



St. James's Hospital

SACC Directorate Service Title

Critical Care Units

Oesophagectomy care following *Enhanced Recovery after Surgery (ERAS) Pathway No.*

Protocol Number **SACC 036**

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This protocol replaces all existing protocols/guidelines from April 2022 onwards and is due for review in April 2025. It will be reviewed during this time as necessary to reflect any changes in best practice, law, and organisational, professional or academic change.

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Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway Protocol Number SACC 036*

1.0 Introduction

St. James's Hospital is committed and acknowledges its responsibility to provide evidence based, quality, safe and effective healthcare to all of its patients/clients, staff and site visitors. Oesophagectomy is the surgical resection of oesophageal neoplasm through an abdominal incision and right thoracotomy. The anastomosis is located in the upper chest.

The surgical management of oesophageal cancer represents a complex and challenging problem. **Enhanced Recovery after Surgery (ERAS)** is a paradigm shift away from the more traditional surgical vision to that of one that encompasses the multidisciplinary approach. ERAS attempts to standardise care that reflects International best practice. This multimodal approach is thought to improve perioperative care, reduce complications and ultimately mortality and accelerates patient recovery. In doing so it decreases the economic burden associated with longer hospital stays and a quicker return to a functional baseline for the patient. Academic experts in each discipline of surgery grade the available evidence and provide recommendations for future practice.

The ERAS components discussed here encompass a Preoperative, Intraoperative and Postoperative approach to oesophagectomy surgery with the intention for seamless integration a priority.

The ideal ERAS protocol has seamless integration of all three components. **Table 1**

- Preoperatively patient optimisation is key.
- The surgical approach and anaesthetic management in the intraoperative section are integral to minimise surgical insult and reduce the impact on physiology.
- Postoperatively early removal of drains/lines, early mobilisation, early enteral nutrition and adequate analgesia are important.

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

Preoperative	Intraoperative	Postoperative
Multidisciplinary team discussion with appropriate workup	Surgical approach	Adequate analgesia with opiate limitation to lowest effective dose.
Prehabilitation	Anaesthetic management	Early mobilisation
Cardiorespiratory assessment at Pre- Assessment clinic	Lung protective ventilation	Early removal of drains/invasive lines
Patient counselling & education	Perioperative fluid management	Postoperative nausea & vomiting management
Smoking & alcohol cessation	Hypothermia management	Tight glycaemic control
Venous thromboprophylaxis	Limitation of blood products	Early enteral feeding
Suitable fasting time and carbohydrate loading.		

2.0 Scope

This protocol is applicable to all members of the multidisciplinary team caring for patients undergoing oesophagectomy surgery on the St. James's Hospital site.

3.0 Definitions/Abbreviations:

- **ABG:** Arterial blood gas
- **APTT:** Activated Partial Thromboplastin time.
- **ASA stage:** American Society of Anaesthesiologist's physical classification stage. Used pre-operatively/ pre anaesthesia to communicate a patient's pre-morbid state or if co-morbidities are present.
- **BMI:** body mass index
- **Cardiac ejection fraction:** ejection fraction is a percentage of blood ejected in each cardiac cycle and is a representation of left ventricular performance. It is calculated by the end diastolic and end systolic volumes of the left ventricle.

- **CXR:** chest x-ray

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway Protocol Number SACC 036*

- **DLCO:** diffusion capacity for carbon monoxide. Also known as the transfer factor. It is the extent to which oxygen passes from the alveoli in the lungs into the blood stream.
 - **EPR:** Electronic Patient Record (Cerner) used in ward areas
 - **EUS:** Endoscopic ultrasound
 - **FEV1:** Forced expiratory volume of air in 1 second of maximal expiration after a maximal inspiration. FEV1/FVC: FVC is forced vital capacity. FEV1/FVC is expressed as a ratio. It is useful to analyse airflow limitation/obstruction.
 - **FiO2:** Fraction of inspired oxygen
 - **ICCA** Intellivue Critical care & Anaesthesia: The electronic patient record used in Critical Care.
 - **NSAID's** Non-Steroidal Anti Inflammatory Medications
 - **Oesophagectomy Three-Stage:** The technique is the same as a two-stage oesophagectomy with the addition of a neck incision. This is performed to facilitate mobilisation of higher tumours: choice of operation depending on the location of the tumour.
 - **Oesophagectomy Transhiatal:** If a patient's pulmonary function does not allow for a thoracotomy, and in some patients with an early tumour, a transhiatal approach is the preferred technique as this avoids a thoracotomy. This involves both an abdominal and neck incision. The intra-thoracic part of the oesophagus is bluntly dissected away from the adjacent thoracic structures. The stomach is refashioned and passed up through the chest where it is anastomosed in the neck.
 - **Oesophagectomy Two-Stage:** This involves an abdominal incision and a right thoracotomy incision. The mid and lower parts of the oesophagus are removed along with the upper part of the stomach. The stomach is refashioned into a tube to replace the oesophagus. A thoracotomy follows and the oesophagus is divided in the chest. The stomach is anastomosed to the oesophagus in the chest cavity. One chest tube with underwater sealed drain is placed and will remain in situ post-operatively.
 - **OLV:** One lung ventilation.
 - **PET:** Positron emissions scan.
 - **PF Ratio:** The P/F ratio is an objective tool to identify acute hypoxemic respiratory failure at any time while the patient is receiving supplemental oxygen. The P/F ratio equals the arterial pO₂ ("P") from the ABG divided by the FiO₂ ("F") – the fraction (percent) of inspired
- Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway Protocol Number SACC 036***

