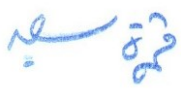
Institution Name: Directorate General of Specialized Medical Care, MoH

Document Title: Enhanced Recovery After Surgery (ERAS) General Guidelines

Approval Process

	Name	Title	Institution	Date	Signature
Written by	Shabib Al Kalbani	Head of Hospital Dietetics and Catering	Ministry of Health	November 2021	Shabib Al Kalbani
	Dr Mariam Al Waili	Director of Supportive Services	Ministry of Health	November 2021	Dr Mariam Al Waili
Reviewed by	Dr Lina Al Tahhan	Head of Applied Medicine, DSS, DGSMC	Applied Medicine Section, DSS, DGSMC	November 2021	Dr Lina Al Tahhan
	Dareen Tubeileh	Hospital Dietetics and Catering	Hospital Dietetics and Catering, DSS,DGSMC	November 2021	Dareen Tubeileh
Validated by	Dr. Qamra Al Sariri	DG of QAC	Ministry of Health	November 2021	
Approved by	Dr. Kadhim Sulaiman	DG of SMC	Ministry of Health	December 2021	

Contents Table

Acknowledgment

The directorate General of Specialized Medical Care would like to take this opportunity to thank all ERAS members who have participated in reviewing the following guidelines. A special acknowledgement to the following:

Dr Hind Al Mujarfi	Royal Hospital
Dr Anwar Zahran	Sultan Qaboos Hospital Salalah
Dr Abhijit Nair	Ibra Hospital
Dr Medhat Shalabi	Al Zahra Hospital Dubai

Please do not hesitate to contact us on 24946359 or through shabib.alkalbani@yahoo.com should you have further comments/suggestions regarding this guideline

Acronyms

ER	Enhanced Recovery
AHRQ	Agency for Healthcare Research and Quality
CHO	Carbohydrate
PONV	Post Operative Nausea and Vomiting
ERAS	Enhanced Recovery After Surgery
MUST	Malnutrition Universal Screening Tool
STAMP	Screening Tool for the Assessment of Malnutrition in Pediatrics
ASA	American Society of Anesthesiologists
PO	Post operative
DVT	Deep Vein Thrombosis
GA	General Anesthesia
GDFT	Goal Directed Fluid Therapy
IVF	Intravenous Fluid
ESP	Erector Spinae
EMR	Electronic Medical Reports
TAP	Transversus Abdominis Plane
QL	quadratus lumborum
NGT	Nasogastric Tube
NSQIP	National Surgical Quality Improvement Program
APAP	N-acetyl-para-aminophenol
TIVA	Total Intravenous Anesthesia
COX	Cyclooxygenase
SSI	Surgical Site Infection
H&P	History and Physical Examination
ISCR	Improving Surgical Care and Recovery
ACS	American College of Surgeons
PONS	Post-Operative Nutrition Screening
MDT	Multidisciplinary Team
MNT	Medical Nutrition Therapy

Enhanced Recovery After Surgery (ERAS) General Guidelines

1 Introduction

ERAS is short for Enhanced Recovery After Surgery. The ERAS definition refers to a multimodal multidisciplinary care pathway or protocol designed to achieve early recovery for patients undergoing elective surgery.

By implementing steps of the ERAS program during the different stages of the patient's hospital stay (Surgical OPD, preoperative, intraoperative, and postoperative), it has been demonstrated to improve the patient's anxiety and overall wellbeing, decrease the length of stay, and reduce complications.

Locally in 2019, an ERAS guideline for **Enhanced Recovery for Caesarean Section (ERACS)** has been implemented with positive outcomes. Following provincial implementation of the aforementioned guideline, there has been a demand for implementing this concept in other surgical procedures in all referral hospitals nationwide.

2 Scope

This guideline covers all healthcare professionals who are responsible to implement and monitor all stages of ERAS from preadmission to discharge i.e. Anesthetists, Surgeons, Nurses, Dieticians, Pharmacists, Respiratory therapists and physiotherapists (depending on the case itself)

3 Purpose

The purpose of this guideline is to provide assistance implementing all aspects of enhanced recovery in most surgical procedures with an aim of improving patient wellbeing outcome, increasing bed turnover rate, reducing medical complications and enhancing cost effectiveness.

