Mini Review

Impact of the Enhanced Recovery Program after Hepato-Pancreato-Biliary Surgery

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Received: April 07, 2019, Accepted: April 27, 2019

ABSTRACT

Enhanced Recovery after Surgery (ERAS) is a multicentric program that includes the fields of nursing and anesthesia, nutrition and fluid management, and minimally invasive surgery. ERAS protocols focus on reducing the postoperative complications and stress response, optimizing the postoperative recovery. They have been implemented in many surgical fields, such as cardiac, gastric, and urologic, as they were shown to be effective in reducing morbidity and the overall health costs and in improving patient satisfaction. The aim of this minireview was to investigate the impact of ERAS programs on patients’ postoperative outcome after hepato-pancreato-biliary surgery.

Key words: Enhanced Recovery after Surgery programs, fast track and surgery, fast-track surgery

Kehlet and Wilmore introduced the concept of fast-track (FT) protocols and Enhanced Recovery after Surgery (ERAS) in 2001. ERAS is a multicentric program that includes the fields of nursing and anesthesia, nutrition and fluid management, and minimally invasive surgery. ERAS protocols focus on reducing the postoperative complications and stress response, generally optimizing the postoperative recovery. Thus, ERAS programs reduce the postoperative hospitalization time and morbidity.1

ERAS protocols were first applied in hip and knee arthroplasty and gynecological and colorectal surgeries.

These protocols have been implemented in many surgical fields, such as cardiac, gastric, and urologic, as they were shown to safely reduce morbidity2 and the cost of hospitalization and also improve patient satisfaction.3 The aim of this minireview was to investigate the impact of ERAS programs in patient’s postoperative outcome after hepato-pancreato-biliary (HPB) surgery.

After ERAS protocols were introduced in postoperative care, 2326 studies were conducted from 2001 to 2019.

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Cite this article as: Kapritsou M. Impact of the Enhanced Recovery Program after Hepato-Pancreato-Biliary Surgery. Asia Pac J Oncol Nurs 2019;6:333-5.
ERAS programs have been implemented in 422 studies in the past 2 years. A literature review of studies in the Medline/PubMed, Cochrane, Scopus, and Google Scholar databases was conducted from 2018 to 2019. The keywords used in the bibliography search were “fast track surgery,” “ERAS programs,” “fast track,” and “surgery.” The inclusion criteria were (a) studies that were directly related to the topic and (b) studies in English and Greek languages published in peer-reviewed journals. The search strategy was applied to 422 studies, 412 of which were excluded and 10 of which met the inclusion criteria.

A data extraction sheet was developed including the name of the first author; country of origin; year of publication; study design; aim; patient characteristics; sample size; data collection method and instrumentation; and finally, the main results and outcomes. Figure 1 (flow diagram) summarizes the selection process.

In the past 2 years, many studies have demonstrated the benefits of implementing the ERAS programs in HPB surgery, such as reduction in the length of stay (LOS) and complications.[4]

The results of the minireview appeared in Table 1.

Cho et al. reported that patients undergoing pancreatoduodenectomy in the ERAS group started the oral liquid diet and soft diet 1.1 and 2.5 days earlier than the control group, respectively.[5] Mahendran et al. reported that patients were mobilized on the day of surgery, 90% of whom tolerated the liquid diet on the 2nd postoperative day (POD) and were discharged on the 6th POD.[6]

Furthermore, Kaman et al. reported in 2019 that, although patients were mobilized on the 1st POD and received a solid diet from the 3rd POD, the LOS was not statistically significant.[7] In contrast, Williamsson et al. showed in 2018 that the postoperative complications and LOS were not significantly different between the ERAS and control groups.[8]

In a Brazilian tertiary center, Teixeira et al. showed that patients in the ERAS group after hepatectomy were discharged 2 days earlier than those in the control group ($P < 0.001$).[9] In 2019, Chong et al. reported shorter LOS ($P = 0.033$) with ERAS, without any increase in complication rates. Patients were discharged at least 1–10 days earlier.[10] In 2018, Wang et al. focused on the predictive modeling of ERAS program failure, which was 0.866, with 69.6% sensitivity and 9.1% specificity after liver resection.[11]

Although many studies have evaluated the postoperative parameters of patient hospitalization, not many have evaluated patient satisfaction and quality of life. Hepatectomy patients who were preoperatively informed about their inclusion in the ERAS program showed increased stress levels preoperatively. However, after the implementation of ERAS, the stress levels were not increased.[12]

**Table 1: Characteristics of studies**

| References          | Sample size ($n$) | Mobilization | Early oral intake | LOS | Morbidity | Mortality |
|---------------------|------------------|--------------|-------------------|-----|-----------|-----------|
| Pancreatoduodenectomy |                  |              |                   |     |           |           |
| Mahvi et al., 2019[17] | 10,741           | +            | +                 | +   | +         |           |
| Kaman et al., 2019    | 56               | +            | +                 | +   | +         |           |
| Cho et al., 2018      | 48               | +            |                   |     |           |           |
| Williamsson et al., 2018 | 160             | +            | +                 | +   |           |           |
| Mahendran et al., 2018 | 50              | +            | +                 | +   |           |           |
| Takagi et al., 2018[18] | 74              | +            | +                 | +   |           |           |
| Hepatectomy           |                  |              |                   |     |           |           |
| Chong et al., 2019    | 40               | +            | +                 | +   | +         |           |
| Teixeira et al., 2019 | 85               | +            | +                 | +   | +         |           |
| Thornblade et al., 2019 | 127             | +            | +                 | +   | +         |           |
| Kapritsou et al., 2018 | 46              | +            | +                 | +   |           |           |

*LOS: Length of stay*
ERAS protocols in colorectal surgery offered no significant difference in patient satisfaction in two studies but significantly improved the overall satisfaction in one study.[4] A few researches demonstrated the quality of life after colorectal surgery. Many patients reported a high quality of life after the early discharge, but there were patients with worse emotional status after the discharge.[4]

Nurses play a cornerstone role in the implementation of ERAS programs. The success of these programs depends on successful postoperative care.[13] Nurses are responsible for patients’ postoperative mobilization and evaluation of nausea, vomiting, pain, and stress levels.[14] Furthermore, nurses have a key position in the FT postoperative care after HPB surgery.

The ERAS society has been developing guidelines for HPB surgery since 2012. The society published guidelines for pancreateoduodenectomy in 2012 and 2013 and for hepatectomy in 2016.[15]

HPB surgery is a complicated procedure with high rates of morbidity and mortality.[15] Therefore, the ERAS programs should be implemented carefully by doctors and nurses, with a focus on the evolution of evidence quality and recommendations for HPB surgery.

Perioperative management is an important component of ERAS programs.[16] The findings of this review highlight the ERAS protocols of postoperative care, which are beneficial for patients undergoing HPB surgery. Future studies should aim at the improvement of hospitalization conditions, reduction of patient stress, safer care, fewer complications, and cost-effectiveness.

Financial support and sponsorship
Nil

Conflicts of interest
There are no conflicts of interest.

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