oxygen that the patient is receiving expressed as a decimal (e.g., 40% oxygen = FiO₂ of 0.40).

- **PFT:** Pulmonary function test.
- **POD:** Post-operative day
- **PT:** Prothrombin time.
- **SLT:** Speech and language therapy/therapist
- **TIVA:** Total intravenous anaesthesia. A technique of anaesthesia which uses a combination of agents given exclusively by intravenous route without the use of inhalational agents.
- **UGI team:** Upper Gastrointestinal Team.

4.0 Standards

4.1. Pre-operation assessment completed by Pre-Op Assessment Nurse, UGI team and Anaesthetist. Record if the following are applicable or not.

- Full work-up as per multidisciplinary team i.e. pathology, oncology, radiation oncology and surgical input staging/EUS/PET as indicated
- Known drug allergies documented
- Pre-op patient information provided in clinic (word/written format)
- Chemotherapy or Radiotherapy and chemotherapy combined treatment prior to surgery
- Clinical Trial patient
- Prehabilitation
- Pre-operative Assessment Clinic
- If on anticoagulation, ensure appropriate bridge to surgery is prescribed.
- **Thromboprophylaxis:** As per European Guideline recommendations ensure all patients receive intermittent Pneumatic device (IPC) intra op and that anticoagulation is stratified in low risk and high risk patients. Administration of low molecular weight heparin (LMWH) 3000 to 4000 anti-xa international units (IU) administered subcutaneously 12 hourly in patients with a BMI of over 40 kgm² is advised. This decision is made prior to theatre.
- PFTs: FEV₁ (L); FEV₁/FVC (%; DLCO (%)

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

- Cardiac ejection fraction
- APTT, PT and platelet count.
- ASA stage.
- Pre-op weight and BMI - document in notes
- Bloods to include: Hb, Albumin, Creatinine
- SpO2 on room air
- ABG on room air/pre surgery in patients with respiratory co-morbidity.

4.2. Pre-operative Oral Fluids and Fasting: Care administered by ward nurse's unless otherwise stated.

- 4.2.1. Avoid Oral fluids in dysphasic patients unless enteral route is available.
- 4.2.2. Clear fluids allowed up to 2 hrs pre-surgery if no dysphagia.
- 4.2.3. **No food for 6 hours** pre induction of anaesthesia
- 4.2.4. Administer **Chlorhexidine 0.12% mouthwash** e.g. KIN™ the night before & morning of surgery.
- 4.2.5. Carbohydrate loading drink e.g. 'Preload' provided the night before and morning of surgery. The Carbohydrate drink is prescribed by UGI team on EPR per **Table 2**. These sachets will be kept on Bennett's ward and/or Private ward.

Oral Carbohydrate drink administered by nursing staff		
Preload Sachet(s)	Evening/Night before surgery	2 x Preload sachets in 400mls
	Morning of surgery	1 x Preload sachet in 400mls up to 2 hours prior to induction of anaesthesia

Table 1

4.3. Induction: The Anaesthetist is responsible for recording the interventions below on the Anaesthetic Record Sheet (Form no WMN00041).

4.3.1. **Airway**

- Grade of intubation:
- Time spent with Double Lumen tube.

4.3.2. **Ventilation** intraoperatively to include the following:

Oesophagectomy Care following Enhanced Recovery after Surgery (ERAS) Pathway Protocol Number SACC 036

- Mode of ventilation recorded throughout procedure:
- Was a lung protective strategy used
- Tidal volume and level of peep (mean) used during procedure
- Driving pressures used
- Time spent in OLV
- Highest level of FiO₂ used:
- Lowest SpO₂ recorded.
- Detail any episode of hypoxaemia including duration in minutes.