4 Definitions

4.1 Enhanced Recovery After surgery ERAS: " standardized, multi modal intervention, multi- disciplinary approach, evidence-base protocol for perioperative care for elective surgeries

4.2 Surgical OPD: Initial clinic visits attended prior admission

4.3 Pre-operative Stage: a term applied to any intervention administered before surgery

4.4 Intraoperative Stage: a term applied to any intervention administered during surgery

4.5 Post-operative Stage: a term applied to any intervention administered after surgery

4.6 Malnutrition Universal Screening tool (MUST): is a five-step screening tool to identify adults, who are malnourished, or at risk of malnutrition (undernutrition or obese).

4.7 Screening Tool for the Assessment of Malnutrition in Pediatrics (STAMP): is a validated nutrition screening tool for use in hospitalized children from 2 weeks to 16 years of age

5 Guideline

5.1 Surgical OPD Clinic Prior Admission

5.1.1 All patients should receive pre-operative counseling which may include:

5.1.1.1 Enhanced recovery education and patient/caregiver expectations

5.1.1.2 Fasting guidelines and CHO beverage information

5.1.1.3 Incentive spirometer demo (depending on the surgery)

5.1.1.4 Post-Operative Nausea and Vomiting (PONV) management

5.1.1.5 Fulfill all prescriptions (e.g., bowel prep, antibiotics)

5.1.1.6 Confer with concerned ERAS involved parties

5.1.1.7 Share contact information with patient/caregiver for any further questions needed

5.1.1.8 smoking/alcohol cessation four weeks prior surgery

5.1.1.9 Preoperative screening for anemia and correction according to condition

5.1.1.10 Consult any specialties concerned as per needed (i.e. diabetics/endocrine, MUST/nutrition screening, psychiatry etc)

5.2 Preoperative

5.2.1 Quick interview to review ER steps done with surgeon, anesthetist, and nurse (any other specialty personnel as per case needs)

5.2.2 Normal preoperative assessment of patient

5.2.3 NPO status

5.2.3.1 6 hours prior to surgery fasting from solids (Consider 8 hours for high risk i.e. Gastroparesis patients etc..)

5.2.3.2 2 hours from liquids (liquids allowed are clear apple juice, water)

5.2.3.3 NIL by mouth for 2 hours

5.2.4 Carbohydrate loading drink of 12.5% Carbohydrate containing clear drink with proven safety profile (unless otherwise contraindicated according to specific case)

5.2.5 Maintain Normoglycemia

5.2.6 Skin cleanse i.e. Chlorhexidine wipes, Chlorhexidine wash

5.2.7 Maintain normothermia i.e. warm gown

5.2.8 Minimize IV Fluids preoperatively (considered NS lock in Pre Op) Ringers Lactate or Plasmalyte preferred, unless contraindicated

5.2.9 Multimodal pain management

5.2.9.1 PO Acetaminophen (patient dependent) or oral paracetamol preop with sips of water

5.2.9.2 Consider Gabapentinoids (if available)

5.2.9.3 Celebrex (patient dependent)

5.2.9.4 Dexamethasone can be used in all surgical patient as PONV prophylaxis, in addition Ondasetrone or alternative can be added to a patient with clinical risk factors for PONV like previous history, or certain stimulating surgeries like inguinal hernia repair or ENT surgeries

5.2.9.5 Avoid routine preoperative sedative hypnotics even in patients with significant anxiety due to increased cognitive dysfunction, and increased pharyngeal/laryngeal dysfunction

5.2.9.6 1 tablet 1-3 hrs before surgery with Gabapentin (300mg single dose)

5.2.9.7 Gradual compression thromboembolic deterrent stocking (TEDs) should be used. Also intraoperatively pneumonic mechanical compression stockings should be used

5.3 Intraoperative

5.3.1 Analgesia – Maintenance Phase

5.3.1.1 Utilize short acting anesthetics

5.3.1.2 Minimize opioids

5.3.1.3 Consider beta blockers for laryngoscopy (Anesthetist will decide according to patient and what is available)

5.3.1.4 Lidocaine 1.5 mg/kg bolus followed by 1–2 mg/kg/hr*

5.3.1.5 Ketamine 0.5 mg/kg bolus followed by 0.25–0.5 mg/kg/hr*

5.3.1.6 Magnesium infusion 5–10 mg/kg/hr or 30-50 mg/kg as a starting dose (over 30 min – 1 hr)

5.3.1.7 Dexmedetomidine bolus 0.5 mcg/kg over 10 min and/or infusion 0.2–1 mcg/kg/hr*

5.3.2 Analgesia – Emergence Phase

5.3.2.1 Ketorolac 15–30 mg IV/IV diclofenac 75 mg or rectal diclofenac suppository (100mg)

5.3.2.2 Dexamethasone 0.1 mg/kg IV

5.3.2.3 IV Acetaminophen — Minimal dosing interval q4h for adults, adolescents, and children ≥2 yrs. (Based on clinical judgement)

