


Enhanced recovery after surgery recommendations for renal transplantation: guidelines

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Abstract

Background: Enhanced Recovery After Surgery (ERAS) protocols are now widely practiced in major surgery, improving postsurgical outcomes. Uptake of these programmes have been slow in kidney transplantation due to challenges in evaluating their safety and efficacy in this high-risk cohort. To date, there are no unified guidance and protocols specific to ERAS in kidney transplantation surgery. This paper aims to summarise current evidence in the literature and develop ERAS protocol recommendations for kidney transplantation recipients.

Methods: PubMed, Cochrane, Embase and Medline databases were screened for studies relevant to ERAS protocols in kidney transplantation, up to August 2021. A secondary search was repeated for each ERAS recommendation to explore the specific evidence base available for each section of the protocol. Randomised controlled trials, case-control and cohort studies were included. The Grading of Recommendations, Assessment, Development and Evaluations (GRADE) framework was used to evaluate the quality of evidence available and recommendations.

Results: We identified six eligible studies with a total of 1225 participants. All studies found a reduction in length of hospital stay without affecting readmission rates. The evidence behind specific pre-operative, intra-operative and post-operative interventions included in current ERAS protocols are reviewed and discussed.

Conclusion: Compared to other surgical specialties, the evidence base for ERAS in kidney transplantation remains lacking, with further room for research and development. However, significant improvements to patient outcomes are already possible with application of the currently available evidence. This has shown that ERAS in kidney transplantation surgery is safe and feasible, with improved postoperative outcomes.

Introduction

Enhanced recovery after surgery (ERAS) protocols may improve surgical outcomes. Uptake has been slow in kidney transplantation owing to a lack of consensus. This review aims to address this gap to develop guidelines.

Methods

This review was conducted in accordance with PRISMA guidelines for reporting systematic reviews. The recommendations outlined in this paper were developed based on ERAS[®] Society standards for the development of guidelines. Six ERAS protocols involving 1225 kidney transplant recipients were included^{1–6}. A literature search was also performed for the evidence base behind each intervention (*Fig. 1*). The full search protocol, study selection process, and GRADE framework used is outlined in [supplementary material](#).

Results

Preoperative

Preoperative counselling and education

Statement: Preoperative counselling about the surgery and estimated duration of hospital stay, and advice on smoking cessation and weight reduction improve outcomes and patient satisfaction.

Summary and recommendation: Preoperative education and counselling on postoperative care regimens, potential complications, and how to reduce/manage them.

Recommendation grade: 1C

Preoperative optimization

Statement: Frail kidney transplant recipients are at risk of delayed graft function, longer duration of hospital stay, early readmission, mycophenolate mofetil intolerance, graft loss, and post-transplant death⁷. Pilot studies have shown promising results⁸.

Summary and recommendation: Prehabilitation programmes to improve frailty issues.

