CNS 2017 ANNUAL MEETING
BOSTON, MASSACHUSETTS OCTOBER 7–11,2017

Safety and Efficacy of a Novel Neurosurgical Enhanced Recovery after Surgery (ERAS) Protocol for Elective Craniotomy: A Prospective Randomized Controlled Trial

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Introduction

Although ERAS programs have gained increasing acceptance in various surgical specialties, there is currently no established neurosurgical ERAS protocol for patients undergoing elective craniotomy reported in literature. Here, we described the design, implementation, safety and efficacy of a novel neurosurgical enhanced recovery after surgery (ERAS) protocol for elective craniotomy in a tertiary center located in China.

Methods

A multi-disciplinary neurosurgical ERAS protocol for elective craniotomy was developed, based on the best available evidence. A total of 140 patients undergoing elective craniotomy between Oct 2016 and May 2017 were enrolled in a randomized clinical trial (RCT) comparing our novel ERAS protocol to conventional neurosurgical perioperative management. The primary end point of this study was the postoperative hospital length of stay (LOS). Postoperative morbidity, perioperative complications, postoperative pain scores, etc. were secondary end points.

Results

The median postoperative length of hospital stay (4 days) was significantly decreased with the incorporation of our ERAS protocol compared to conventional perioperative management (7 days, P<0.0001). In the ERAS group, more patients (79%) reported mild pain (Visual Analogue Scale, VAS, 1-3) on postoperative day (POD) 1 (P < 0.001) compared to the control group. Furthermore, the majority of patients (53%) demonstrated a shortened duration of pain (1-2 days) (P < 0.001) in the ERAS group. Of note, more patients experienced mild postoperative nausea and vomiting (PONV) VAS (1-4) in the ERAS group compared to the controls (86% in ERAS vs. 71% in control, P = 0.0394).

Conclusions

This multidisciplinary, evidence-based neurosurgical ERAS protocol for craniotomy appears to have significant benefits compared to conventional perioperative management. Implementation of ERAS is associated with a significant reduction in postoperative hospital stay and acceleration of recovery, without increasing complication rates related to elective craniotomy. Further evaluation of this protocol in large, multi-center studies is warranted.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Understand the establishment of ERAS for neurosurgery protocol and how this ERAS protocol was applied in the clinical practice, 2) Our ERAS protocol for elective craniotomy was associated with shortened postoperative length of hospital stay and promoted rapid recovery after surgery, while the surgical and non-surgical complications experienced in ERAS protocol patients were similar to the conventional intervention 3) Patients in the ERAS group were able to achieve earlier oral water/food intake and ambulation after surgery. An accelerated functional recovery was also achieved with measures related to prophylaxis and management of PONV, DVT, preoperative fasting, incisional local anesthesia, wound closure, urinary catheter duration, and surgical site pain, among others. 4) To the best of our knowledge, this is the first neurosurgical ERAS protocol for elective craniotomy patients, and the first randomized controlled trial to evaluate the efficacy of a ERAS protocol in neurosurgical patients admitted for elective craniotomy. Our ERAS protocol appears to be safe, effective and feasible in this patient population.

References

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