5.3.2.3.1 Rectal: 40 mg/kg

5.3.2.3.2 PO 10-20 mg/kg –

5.3.2.3.3 IV (age above 2 years) – 15 mg/kg

5.3.2.3.4 Maximum (per day_ - 60 mg/kg)

5.3.3 Analgesia – Regional Phase

5.3.3.1 General anesthesia (GA) + thoracic epidural/spinal – lumbar epidural/ or CSE (combined SPINAL EPIDURAL TECHNIQUE)

5.3.3.2 GA + intrathecal opioids

5.3.3.3 GA + erector spinae Plane (ESP) block (IF EXPERT QUALIFIED ANESTHETIST AVAILABLE)

5.3.3.4 GA + Transversus Abdominis Plane (TAP) blocks/quadratus (IF EXPERT QUALIFIED ANESTHETIST AVAILABLE)

5.3.3.5 lumborum (QL) blocks (+/- Rectus Shealth blocks +/- catheters) (IF EXPERT QUALIFIED ANESTHETIST AVAILABLE)

5.3.4 IV Fluid Therapy

5.3.4.1 Purposeful fluid administration (do not restrict fluids)

5.3.4.2 Goal-directed fluid therapy with stroke volume optimization

5.3.4.3 Goal-directed fluid therapy without advanced hemodynamic monitoring

5.3.5 Neuromuscular Blockade (NMB)

5.3.5.1 Utilize quantitative neuromuscular monitor

5.3.5.2 Objectively demonstrate adequate reversal

5.3.6 Standardize Care

5.3.6.1 Maintain normothermia

5.3.6.2 DVT prophylaxis Mechanical and/or pharmacological

5.3.6.3 Minimize catheters and drains

5.3.6.4 Remove nasogastric tubes prior to end of surgery (unless otherwise indicated)

5.4 Post-operative

5.4.1 IV Fluid Therapy

5.4.2 Avoid salt and water overload

5.4.3 Goal Directed Fluid Therapy (GDFT) when possible/indicated based on clinical judgement

5.4.4 Recommended fluid (rate and duration)

5.4.5 Consider isotonic buffered solution (D51/2 NS) vs balanced salt solution

5.4.6 Allow PO intake in place of Intravenous Fluid (IVF) when tolerated

5.4.7 PONV Prevention continue PONV treatment

5.4.8 Early Foley's catheter removal preferred on the day of or the day after surgery (If surgeon sees fit)

5.4.9 Consider early oral nutrition (consult dietician if needed) or advance diet as tolerated

5.4.10 Non-Opioid Oral Analgesics/NSAIDS

5.4.10.1 Schedule non-opiates when appropriate

5.4.10.2 No opioid/Acetaminophen combo drugs

5.4.10.3 N-acetyl-para-aminophenol (APAP) 1 gm q6h

5.4.10.4 Toradol/Ibuprofen Use ketorolac instead of toradol

5.4.10.5 Acetaminophen

5.4.10.6 COX-2 Inhibitors

5.4.10.7 Gabapentinoids

5.4.10.8 Tramadol

5.4.10.9 PRN opioids (consider PO first)

5.4.11 Additional Considerations;

5.4.11.1 Magnesium sulphate IV can also be added as a part of multimodal analgesia

5.4.11.2 Ketamine infusion

5.4.11.3 Lidocaine infusion

5.4.11.4 PCA

5.4.11.5 Use of remifentanil instead of long-acting opioids like morphine whenever feasible

5.4.12 Stimulation of Gut Mobility;

5.4.12.1 Decrease postoperative fasting period

5.4.12.2 Consider Entereg

5.4.12.3 Gum chewing

5.4.12.4 Limit opioid administration

5.4.12.5 Eliminate NGT utilization

5.4.13 Analgesia;

5.4.13.1 Reinforce pain expectations and goals

5.4.13.2 Consider using tool to determine amount of opioids for

5.4.13.3 Breakthrough pain (see Michigan OPEN)

5.4.13.4 Consider scheduled non-opiates (acetaminophen, COX- 2 inhibitors, tramadol, gabapentinoids)

5.4.13.5 Consider PRN opioids rather than scheduled

5.4.14 Miscellaneous;

5.4.14.1 Instruct patient to come back

5.4.14.2 Follow up with patients and family for feedback loop for Improvement (phone follow up)

6 Responsibilities:

6.1 Surgeon:

6.1.1 The surgeon is responsible for the preoperative diagnosis of the patient, for performing the operation, and for providing the patient with postoperative surgical care and treatment