Recommendation grade: 2B

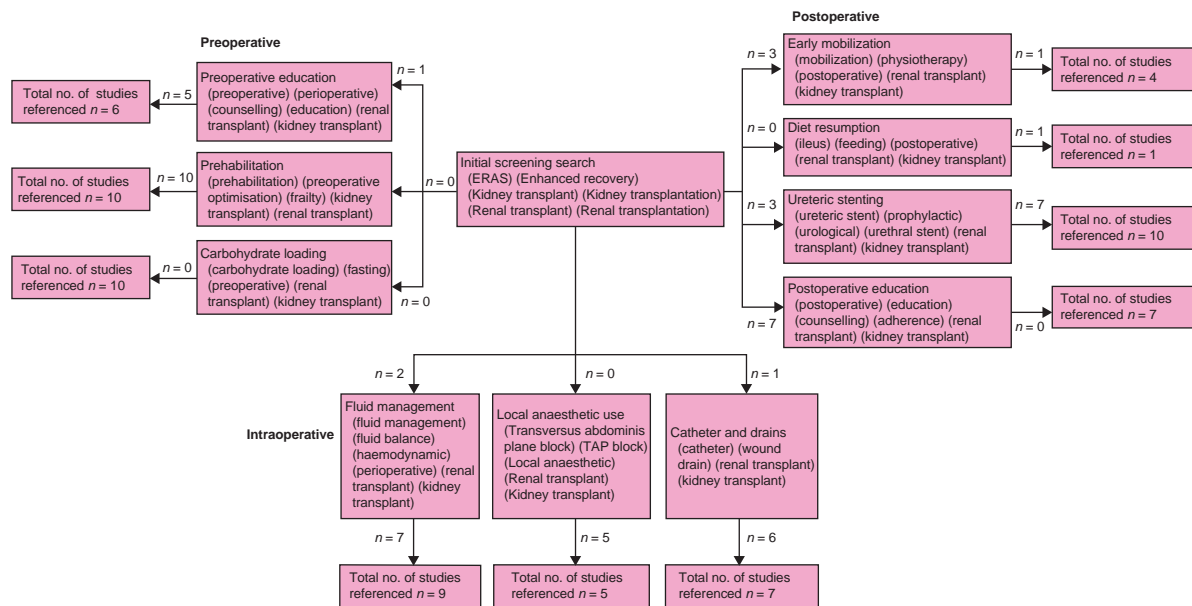


Fig. 1 Summary of full search protocol

Carbohydrate loading

Statement: Carbohydrate loading has been incorporated into ERAS protocols for non-diabetic patients, with no reported adverse outcomes. There is currently little evidence to provide guidance in this setting, where many patients have diabetes.

Summary and recommendation: Non-diabetic kidney transplant recipients can safely receive carbohydrate loading before operation.

Recommendation grade: 2C

Intraoperative

Fluid management

Statement: Optimized perioperative haemodynamic management can help reduce rates of delayed graft function. Current evidence supports goal-directed therapy in kidney transplantation surgery⁹. The use of transoesophageal Doppler and dynamic indices, such as pulse-pressure variation and stroke volume variation, reduces cardiovascular complications, fluid overload, and delayed graft function^{9–11}.

Summary and recommendation: Goal-directed fluid therapy strategy over liberal fluid therapy with dynamic monitoring.

Recommendation grade: 2B

Local anaesthetic wound infiltration

Statement: A transversus abdominis plane (TAP) block can significantly decrease reliance on opioid analgesics¹². It reduces patient-controlled analgesia requirements, opioid use, and pain scores.

Summary and recommendation: TAP block to reduce reliance on opioid analgesics.

Recommendation grade: 2B

Catheter and drains

Statement: Prolonged catheter retention is associated with an increased risk of urinary tract infection (UTI) and reduced mobilization. Current ERAS protocols aim for catheter removal by days 2–6. Early removal by postoperative days 1–2 is safe¹³.

Prophylactic wound drains are often inserted. Omission of prophylactic drain use and early removal of drains do not cause adverse effects in ERAS protocols. At present, the use of drains is a surgical preference rather than a robust guideline.

Summary and recommendation: Remove catheters as early as possible to reduce the risk of UTI. Prophylactic drain insertion does not appear to confer any benefit.

Recommendation grade: 1B

Postoperative

Physiotherapy and early mobilization

Statement: Poor physical activity after transplantation is associated with poorer quality of life¹⁴. Exercise interventions are feasible and safe, even early after kidney transplantation¹⁵. Early graded exercise improves functional capacity, fatigue levels, muscle strength, and quality of life¹⁶.

Summary and recommendation: Early mobilization to reduce complications, hospital, and overall recovery time.

Recommendation grade: 1A

Diet, laxatives, and bowel movement

Statement: Routine nasogastric tubes are not required. Patients can tolerate oral fluids immediately and be escalated to regular diet after surgery. Laxatives may assist bowel activity to enhance this progression.

Summary and recommendation: Early resumption of diet with active measures to manage emesis.

Recommendation grade: 1B

Ureteric stent management

Statement: The use of prophylactic double-J ureteric stenting of the transplant ureter is a technical consideration to reduce urinary complications. Removal should be undertaken early to reduce infection and ureteric stenosis risk. Stent removal before 2 weeks may be ideal^{17–19}.

Summary and recommendation: Prophylactic ureteric stenting may reduce post-transplant urological complications but early removal is advised.

Recommendation grade: 1A

Postoperative counselling and education

Statement: Post-transplantation immunosuppression regimens require patient-involved management with multidisciplinary education. Smoking cessation programmes are important to avoid risks of cardiovascular disease, non-skin malignancy, graft loss, and death²⁰.

Summary and recommendation: Education and counselling on medication regimens, lifestyle advice, and smoking cessation programmes (where indicated).

Recommendation grade: 1B

Conclusion

This review summarizes the evidence available for kidney transplant recipients, and serves to highlight areas for research and innovation. ERAS protocols can be implemented safely with good postoperative outcomes.

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Disclosure

The authors declare no conflict of interest.

Supplementary material

Supplementary material is available at *BJS* online.

Data availability

The authors confirm that the data supporting the findings of this study are available within the article and its supplementary materials.

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