4.3.3. Circulation:

- Was Advanced haemodynamic monitoring used e.g. FloTrac™
- Volume of IV Fluids administered including bolus.
- Blood products administered including Type and Volume
- Vasopressor or inotrope include Drug administered, maximum in dose and duration of therapy.
- If high risk for cardiac arrhythmia record the treatment and/or medication prophylaxis used.

4.4. Intraoperative Anaesthesia: The Anaesthetist is responsible for recording the interventions below on the Anaesthetic Record Sheet (Form no WMN00041).

- Pre-op medication
- Volatile agent
- T.I.V.A used
- Spinal Morphine State time and dose.
- Magnesium
- Nitrous oxide
- Remifentanyl
- Ketamine infusion (If required use low dose, may be beneficial if history of chronic pain)
- **Epidural** Content and rate. Ease of placement of epidural: 1st pass, 2nd pass?

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

- Where an **Epidural is NOT used**; state adjunct analgesia administered.
- State if **Paravertebral block** or **Rectus sheath catheters** were considered if epidural is not used.

4.5. Post Op Theatre Recovery Area:

The Recovery area nurse administers and records the interventions below until handover to Critical Care nursing staff (see 4.6).

- 4.5.1. Administer high flow humidified oxygen via nasal prongs e.g. *AIRVO*®.
- 4.5.2. Perform ABG within 15 minutes of extubation recording FiO₂
- 4.5.3. Epidural Drug (s) & Rate; Aim for rate of 10 ml/hour.
- 4.5.4. PCA Fentanyl is the drug of choice unless otherwise indicated. State rate and lockout period.
- 4.5.5. Administer Shoulder tip pain care as a bundle as described below as proposed standard of care.
- 4.5.6. Paracetamol 1g IV, Ondansetron 4mg IV & Clonidine*, discuss appropriate Clonidine low dose with anaesthetist.
- 4.5.7. Be vigilant for hypotension with co-administration of opioid and clonidine.
- 4.5.8. **Anti-emetics:** Commence Post-Operative Nausea and Vomiting (PONV) pathway with Cyclizine 50mg; then escalate to Ondansetron 4mg as standard. NB: Ondansetron 4mg is given in the shoulder tip pain bundle. If total of 8mg is given, escalate only as per anaesthetic advice.
- 4.5.9. Avoid additional Dexamethasone unless clinically indicated as directed by anaesthesia.

4.6. Immediate Post Op Transfer and Recovery Handover to Critical Care Team

Anaesthetic and theatre recovery nursing staff hand over care of patient together to the critical care team to include the following:

- 4.6.1. Surgical approach
- 4.6.2. Extubation time

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

- 4.6.3. Humidified High Flow Oxygen/Flow settings and start time i.e. AIRVO®
- 4.6.4. IF CXR is completed and/or reviewed. If reviewed, by whom.
- 4.6.5. Total fluids administered intraoperatively and prior to transfer:
 - 4.6.5.1. Blood products administered & number of units
 - 4.6.5.2. Estimated blood loss.
 - 4.6.5.3. Fluid balance at the end of case.
- 4.6.6. Circulation and/or Renal issues or concerns.
- 4.6.7. Chest drains, pleural drains and Jejunostomy and all invasive devices.
- 4.6.8.** ICU medical team to document if difficult airway during anaesthesia on ICU admission. Reintubation for standard indications. If the patient develops respiratory failure, then high flow oxygen may be used. Non-Invasive ventilation is **not** to be used in 3 stage oesophagectomy. Please discuss with surgical team prior to commencing non-invasive ventilation.

5.0 Standards for Postoperative care: Overview of specific care targets for the multidisciplinary team.

- 5.1.** Complete patient admission assessment and 12 hourly assessments thereafter or if condition changes.
- 5.2.** Implement continuous patient monitoring as per ICU standards. Frequency of vital Signs monitoring in ward areas is directed by the Early Warning Score and/or the UGI team.
- 5.3. Pain Management:**
 - 5.3.1. Target pain score less than 4 on moving, deep breathing and coughing.
 - 5.3.2. If standard post-operative analgesia is insufficient consider consulting pain team for advice/consult.
 - 5.3.3. If an epidural is in situ, perform pain assessment on admission and complete all care in accordance with **Epidural Analgesia - Nursing Management Protocol No. SJH: ORIAN(Pt)022**
<https://www.stjames.ie/intranet/ppgs/clinicaldirectorates2/ORIANPt022.pdf>
 - 5.3.4. Epidural pain relief may be inadequate for a 3-stage oesophagostomy; Levobupivacaine Epidural combined with a PCA opioid intravenously may be

Oesophagectomy Care following Enhanced Recovery after Surgery (ERAS) Pathway Protocol Number SACC 036

required. In general, the Epidural must not contain an opioid in this instance unless specified by Consultant Anaesthetist/Pain Team. Refer to

5.3.5. Patient Controlled Analgesia (PCA) - Nursing Management Protocol SJH: SACC-

021 <https://www.stjames.ie/intranet/ppgs/clinicaldirectorates2/SACCO21.pdf>

5.3.6. If TEA is not used, please record adjunct modality used (e.g. Rectus sheath catheter, spinal morphine) on ICCA and/or EPR.