6.1.2 During the course of an operation, the surgeon must make important decisions about the patient's health, safety, and welfare. Furthermore, the surgeon must work to ensure cooperation among the other members of the surgical team, which typically includes another surgeon or qualified person who acts as the surgeon's assistant, the anesthetist, and OT/OR nurses.

6.1.3 Managing post-operative recovery and follow-up care

6.1.4 Patient counselling

6.2 Anesthetist:

6.2.1 Preoperative patient preparation and assessment Preparation included patient optimization; cardiopulmonary evaluation, referral to specialist; nephrology, pulmonology, physician as necessary, and correction of anemia. Postoperative pain rounds in hospitals having acute pain services or on request of surgeons. Analgesia prescription for postoperative period

6.2.2 Intraoperative fluid management

6.2.3 Intraoperative pain relief

6.2.4 Providing high oxygen concentration (around 80%FiO2) Reduces chances of surgical site infections and also incidence of PONV (a bit controversial though)

6.3 Dietician (As required):

6.3.1 Perform a nutritional assessment should a patient be suspected of malnutrition prior to surgery and provide suitable medical nutrition therapy (MNT) to address any deficiencies prior to surgery

6.3.2 Ensure that fasting protocols are being met and that the patient is fasting from solids 6 hours prior to surgery and taking clear liquids up to 2 hours prior to surgery (unless contraindicated)

6.3.3 Guide the patient after surgery and provide suitable nutritional support (normal diet, oral or enteral) according to the patient's ability

6.3.4 Immuno-nutrition (Omega-3Fatty acids, Glutamine) can be considered for patients undergoing oncological surgeries

6.4 Nurse:

6.4.1 Work compliantly to ensure the highest standard of personalized nursing care and advice is delivered to patients/caregivers across all stages of the ERAS program, and their families in partnership with all members of the multi-disciplinary team

6.5 Physiotherapist:

6.5.1 Enable patients to achieve ERAS program aims throughout their stay in improving respiratory function, and initiating the rehabilitation process

6.5.2 Provide both respiratory and physical assessments to identify the needs of physiotherapy intervention and Implement a pre-operative respiratory and physical therapy program

6.5.3 Develop a SMART plan in relation to the short term and long term goals

6.5.4 Provide intervention as per the SMART management plan

- Deep breathing exercises incentive spirometry can be added here
- Coughing and huffing
- Early mobilization
- Muscle strengthening training
- Circulatory/ bed exercises

6.5.5 Provide effective and efficient counseling and education

6.5.6 Advice on discharge and home program

6.5.7 Work within MDT members to provide comprehensive management approach

6.6 Respiratory Therapist:

6.6.1 Respiratory and ventilatory support according to the cases received from OT

6.6.2 Maintains advanced skill to provide the highest quality of care to most critically ill patient.

6.6.3 Preforming ventilator invasive and Non- invasive guideline

6.6.4 Using weaning protocol as soon as possible by using evidence-based practices

6.6.5 Follow patient treatment according to the strategy plan in medication e.g., nebulization, Oxygen therapy or Aerosol therapy … throughout patient stay in Intensive Care Unit

7 Document History and Version Control

Document History and Version Control			
Version	**Description of Amendment**	**Author**	**Review Date**
01	Initial Release	Dr Mariam Al Waili Shabib Al Kalbani	January 2022
02	Version 2	Dr Mariam Al Waili Shabib Al Kalbani	November 2024
03			
04			
05			

Written by	**Reviewed by**	**Approved by**
Dr Mariam Al Waili Shabib Al Kalbani	Dr Lina Al Tahhan Dareen Tubeileh	Dr. Kadhim Sulaiman

