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Original research

## The implementation and effectiveness of an enhanced recovery programme after oesophago-gastrectomy: A prospective cohort study



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## ABSTRACT

**Background:** Oesophageal resection is notoriously complicated and produces a cohort of patients prone to postoperative complications. Maintaining quality care demands a systematic approach to patient management yet postoperative recovery after oesophagectomy is often needlessly inefficient, heterogeneous and governed by the idiosyncrasies of the operating surgeon. Enhanced recovery after surgery (ERAS) programmes are now well established in colorectal surgery and here we describe the implementation and effectiveness of an ERAS programme for the postoperative management of Ivor Lewis oesophago-gastrectomy (ILOG).

**Methods:** An ERAS programme was devised and implemented with the support of a dedicated in-hospital task-force. Three consultant surgeons allocated consecutive patients to the programme (ERAS) and outcomes were compared to consecutive patients not on the ERAS programme (non-ERAS) and a pre-ERAS cohort (pre-ERAS). Principal outcome measures were total length of stay (TLOS), Accordion postoperative complication grade and 30-day readmission rate.

**Results:** 75 patients were enrolled on the ERAS programme, 41 continued as a non-ERAS cohort and 80 consecutive pre-ERAS patients were identified. A significant improvement in median TLOS was observed in the ERAS group (10 days r.7–58) compared to pre-ERAS (13 days r. 8–57) ( $p = <0.001$ ) and non-ERAS patients (13 days r.8–42) ( $p = <0.001$ ). No significant difference in Accordion scores for postoperative complications or 30-day readmission rates were observed.

**Discussion:** The introduction of an ERAS programme after ILOG can significantly reduce TLOS without jeopardising patient safety or clinical outcomes. The successful introduction of an ERAS programme requires full motivation and support from all team members including the patient.

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## 1. Introduction

The evolution of high-volume centres for oesophago-gastric surgery has created an environment capable of supporting the dedicated infrastructure and breadth of multi-disciplinary experience required to deliver consistently high quality outcomes [1,2]. Oesophageal resection is notoriously complicated and produces a cohort of patients particularly prone to peri-operative morbidity and mortality [3,4]. Maintaining quality care demands a comprehensive and systematic approach to patient management with the formulation of standardised clinical care pathways [5,6]. Such pathways optimise every aspect of patient care from initial referral through to postoperative follow-up, improving outcomes and

reducing costs [5,6]. However, the immediate postoperative recovery phase after major oesophageal resection often remains faithful to the idiosyncrasies of the individual operating surgeon leading to inefficient patient progression and needlessly prolonged inpatient stay. Enhanced recovery after surgery (ERAS) programmes are now well established in colorectal surgery, driven by a multi-disciplinary approach that aims to ally the expectations of surgeons, nursing staff, physiotherapists, dieticians and most importantly the patient, to facilitate an accelerated and safe hospital discharge [7,8]. Considering that published series report an inpatient post-oesophagectomy stay of between 11 and 26 days [3,5,9,10] and that the potential benefits of ERAS programmes have been clearly demonstrated in other cancer care pathways, we wish to focus attention to replicate this success in major oesophago-gastric resections.

Here we describe the implementation and effectiveness of a goal-directed ERAS programme for the postoperative management

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**Table 1**

Enhanced recovery after surgery programme for ILOG patients implemented at the Peninsula Oesophago-Gastric Surgery Unit, Derriford Hospital, October 2011.

	Day of Operation (Day 0)	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
<b>Monitoring</b>	Hourly observations Heart monitor attached Humidified oxygen via mask TED	2–4 hourly obs Hourly urine Remove heart monitor TEDS – removed, legs checked, replaced daily	4–6 hourly obs Hourly urine			Stop Oxygen	6 hourly obs	6 hourly obs
<b>Pain Control</b>	stockings in situ Epidural, PCA or Paravertebral IV paracetamol Diclofenac PR if required					Remove epidural / paravertebral Oral analgesia		
<b>Exercise</b>	Supported to lie upright in bed Sit out in chair (depend time get to ward) Leg movements in bed Breathing exercises using incentive spirometer	Sit out in chair Support patient to mobilise x4 times per day Other exercise as per Day 0						
<b>NG Tube</b>	In place				Spigot (4–6 hrly aspirates)	Consider removal		
<b>Chest Drains</b>	In place					Consider removal 1 chest drain	Consider removal 2nd & 3rd (left sided) if present	
<b>Abdominal Drain</b>	In place			Consider removal				
<b>Urinary Catheter</b>	In place			Consider removal				
<b>Central Line</b>	In place			Consider removal				
<b>IV Fluids</b>	In place				Consider stopping Free Fluids			
<b>Eating and Drinking</b>	jejunostomy feed 30ml/hr Sips of water up to 100ml per hour						Start full diet as per dietician advice. Overnight feed via jejunostomy	Dietitian review as to need for overnight jejunostomy feeding at home
<b>Wound Care</b>		Change drain dressings Surgical wounds checked & dressings changed if necessary				Leave surgical wound undressed, if dry and healing well		
<b>Investigations</b>	Chest X-Ray recovery	Chest X-Ray FBC, U&E	FBC, U&E	Chest X-Ray FBC, U&E, CRP	FBC, U&E	Chest X-Ray FBC, U&E, CRP	Chest X-Ray FBC, U&E	Chest X-Ray

of two-stage Ivor Lewis oesophago-gastrectomy (ILOG) patients in a high-volume regional tertiary referral centre for oesophago-gastric resections.

## 2. Methods

An ERAS programme was devised to standardise the admission process and postoperative management of oesophagectomy patients with a principle aim of reducing inpatient stay whilst maintaining or improving outcomes. The ERAS programme was designed over a series of meetings involving a task-force of representatives from all aspects of patient care, principally oesophago-gastric surgeons, specialist anaesthetists, cancer specialist nurses, theatre staff, dieticians, physiotherapists, senior nursing staff, directorate managers and a Trust appointee for the implementation of ERAS programmes. The finalised ERAS programme (adapted with

**Table 2**

Accordion Severity Grading System (ASGS) for postoperative complications [11].

Severity Grade	
1 Mild complication	Requires only minor invasive procedures at the bedside
2 Moderate complication	Requires pharmacological treatment such as antibiotics
3 Moderate complication	Requires management by endoscopic intervention or intervention without anaesthesia
4 Severe complication	Requires management by a procedure under general anaesthesia
5 Severe complication	Organ system failure
6 Death	Postoperative death within 30 days

The ASGS provides a framework for complication assessment which is based on grading the complexity of therapy for the complication.

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