5.3.7. Administer Intravenous Paracetamol as prescribed. Advise 6 hourly unless contraindicated.

5.3.8. Monitor Renal Function: If Creatinine has increased with no background renal history avoid the use of NSAID's

5.3.9. Implement non-pharmacological methods to relieve pain as indicated e.g. patient positioning, pillow for splinting abdominal wound when coughing and deep breathing.

5.3.10. If the patient is ventilated, please record CPOT in ICCA.

5.4. Respiratory Management:

5.4.1. The risk of respiratory complications is substantial after any oesophageal surgical procedure.

5.4.2. Maintain adequate oxygenation via humidified high flow Oxygen to Target oxygen saturations of >94% and/or PaO₂> 10kPa unless otherwise specified.

5.4.3. Maintain patient in an upright position $\geq 45^\circ$ and encourage deep breathing and coughing exercises hourly.

5.4.4. Portable chest X-ray to be performed on admission unless completed in recovery. Repeat Chest X-ray for first three days only. Subsequent CXR's should only be ordered dependant on clinical scenario.

5.4.5. Administer nebulised bronchodilators as prescribed if sputum retention is a problem.

5.4.6. Suction only as indicated by patient assessment. Avoid suctioning patient orally or via nasal airway, especially if neck anastomosis is in place.

5.4.7. Mobilise the patient with physiotherapy input the morning after surgery provided the patient is haemodynamically stable and pain is controlled.

5.4.8. Liaise with the respiratory physiotherapists who must review the patient twice daily for 1st 5 days then once daily.

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

- 5.4.9. Provide care as per **Chest Drain - Nursing Management Protocol SJH:N:016** including chest clamps (metal) at the bedside)
<https://www.stjames.ie/intranet/ppgs/clinicalsupport/SJHN016.pdf>
- 5.4.10. **Observe closely for clinical signs of respiratory distress, respiratory rate, work of breathing and/or increasing oxygen requirements:** If noted
- 5.4.10.1. Consult with ICU team and/or UGI immediately.
 - 5.4.10.2. Inform CNM /Senior Nurse in charge.
 - 5.4.10.3. Urgent referral to Physiotherapist/ On-Call Physio if necessary.
 - 5.4.10.4. Record and highlight increasing Oxygen requirements.
 - 5.4.10.5. Perform ABG analysis. Ensure P/F ratio is recorded.
 - 5.4.10.6. If clinically indicated a repeat CXR is ordered.
 - 5.4.10.7. If suspicion of pulmonary complications e.g. purulent secretions and/or temperature; send a full set of cultures to Microbiology (unless cultures were sent in the previous 24 hours.)
- 5.4.11. Ensure anticoagulation is administered (unless contraindicated).
- 5.4.12. If >300ml fresh blood loss into chest drain per hour contact UGI team.
- 5.4.13. Please ensure pleural drain is secured. If for any reason bag needs to be unattached clamp drain and make sure to unclamp drain once bag is securely re-attached.
- 5.4.14. Monitor the patient for subcutaneous emphysema. If subcutaneous emphysema is present, check chest drain for patency and for air leak.
- 5.4.15. Thoracic suction is rarely needed but use at 3.5 –5kPa if pneumothorax, subcutaneous emphysema, or air leak (bubbling) is present. ICU Anaesthetic team or Surgical team orders thoracic suction.
- 5.4.16. Non-invasive Ventilation (NIV) if necessary is used with caution after consultation with ICU consultant and UGI team. To be avoided in high anastomosis i.e. 3-stage. Can be used in 2 stage but please consult with surgical team. General safe principle is to re-intubate early rather than persist with NIV if patient clearly tiring and deteriorating.