8 Related Documents:

There is no related document for this guideline

9 Reference:

Title of Book/Journal/Articles/Website	Author	Year of Publication	Page
Enhanced Recovery At a Glance/ AANA.com	American Association of Nurse Anesthetists (AANA)	2021	
Enhanced Recovery After Surgery: An Anesthesiologist's Perspective/Journal of Anaesthesiology, Clinical Pharmacology	Srilata Moningi, Abhiruchi Patki, and Gopinath Ramachandran	2019	35 (Suppl 1) S5-S13
The role of physiotherapy in Enhanced Recovery After Surgery in the intensive care unit/Recovery	Thomas W. Wainwright David A. McDonald Louise C. Burgess	2017	144-147
Successful Implementation of an Enhanced Recovery Pathway: The Nurse's Role	Karen M Brady, Deborah S Keller, Conor P Delaney	2015	Nov(102)(5): 469-81
Evaluation of the effectiveness of an enhanced recovery after surgery program using data from the National Surgical Quality Improvement Program	Louise M. Gresham, BSc, MD, Manahil Sadiq, BSc, Gillian Gresham, MSc, PhD, Maureen McGrath, RN, BScN, Kiley Lacelle, MN, BScN, Michael Szeto, MD, John Trickett, RN, BScN, David Schramm, MD, Emily Pearsall, MSc, Marg McKenzie, RN, CCRP, Robin McLeod, MD, and Rebecca C. Auer, MD, MSc	2019	62(3): 175–181.
ERAS: Roadmap For A Safe Perioperative Journey/ ERAS: Roadmap For A Safe Perioperative Journey - Anesthesia Patient Safety Foundation (apsf.org)	Rebecca N. Blumenthal, MD	2019	Circulation 122,210 • Volume 34, No. 1
What is the job description for surgeons/ What is the job description for surgeons? (facs.org)		2021	
Goal-Directed Fluid Therapy in the Perioperative Setting/Journal of Anesthesiology, Clinical Pharmacology	Julia B. Kendrink, Alan David Kaye, and Henry Liu	2019	35(Suppl):S29-S34

Appendix 1: List of Suggested Medication

Serial No.	Medication/Equipment	Is it available for hospital use in sufficient amounts?	What alternative(s) are available if this medication/equipment is not available?
1	Chlorhexidine	ok	Iodine, for skin asepsis
2	Lactated Ringers	ok	
3	Plasmalyte	ok	Lactated ringers
4	PO Acetaminophen	No	Paracetamol
5	gabapentinoids		gabapentin, pregabalin
6	Celebrex	ok	celecoxib
7	Entereg	no	Oral syrup (lactulose)
8	Lidocaine	ok	
9	Ketamine	ok	
10	Magnesium infusion	ok	Any multimodal analgesic regimen without lidocaine, magnesium or ketamine
11	Dexmedetomidine	ok	clonidine
12	Propofol	ok	
13	Ketorolac	ok	NSAIDs
14	Dexamethasone	ok	
15	Epidural at thoracic or lumbar level as indicated		- Post operative analgesia for abdominal or Thoracic surgeries - To be decided on a case by case basis and as per availability
16	intrathecal opioids		Fentanyl , pethidine/MORPHINE)
17	Transversus Abdominis Plane (TAP) blocks (+/- catheters)		- Post operative Analgesia for LSCS/Under GA or any lower abdominal surgeries - To be decided on a case by case basis and as per availability
18	DVT prophylaxis	Ok	anticoagulants. LMWHs,warfarin
19	isotonic buffered solution (D51/2 NS)	Ok	Pneumatic compression devices
20	Ibuprofen		**ketorolac** and ibuprofen
21	COX Inhibitors		celecoxib available
22	Muscle relaxants		atracurium
23	PRN opioids		Morphine sulfate /Tramadol

Appendix 2: ERAS Checklist

Tasks	Done [√]	Time [hh:mm]	Done By [Health Professional]
Preoperative			
Preadmission Information and Counselling			
Preoperative bowel preparation			
Preoperative fasting and preoperative carbohydrate loading			
Same-day admission			
Pre-anaesthetic medication avoidance			
Antimicrobial prophylaxis			
Intraoperative			
Standard anaesthetic protocol			
Balanced/multimodal analgesia			
Goal-directed therapy			
Minimally invasive techniques			
High oxygen concentrations			
Preventing intraoperative hypothermia			
Avoidance of drains and lines			
Nausea and Vomiting Prophylaxis			
Postoperative			
Early mobilisation and oral intake			
Prophylaxis against thromboembolism			
Preventing and treating postoperative nausea, vomiting and ileus			
Balanced analgesia			
Early removal of drains, lines and urinary catheters			
Audit			