

# Protocol for rapid recovery pathways after surgery in children: a systematic review and meta-analysis

## Abstract

**Background:** In adult surgical patients rapid recovery pathways after surgery have shown improvement in postoperative complications and length of hospital stay. Enhanced recovery after surgery is a concept which includes patient management protocols beginning from the preoperative period, continues in the intraoperative period and the postoperative period. This concept aims to improve postoperative outcome. In pediatric patients rapid recovery pathways are beginning to develop. This study is undertaken to analyse whether enhanced recovery after surgery improves postoperative outcome in children.

**Methods:** systematic review and meta-analysis of randomized and non randomized trials starting in April 2019 until July 2019. Statistic analysis will be realised with RevMan 5.3 software. Results are expected by July 2019.

**Conclusion:** This protocol was realised to describe the systematic review and meta-analysis which will be undertaken to clarify the impact on postoperative outcome of rapid recovery pathways after surgery in children.

**Keywords:** Enhanced recovery after surgery, rapid recovery pathways, children, outcome

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## Background

In adult surgical patients rapid recovery pathways after surgery have shown improvement in postoperative complications and length of hospital stay.<sup>1</sup> Enhanced recovery after surgery (ERAS) is a concept which includes patient management protocols beginning from the preoperative period, continues in the intraoperative period and the postoperative period. For instance preoperatively anticipating blood transfusion in potential hemorrhagic interventions by improving preoperative hemoglobin levels by administering iron or erythropoietin, anticipating the nutritional patient status,<sup>2</sup> reducing preoperative fasting times.<sup>3,4</sup> Intraoperatively, ERAS includes titration of fluid therapy to avoid hypovolemia or fluid overload by using means or goals to improve end organ perfusion and oxygen delivery;<sup>5</sup> includes protective invasive or noninvasive lung ventilation if necessary,<sup>6</sup> includes optimal analgesia using non opioid medications (for instance loco-regional analgesia), prevention of postoperative nausea and vomiting, using minimal invasive surgical techniques such as laparoscopy, robotic surgery, interventional radiology; and postoperatively ERAS includes rapid oral intake, preferring enteral alimentation, prevention of postoperative nausea and vomiting rapid mobilisation, physiotherapy, avoiding naso-gastric tubes, urinary bladder catheters or tubes if not necessary, early intravenous access withdrawal if not necessary.<sup>7-10</sup> This study is undertaken to analyse whether ERAS improves postoperative outcome in children.

## Description of the condition

Surgical pediatric patients in whom rapid recovery pathways after surgery are applied compared to interventions where these protocols are not applied.

## Description of the intervention

Surgical interventions where ERAS protocols as described in the background are applied and interventions where these protocols are not applied.

## How the intervention might work

By optimizing preoperative, intraoperative and postoperative patient management, postoperative morbidity or complications are improved and thus length of hospital stay (LOS) can also be improved.

## Why it is important to do this review?

In adults these protocols are well established and have shown benefits. In the pediatric surgical population these protocols are beginning to be developed and put into practice and outcome can be improved.

## Objective

To demonstrate whether ERAS improves postoperative outcome in pediatric surgical patients.

## Methods

This study was registered under the number CRD42018103518 in PROSPERO, the international registration database for systematic reviews and meta-analysis. Since this is a systematic review and meta-analysis ethical approval from the local ethic committee was not necessary. Types of studies included will be randomized and non randomized.

**Types of participants**

Children aged 0-18 years (inclusion criteria) will be included and patients above 18 years will be excluded (exclusion criteria).

**Types of interventions**

Surgical pediatric patients in whom rapid recovery pathways after surgery are applied compared to interventions where these protocols are not applied.

**Primary outcomes**

Morbidity defined as postoperative complications.

**Secondary outcomes**

Length of postoperative (LOS).

**Primary outcome measures**

Number of patients with postoperative complications defined as organ failure or dysfunction and infections.

**Secondary outcome measures**

Number of days spent in hospital after surgery.

**Search methods for identification of studies**

One or more reviewers will search electronically for titles and abstracts including keywords defined here above. Once these are searched, abstracts with relevant content will be retained and complete articles searched and screened for further inclusion or exclusion.

**Electronic searches**

Electronic search will be done using MEDLINE, EMBASE, CENTRAL, GOOGLE SCHOLAR, CLINICALTRIALS.GOV, ABSTRACT CONFERENCE and DARE.

**Searching other resources**

Other sources will be searched like grey literature. Data collection and analysis : comparisons, outcomes and subgroups will be collected and analysed. Data collection and analysis will be done using RevMan 5.3 software.

**Data extraction and management**

Data selection and extraction will be realised by one or more researchers. A flow chart will illustrate the selection process as recommended by the PRISMA statement. Assessment of risk of bias in the included studies will be realised using the tools proposed by the Cochrane Handbook for Systematic reviews of Interventions.

**Measures of treatment effect**

- A. Will be dichotomous (how many patients complicated) and will be presented as relative risk or odds ratio with 95%CI. Forest plots will be used to provide visual summary of data included.
- B. Will be continuous for LOS with measurement of weighted mean and weighted mean difference.

**Unit of analysis issues**

- A. Morbidity in the postoperative period until discharge from hospital.
- B. LOS in the postoperative period.

**Dealing with missing data**

Missing data will not be included

**Assessment of heterogeneity**

Forest plot will be used and  $I^2$  statistics will be used to assess for heterogeneity.

**Assessment of reporting biases**

Funnel plots will be used to assess for bias

**Data synthesis**

Data will be synthesized using RevMan 5.3 software.

**Subgroup analysis and investigation of heterogeneity**

See above.

**Sensitivity analysis**

Sensitivity analysis will be done by restricting the analysis to a defined intervention and or to a subgroup of patients.

**Results**

The study will begin 1/04/2019 and results are expected 31/07/2019.

**Conclusion**

This protocol was realised to describe the systematic review and meta-analysis which will be undertaken to clarify the impact on postoperative outcome of rapid recovery pathways after surgery in children.

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**Contributions of authors**

Authors will contribute either by searching or selecting the articles or by reviewing the work.

**Declarations of interest**

There are no conflicting or competing interests.

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