5.5. Cardiac Management:

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

- 5.5.1. Maintain continuous invasive haemodynamic monitoring and observation.
Report any deviation/changes in vitals to ICU team in Critical Care. Increase frequency to half hourly if haemodynamically unstable.
- 5.5.2. Monitor & report cardiac arrhythmias. Perform 12 Lead ECG
- 5.5.3. Report Temperature >38.5° C.
- 5.5.4. Daily Blood Tests: ICU admission set to include FBC, Coagulation, ICU profile and liver function tests. Monitor results and report abnormalities.
- 5.5.5. Monitor electrolytes in particular monitor potassium and magnesium levels and replace as necessary.
- 5.5.6. Ensure prophylactic pharmacological DVT therapy has been ordered. If pharmacological prophylaxis is contraindicated use intermittent pneumatic compression device.

5.6. Fluid Optimisation:

- 5.6.1. IV fluid maintenance prescribed on admission.
- 5.6.2. Ensure strict fluid intake/output is recorded hourly including nasogastric aspirate and chest tube drainage.
- 5.6.3. If patient requires fluid boluses; monitor closely for signs of fluid overload and bring to the early attention of the ICU Medical or UGI teams.
- 5.6.4. Observe fluid balance. If trending into a positive balance bring to the early attention of the ICU Medical or UGI teams.
- 5.6.5. Record Daily weights. The ICU bed scale is zeroed pre admission (where available). Alternatively weigh using SECA seated scales or Hoist.
- 5.6.6. Notify ICU Medical Team/UGI team if urine output is <0.5ml/kg/hr for two consecutive hours.

5.7. Gastro-Intestinal Tract (G.I.T)

- 5.7.1. Patients are nursed with head up 45°.
- 5.7.2. Where possible the patient should not be laid flat. Patients are at risk of gastric reflux and aspiration post-surgery due to sphincter incompetence and because the stomach now lies in the thorax. Risk of aspiration is greater in 3-stage resection or transhiatal techniques: i.e. neck anastomosis.

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

- 5.7.3. Assess abdomen for distention, rigidity, pain and tenderness & auscultate for bowel sounds on admission and every shift.
- 5.7.4. Keep patient nil by mouth until otherwise directed by the UGI team. The stomach must be kept empty as patients are at high risk of gastric reflux and aspiration.
- 5.7.5. Patients will have a Nasogastric tube and a Jejunostomy tube inserted at the time of surgery.
- 5.7.6. The **Nasogastric tube** will be sutured in place;
- 5.7.6.1. Do not manipulate. **If it becomes dislodged inform UGI team; do not reinsert.**
- 5.7.6.2. Naso-gastric tube is maintained on free drainage and gentle aspiration 6 hourly.
- 5.7.6.3. Monitor for amount and colour of drainage and patency of Naso-gastric tube. Report large amounts of drainage, presence of blood and changes in colour to surgical team.
- 5.7.6.4. Do not flush unless surgically advised (not as standard of care).
- 5.7.6.5. No medications are to be administered via the Naso-gastric tube.
- 5.7.7. The Jejunostomy tube will be sutured in place.
- 5.7.7.1. If it becomes dislodged inform UGI team; do not reinsert.
- 5.7.7.2. Maintain patency of Jejunostomy tube; Flush prior to use and once a shift or as directed by the surgeons. Keep clamped when not in use.
- 5.7.7.3. Avoid administering medication via Jejunostomy unless approved by the UGI team.
- 5.7.7.4. If enteral medications are required they are administered via the jejunostomy tube i.e. not via nasogastric tube.
- 5.7.7.5. **STRICTLY NO PPIs** via Jejunostomy tube. Administration of Proton Pump Inhibitors or H2 antagonists is not required. The patient has had a vagotomy and therefore will not be at risk of increased gastric acidity.
- 5.7.7.6. Do not administer Magnesium Verla™. If Magnesium replacement is required, administer via IV route.
- 5.7.7.7. If any a medication is administered flush Jejunostomy tube with Sterile Water 50mls pre and 50mls post administration.

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

5.7.7.8. See Information for Ward Staff on the 8Fr Argyle Surgical Jejunostomy Feeding Tube on the ICU intranet – Clinical reference.

<https://www.stjames.ie/intranet/oncampus/departments/intensivecareunit/clinicalreferencecribcards/ICUHDU,Information,on,the,8Fr,Surgical,Jejunostomy,Feeding,Tube,2018.pdf>

5.7.8. Ensure strict oral care as per patient assessment to promote patient comfort and reduces risk of oral mucosa breakdown, colonisation by hospital bacteria and infection. Chlorhexidine 0.12% Mouth wash is administered TDS for 3 days.

