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Risk factors for postoperative fatigue after gastrointestinal surgery



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ABSTRACT

Background: Postoperative fatigue (POF) is an important complication that is commonly observed postoperatively and is also one of the most serious obstacles to postoperative convalescence. However, the risk factors for POF have not been fully addressed, and there is no effective method to predict POF. The aim of the present study was to investigate the risk factors for POF and to explore prediction of the degree of POF.

Methods: A prospective observational study was conducted of patients undergoing elective gastrointestinal surgery. Fatigue score, grip strength, length of postoperative hospital stay (LOS), as well as preoperative and intraoperative factors were collected. χ^2 was used to compare categorical variables, and multivariate logistic regression analysis was used to further analyze correlation between POF and preoperative and intraoperative factors.

Results: A total of 155 patients were included in our analysis without loss in follow-up. Multivariate logistic regression analysis after adjustment for factors with severe POF in univariate analysis including preoperative fatigue, plasma albumin and hemoglobin level, and cardiopulmonary function demonstrated that old age, gastrectomy, and a nutritional risk screening 2002 score ≥ 3 were associated with a higher relative risk of severe POF. Moreover, laparoscopic-assisted surgery was associated with lower relative risk of severe POF.

Conclusions: Old age, nutritional risk screening 2002 score ≥ 3 and gastrectomy were risk factors for POF in patients undergoing elective gastrointestinal surgery. POF was reduced in laparoscopic-assisted surgery. Consideration of these factors could be important for the prevention and treatment of POF.

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1. Introduction

Fatigue is a kind of subjective feeling of discomfort, but objectively, it's a condition with the loss of ability to engage in normal work or daily life activities. It is commonly observed in many diseases and their related treatments [1]. Patients undergoing surgery, especially major abdominal surgery, can also experience fatigue. We call this postoperative fatigue (POF). It is an unpleasant and distressing symptom in convalescence that can have a major impact on a patient's quality of life. Some surveys showed that POF might be one of the main complaints after surgery and may last much longer than pain, even as long as 3 mo [2,3]. This causes difficulties in the performance of daily activities, such as housework and climbing stairs, and can also be a source of increased costs to the health service. With improvements in health care, there is an increased focus on postoperative recovery, and not only on the effects of an operation. Evidence from clinical trials showed that laparoscopic and Enhanced Recovery After Surgery programs can improve POF [4–6]. However, POF occurring after surgery continues to be one of the most serious obstacles to postoperative convalescence. Although there is ample research that has indicated the etiology of POF, the risk factors for POF have not been fully addressed. From a clinical point of view, it is of vital urgency to find risk factors for which patients are likely to experience severe POF to assist physicians in developing a convalescence plan.

The aim of the present study was to investigate the risk factors for POF and to explore prediction of the degree of POF.

2. Patients and methods

2.1. Patients

From October 2013–April 2014, patients undergoing elective gastrointestinal surgery with clear surgical indications were included in a prospective follow-up study at the Gastrointestinal Surgical Department of The First Affiliated Hospital of Wenzhou Medical University. The inclusion criteria included (1) aged ≥ 18 y old; (2) a rating from the American Society of Anesthesiologists $\leq III$; (3) elective gastrointestinal surgery with clear surgical indications and no contraindications; and (4) patient agreed to take part in the experience and signed the informed consent. Exclusion criteria included (1) age < 18 y old; (2) patients with mental illness that impeded communication; (3) patients that were transferred to intensive care unit and received treatment after operation; and (4) patients need reoperations due to severe complications. All patients gave written informed consent for participation in the study and the study was registered with the Chinese Clinical Trial Registry (Trial Registration Number: ChiCTR-RCC-13004467).

2.2. Fatigue assessment

All patients were presented with a constructed fatigue scale model, which is improved from Christensen visual analog scale (VAS) [7] once preoperatively and everyday before the seventh postoperative day and the 10, 20, 30th day after

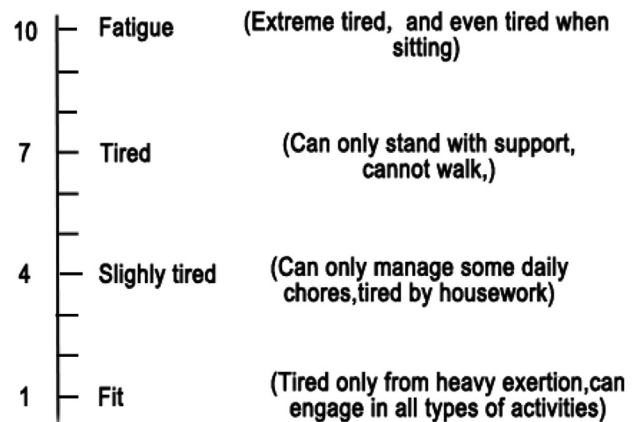


Fig. 1 – Fatigue scale for quantification of subjective feeling of fatigue in patients undergoing major abdominal surgery. Improved from Christensen et al.

surgery (Fig. 1). The fatigue scores were integrated and provided an average fatigue score of postoperative day 1–7 (AFS1–7) as the main index to estimate the degree of fatigue. VAS's score is composed of 1 to 10, and the median is 5.5, so we arbitrarily defined 6 as the cut point for AFS1–7. We defined moderate fatigue as (AFS1–7 < 6) and severe fatigue as (AFS1–7 ≥ 6). Preoperative fatigue was divided into fit (fatigue score = 1) and tired (fatigue score > 1).

2.3. Collection of preoperative and intraoperative factors

All patients undergoing elective gastrointestinal surgeries were given a nutritional risk screening 2002 (NRS2002) [8] and evaluated for body mass index (BMI) to obtain a preoperative nutritional status. The BMI was grouped into thin (BMI ≤ 18.5 kg/m²) and not thin (BMI > 18.5 kg/m²). Age, gender, cardiopulmonary function, and the living habits were also considered in the field of personal investigation. Patients who have dyspnea when climbing stairs were divided into the group with cardiopulmonary dysfunction. Living habits were also divided into two groups, one was healthy (no long-term drinking or smoking), and the other was unhealthy (long-term drinking and smoking). Hematological examination including plasma albumin concentration and hemoglobin concentration was analyzed before the surgery, and hypoproteinemia (plasma albumin < 35.0 g/L) and anemia (hemoglobin in men < 120 g/L, hemoglobin in women < 110 g/L) were used as definitions. Operative data including surgical duration and surgical procedure were collected after surgery. Length of postoperative hospital stay (LOS) was recorded in the scheduled survey after each patient was discharged from the hospital.

2.4. Muscle function

Grip strength was measured on the dominant hand using an electronic hand dynamometer (model: EH101; CAMRY,

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