *Br J Surg*. 2010;97:1187-97.
- Gillis C, Fenton T, Sajobi T, Minnella E, Awasthi R, Loiselle SE, et al. Trimodal prehabilitation for colorectal surgery attenuates post-surgical losses in lean body mass: a pooled analysis of randomized controlled trials. *Clin Nutr*. 2019;38:1053-10608.

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