5.7.9. Enteral feeding commences via Jejunostomy at 08:00hrs the morning after surgery.

5.7.9.1. Commence feeds at 30ml/hr and increase as ordered by the clinical nutritionist.

5.7.9.2. Reduce IV fluids by the same increment as the increase in enteral feeds.

5.7.9.3. Aim to have 100% of fluid and caloric intake within 1st 48hrs post-surgery.

5.7.9.4. If intolerance to jejunostomy feeding occurs; stop feed and inform the UGI team.

5.7.10. Monitor blood sugar levels on admission and 12 hourly thereafter. Monitor 6 hourly if known diabetes mellitus or on TPN.

5.7.11. If Blood sugar elevated above 7.1 – 9 mmols/L in Critical Care, inform ICU Medical team. Insulin administration is provided as per **Intravenous Insulin Therapy Management in Critical Care Patients Protocol SJH:SACC013**

<https://www.stjames.ie/intranet/ppgs/clinicaldirectorates2/SJHSACC013.pdf>

5.7.12. Wound Care: Initial dressing change after 48 hrs then every 7 days PRN.

5.7.12.1. Advise transparent dressing e.g. Opsite™ Grid to ensure visualisation of wound.

5.7.12.2. Send a swab to microbiology if suspicion of infection.

5.8. Psychological Care

5.8.1. Provide Psychological support and reassurance to the patient.

5.8.2. Assess level of family support and involvement. Ensure the patient and their relatives are informed and involved as much as possible.

5.8.3. Ensure visits from Cancer Co-ordinator are facilitated.

5.8.4. Refer to the Social Work Department if required.

Oesophagectomy Care following Enhanced Recovery after Surgery (ERAS) Pathway Protocol Number SACC 036

6.0 POD 0:

Nursing staff complete interventions unless stated otherwise. **Refer to Section 5.0.** If any deviations from baseline refer to the ICU Medical Team without delay.

- 6.1. Administer high flow humidified oxygen e.g. *via Airvo*[®]. Titrate to target saturations.
- 6.2. If for any reason CXR was not performed in recovery after surgery please order.
- 6.3. Elevate the Head of the bed to 45 degrees as much as tolerated.
- 6.4. Monitor and record output from underwater seal & pleural drains.
- 6.5. Suction only as indicated by patient assessment.
- 6.6. Perform ABG recorded with P/F ratio.
- 6.7. Order & send bloods & admission screens as standard to include Albumin, Hb, CRP and LFTs.
- 6.8. Assess effectiveness of epidural therapy. If ineffective contact the ICU Medical team immediately for review
- 6.9. If pain relief remains ineffective 2 hours following an epidural top-up i.e. Pain Score ≥ 4 , request a further review by ICU medical team.
- 6.10. Ensure patency of Nasogastric & Jejunostomy tubes.
- 6.11. Perform oral assessment & care as prescribed e.g. Chlorhexidine 0.12% TDS.
- 6.12. Administer Enoxaparin as prescribed unless clinically indicated otherwise. If withheld record in ICCA.
- 6.13. Pressure relieving mattress as per Braden Scale.

7.0 POD 1:

Nursing staff complete interventions unless stated otherwise. **Refer to Section 5.0.** If any deviations from baseline refer to the ICU Medical Team without delay.

- 7.1. Administer high flow humidified oxygen titrate to effect e.g. *via Airvo*[®].
- 7.2. Start enteral feeding regime at 08:00 as documented by dietician notes.
- 7.3. CXR ordered and reviewed by the ICU Medical Team.
- 7.4. Order & send routine ICU bloods to include albumin, Hb, CRP and LFTs and Creatinine.
- 7.5. Record Daily weight.
- 7.6. Strict Intake Output Monitoring. Avoid positive fluid balance.

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

- 7.7.** Assess effectiveness of the epidural/paravertebral block/rectus sheath catheter to provide analgesia prior to physiotherapy session i.e. ideal self-reported pain score of less than < 4/10.
- 7.8.** Early Mobilisation: Sit patient out of bed **by 11am** unless clinically indicated otherwise (Nursing staff ± Physiotherapist). Target:
- 7.8.1. Standing & Marching on the spot.
 - 7.8.2. Goal; walking 60-100 metres twice a day.
 - 7.8.3. Sitting out in the chair as tolerated
 - 7.8.4. If targets are not achieved document reason why in ICCA.
- 7.9.** Perform oral assessment & care as prescribed (e.g. Chlorhexidine 0.12% TDS)
- 7.10.** Discuss the following with the ICU Medical Team:
- 7.10.1. Reducing Epidural infusion rate by 25% of current dose.
 - 7.10.2. Reducing or discontinuing IV fluids
- 7.11.** Administer Enoxaparin as prescribed unless clinically indicated otherwise. If withheld record in ICCA.
- 7.12.** Initial antibiotic dose given intra-op followed by two doses in the post-operative period. Please ensure prescription is discontinued after three doses unless clinically indicated otherwise.
- 7.13.** Assess devices for removal daily.

