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Enhanced postoperative recovery pathways in emergency surgery: a randomised controlled clinical trial

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Nasogastric tube

Abstract

BACKGROUND: Enhanced recovery pathways are now widely used in elective surgical procedures. The feasibility of enhanced postoperative recovery pathways in emergency surgery for perforated peptic ulcer disease was investigated in this randomized controlled clinical trial.

METHODS: Patients with perforated peptic ulcer disease who underwent laparoscopic repair were randomized into 2 groups. Group 1 patients were managed with standard postoperative care and group 2 patients with enhanced postoperative recovery pathways. The primary endpoints were the length of hospital stay and morbidity and mortality.

RESULTS: Forty-seven patients were included in the study. There were 26 patients in group 1 and 21 in group 2. There were no significant differences in the morbidity and mortality rates, whereas the length of hospital stay was significantly shorter in group 2.

CONCLUSIONS: The application of enhanced postoperative recovery pathways in selected patients with perforated peptic ulcer disease who undergo laparoscopic Graham patch repair seems feasible.

The rate of elective surgical procedures for peptic ulcer disease (PUD) has dramatically decreased since highly effective medical therapies became widely available.[1] However, the rate of emergency surgery for acute complications of PUD such as bleeding and perforation has remained stable and may have actually increased.[2] Perforation occurs in about 2% to 10% of patients with PUD.[3] Perforated peptic ulcer disease (PPUD) is associated with a 6% to 30% mortality rate and is responsible for more than 70% of deaths associated with PUD.[3,4]

The surgical treatment of PPUD has evolved in parallel to the advances in the medical treatment of PUD. Because the eradication of *Helicobacter pylori* and the potent acid-reducing agents can successfully cure the vast majority of patients with PUD, simple procedures such as primary repair or Graham patch repair are now the preferred methods for surgical treatment of PPUD.[5] Furthermore, open procedures have in the most part been replaced by laparoscopic techniques.[6,7] In contrast, the postoperative management of PPUD patients has remained virtually unchanged.[3] The standard postoperative management of PPUD patients is predominantly based on traditional practices rather than being evidence based.[8]

Traditional surgical practices are now being re-examined in light of new evidence-based surgical facts.[9] Enhanced

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recovery after surgery (ERAS) pathways, which originated in the 1990s and have been increasingly adopted over time, are the end products of this new perspective in surgery.[9] The ERAS pathways involved in the pre-, intra-, and postoperative period are usually gathered in an integrated ERAS program in which both health care professionals and patients have active roles.[10] The evidence-based components of the ERAS program were shown in Table 1.[10] Although the ERAS program is widely used in elective procedures in many surgical subspecialties, the place of this program in emergency surgery remains uncertain probably because of the significant challenges in applying all ERAS pathways in the emergency setting.[10] Nevertheless, the ERAS program is often modified in elective procedures on an individual and/or institutional basis and thus may also have a role in the emergency setting albeit in a modified form.[11] The aim of this randomized controlled clinical trial was to investigate the feasibility of enhanced postoperative recovery pathways in patients who underwent laparoscopic repair for PPUD.

Methods

Study design, eligibility, randomization, and exclusion criteria

This study was a prospective, single-center, randomized controlled, nonblinded clinical study. The aim of the study was to evaluate the safety and efficacy of enhanced postoperative recovery pathways in patients who underwent laparoscopic Graham patch repair (LGPR) for PPUD. Patients who were diagnosed with PPUD between May 2012 and January 2013 were recruited for the study. The Institutional Review Board of the Dr. Sadi Konuk Training and Research Hospital, Istanbul, Turkey, approved this study (approval ID: 2012-08-01). The study was also registered at www.clinicaltrials.gov (ClinicalTrials.gov identifier: NCT01620671).

Each patient was provided with detailed information about the study and was requested to sign an informed consent form. Hospital staff involved in the patients' care was informed about the study design and the nature of the randomization. Patients received detailed information regarding their postoperative care including contact details of the medical and research staff in case of complications after hospital discharge. The involvement of the researchers was allowed only in the pre- and intraoperative course and was avoided in the postoperative management of patients including the evaluation of fitness for discharge.

Patients with a perforated ulcer less than 10 mm in size who underwent LGPR were included in the study. The patients were randomized into 2 groups according to their 5-digit hospital registry number, which was automatically given by the computer-based data processing system at admission. Randomization was made at the end of the surgical procedure. Patients with odd and even protocol numbers were included in groups 1 and 2, respectively. Group 1 was the control group and received standard postoperative care, and group 2 was the ERAS group. The surgical team was blinded to this protocol number and was not informed until the end of the surgical procedure.

The exclusion criteria were as follows: (1) refusal to join the study or sign the informed consent form; (2) age younger than 15 years; (3) the presence of any psychiatric or neurologic disease; (4) class 3 and 4 surgical patients according to the classification of The American Society of Anesthesiologists; (5) septic shock on admission; (6) pregnancy; (7) predisposing factors for impaired wound healing (eg, chronic use of steroids); (8) peptic ulcers that were simultaneously bleeding and perforated; (9) multiple perforated peptic ulcers; (10) spontaneously sealed-off perforated ulcers that were diagnosed either preoperatively or during surgery and that did not require surgical repair; (11) conversion to open technique; (12) perforated ulcers that were not amenable to Graham patch repair because of size or technical considerations; and (13) malignant ulcers confirmed by histopathological examination if biopsied for a high index of suspicion for malignity.

Preoperative course

Preoperative preparation was identical in both groups and included the placement of a nasogastric tube, the administration of crystalloids for fluid replacement, intravenous antibiotherapy with cefuroxime (1,500 mg every 12 hours [Multisef; Mustafa Nevzat, Istanbul, Turkey]), intravenous pain relief with tramadol (100 mg every 6 hours [Contramal; Abdi Ibrahim, Istanbul, Turkey]), and

Table 1 The evidence-based components of the ERAS program

Preoperative	Intraoperative	Postoperative
Information and counseling	Fluid optimization Maintenance of	Multimodal, opioid-sparing analgesia
Optimization of organ function	normothermia regional anesthesia	Prevention of nausea and vomiting
Smoking and alcohol abstinence	Short-acting opioids	Prevention of ileus
No bowel preparation	Minimally invasive surgery Oxygen	Early enteral nutrition
Carbohydrate loading	therapy	Early mobilization
	Antibiotic prophylaxis Thromboprophylaxis	Early removal of catheters, drains, and tubes
		Discharge criteria

ERAS = enhanced recovery after surgery.