8.0 POD 2:

Nursing staff complete interventions unless stated otherwise. **Refer to Section 5.0.** If any deviations from baseline refer to the ICU Medical Team without delay.

- 8.1.** Wean High Flow humidified Oxygen: If feasible switch to low flow oxygen via nasal prongs.
- 8.2.** CXR ordered and reviewed by the ICU Medical Team.
- 8.3.** Order & send daily bloods to include CRP, Albumin, Creatinine & LFTs.
- 8.4.** Strict Intake Output Monitoring. Avoid positive fluid balance.
- 8.5.** Record daily weight.
- 8.6.** Perform oral assessment & care as prescribed i.e. Chlorhexidine 0.12% TDS.
- 8.7.** Assess effectiveness of the epidural/paravertebral block/rectus sheath catheter to provide analgesia i.e. ideal self-reported pain score of less than < 4/10.

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

8.8. Mobilisation: Sit patient out of bed by 11am unless clinically indicated otherwise
(Nursing staff ± Physiotherapist). Goal:

8.8.1. Standing & Marching on the spot.

8.8.2. Walking 60-100 metres twice a day.

8.8.3. Sitting out of bed as tolerated

8.8.4. If goals are not achieved document reason why in ICCA.

8.9. Consult with UGI team if UWSD can be removed today. The UGI team must write a note on EPR to this effect.

Assess devices for removal daily.

9.0 POD 3:

Nursing staff complete interventions unless stated otherwise. **Refer to Section 5.0.** If any deviations from baseline refer to the ICU Medical Team without delay.

9.1. Aim for discharge to the ward on POD 3. If unable to discharge continue to target goals as tolerated.

9.2. Continue weaning oxygen as tolerated.

9.3. Perform oral care. Chlorhexidine 0.12% mouthwash TDS e.g. Kin™ is discontinued this evening.

9.4. Order daily bloods to include CRP and Liver function tests.

9.5. Order CXR. This should be the last day a routine CXR is ordered unless clinically indicated otherwise.

9.6. Assess effectiveness of the epidural/paravertebral block/rectus sheath catheter to provide analgesia i.e. ideal self-reported pain score of less than < 4/10.

9.7. Ensure EPR PCA prescription is entered before transfer to ward. Prescription & pump settings must be checked and co-signed by both nurses at ward handover.

9.8. Mobilisation goal 100 metres x 2 today. If goals are not achieved document reason in ICCA.

9.9. Wound Care. Initial dressing change today.

9.10. Assess devices for removal daily. If UWSD not removed yesterday discuss with **UGI team who must write a note on EPR to this effect.**

Oesophagectomy Care following Enhanced Recovery after Surgery (ERAS) Pathway Protocol Number SACC 036

10.0 POD 4: Ward level care.

Nursing staff complete interventions unless stated otherwise. **Refer to Section 5.0.** If any deviations from baseline refer to the UGI Team without delay.

- 10.1. Discontinue Epidural Infusion on POD 4 unless pain control is an issue.
- 10.2. **NOTE:** Ensure 12 hours have elapsed between administration of anticoagulation and removal of the epidural catheter.
- 10.3. Remove the indwelling epidural catheter. This should be witnessed by a second registered general nurse. Document in EPR.
- 10.4. Check with the UGI team if swallow assessment is required. The team must order this on EPR.
- 10.5. SLT routinely complete bedside swallow exam for those with a neck anastomosis, including both Transhiatal, and Post 3 Stage Oesophagectomy and Thoracotomy. If there are aspiration concerns, a video fluoroscopy is scheduled by the SLT. If swallow assessment is not required as per UGI team: commence 60mls/hr of water initially, and then progress up to half portions of level 7/easy to chew food prior to discharge.
- 10.6. Mobilisation Goal Walking 200-400 metres twice daily. Physiotherapist documents if goal is not met.
- 10.7. Wean Oxygen requirements as tolerated.
- 10.8. Review wound dressing and record findings.
- 10.9. Assess devices for removal daily.
 - 10.9.1. Remove urinary catheter once epidural is removed (unless clinically required). Monitor urine output post removal as is standard practice.
 - 10.9.2. Remove Central Venous Access Device if no longer required. Ensure Peripheral access is sited prior to removal.
- 10.10. Document pain assessment and PCA requirements on EPR as standard.

11.0 POD 5:

Nursing staff complete interventions unless stated otherwise. **Refer to Section 5.0.** If any deviations from baseline refer to the UGI Team without delay.

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

- 11.1. Wean Oxygen requirements as tolerated.
- 11.2. Mobilisation target 200-400 metres twice daily. If mobilisation does not take place, Nurse/Physiotherapist records the reason on EPR.
- 11.3. Assess and record pain score on EPR as standard. Target pain score less than < 4. If not achieved refer to the pain team for further advice.
- 11.4. If pain is controlled, discontinue the PCA today. If unable record the reason in EPR.
- 11.5. Barium swallow today; ordered by UGI team - document result.
- 11.6. Assess devices for removal daily.
- 11.7. Review wound dressing and record findings.

12.0 POD 6:

Nursing staff complete interventions unless stated otherwise. **Refer to Section 5.0.** If any deviations from baseline refer to the UGI Team without delay.

- 12.1. Wean Oxygen requirements as tolerated.
- 12.2. Physiotherapy to continue with mobilisation goals.
- 12.3. Review wound dressing and record findings.
- 12.4. Assess devices for removal daily. Discuss with the UGI team if the pleural drain will be removed today. If not, record the reason in EPR.
- 12.5. Feeding Pump training should be started today by dietician.
- 12.6. Discharge communication should be started today with all members of multidisciplinary team with a proposed day of discharge given to patients and families.

13.0 POD 7 onwards for remainder of hospital stay:

All members of multidisciplinary team are responsible for providing the following care. **Refer to Section 5.0.** If any deviations from baseline refer to the UGI Team without delay.

- 13.1. Monitor **Respiratory parameters.**
- 13.2. Promote daily mobilisation
- 13.3. **Physiotherapist** provides advice regarding **exercise options post discharge** with links to cancer services accordingly (ARC, Exwell etc.)

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

- 13.4.** **Dietician** to follow progression of diet e.g. introduce soup, jelly, ice-cream and yogurt. Half portions of easy to chew food. Observe diet tolerance.
- 13.5.** Assess devices for removal daily.
- 13.6.** **Wound:** Remove cervical clips POD 7. Remove remaining clips by POD 9.
- 13.7.** Weekly review jejunostomy site dressing if discharge is delayed.
- 13.8.** Public health nurse referral by nursing staff.
- 13.9.** Less nursing involvement envisaged from POD 7 onwards in patients who have remained on this pathway.
- 13.10.** Aim for discharge on POD 9.

POD1	POD2	POD3	POD4	POD5-9
High flow or AIRVO	Mobilisation goals. Record if not achieved with reason why	Discharge to ward level care.	Discontinue epidural if pain well controlled. Remove indwelling epidural catheter.	If swallow assessment not on POD 4 D/W team if it can be done on POD5.
Start enteral feed at 08:00hrs	Daily weight	ICU bloods and chest x-ray	Remove urinary catheter and CVC	Enteral pump training and education.
ICU bloods, CXR and daily weight.	D/W UGI team if UWSD can be removed today.	Ensure PCA prescribed for transfer to ward.	Assess for swallow assessment as per SLT.	Progress diet to half portions, easy to chew feed as per dieticians.
Chlorhexidine 0.12% mouthwash TDS	Daily CXR	Initial dressing change today.		Remove cervical clips on POD7.

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

<p>Aim for pain relief to be <4/10. If feasible reduce epidural. Start PCA if applicable. Fentanyl only please.</p>		<p>If UWSD was not removed yesterday can it be removed today – check with UGI.</p>		<p>Public health nurse referral by nursing staff.</p>
<p>Mobilisation goals with physiotherapy. Please record reasons if not achieving set goals.</p>		<p>Chlorhexidine 0.12% can be discontinued today (72hrs duration). Discontinue antibiotics unless otherwise indicated.</p>		<p>Aim for discharge POD9.</p>

14.0 Audit/Compliance:

- 14.1. All members of the Multidisciplinary team must record any deviations to this protocol in the relevant patient chart on EPR or ICCA
- 14.2. The practices will be audited periodically by the UGI team.
- 14.3. Adverse Incident Forms will be submitted for any deviations that suggest a near miss or patient harm occurred.

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

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Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway* Protocol Number SACC 036

Document Log			
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Version 2	2	March 2022	Title changed from Oesophagectomy: Post-operative Patient Care Guidelines No. SJH: ORIAN(G)036 to Oesophagectomy care following <i>Enhanced Recovery after Surgery (ERAS) Pathway No. Protocol Number SACC 036</i> Changed from Guideline to Protocol Introduction expanded to include ERAS pathway Scope expanded to Multidisciplinary team Section 3.0 Definitions & Glossary expanded Section 5 Standards updated Sections 6 -13 Post Op days added

Oesophagectomy Care following *Enhanced Recovery after Surgery (ERAS) Pathway Protocol Number SACC 036*