Benchmarking enhanced recovery after surgery oesophagectomy mobilisation targets: A service evaluation

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Abstract

Background

Enhanced recovery after surgery (ERAS) encompasses standardised post-operative care for a wide-range of surgical specialties. ERAS is recommended following oesophagectomy surgery to reduce the risk of pulmonary complications and enable faster return to baseline function. Current ERAS oesophagectomy guidelines advocate early mobilisation as a key component but there is no clear guidance on mobility targets to aim for, or an evidence base to support setting specific mobilisation targets for these patients. A local service evaluation over six months, revealed that 74% (n = 23) of oesophagectomy patients did not achieve the ERAS day one or two post-operative mobility targets. Benchmarking mobility targets will allow comparison of the local ERAS targets in relation to those set in other upper gastrointestinal (UGI) centres and identify if the failure to achieve these is a local or national issue. Aims were to benchmark day one and two post-operative oesophagectomy ERAS mobility targets across similar sized UGI centres to the local trust determine how targets were established and identify potential reasons for failure to meet them.

Methods

A benchmarking design using an online survey to evaluate ERAS mobility targets and service provision following oesophagectomy. Purposive sampling was used to invite UGI centres in England with an established ERAS pathway to participate. All centres were given three weeks to complete the survey for patients admitted between 1st May 2021–31st October 2021.

Results

Ten centres agreed to take part with seven subsequently completing the survey. Two centres reported not having standardised mobility targets. There was no consensus among the other five centres who reported progressive ambulatory targets varying from sitting out of bed to walking 50–100 metres. There was variation in how mobility targets were determined, from expert opinion to group consensus. No centre reported using evidence to determine the targets. The most common reasons for failure were hypotension (65.5%) and pain (50%).

Conclusions

There was no consensus in post-operative mobility targets across centres despite mobilisation being advocated in oesophagectomy ERAS guidelines. In the absence of evidence mobility targets, they were informed by expert opinion. Future research should focus on investigating the optimum level of post-operative mobilisation on days one and two for oesophagectomy ERAS pathway patients.

Introduction

Enhanced recovery after surgery (ERAS) is defined as a '*multimodal perioperative care programme*', which requires a multidisciplinary team approach and categorises care into pre, intra and post operative elements (1). ERAS can reduce hospital and intensive care unit (ICU) length of stay and minimise the risk of post-operative pulmonary complications (PPCs) by promoting a return to baseline functioning as efficiently as possible after surgery (2, 3). ERAS which first began following colon resections (4) has been adopted by other surgical specialties and in 2018 ERAS guidelines for oesophagectomy were published (5).

The risk of developing PPC's for patients post upper gastrointestinal surgery (UGI) is higher than other surgical specialities with oesophagectomy patients having a five-fold increased risk (6). A key aspect of all ERAS guidelines is early mobilisation (EM) which aims to reduce PPC risk by increasing tidal volume minute ventilation and aiding dependent lung recruitment (7). EM has been demonstrated to be safe and effective to implement in ICU and high dependency unit environments (8, 9).

The 2018 ERAS oesophagectomy guidelines state that a standardised EM approach should be used with '*an incremental increase in activity each day to reach predetermined targets*', however, setting the targets is open to interpretation (5). The lack of a standardised definition for early mobilisation has previously been recognised with the definition of early mobility ranging from sitting out of bed to ambulation at varying time points post admission (10, 11).

Background

A local service evaluation over six months revealed that 74% (*n* = 23) of oesophagectomy patients did not achieve the ERAS post-operative mobility target on days one and two after surgery. This was conducted in a cancer and organ transplant surgery specialist ICU with six beds and two isolation side rooms. The local ERAS day one target aims for the patient to sit out of bed twice for two hours, alongside two walks of over 40 metres. The day two target is to sit out of bed twice for two hours again and complete two walks of over 100 metres. The primary reason for not achieving targets was hypotension (65%, *n* = 15) especially in patients who had an epidural (93%, *n* = 14). Currently there is little evidence to support best practice for EM in UGI surgery ERAS programmes (11). There has been no comparison to date of the ERAS mobility targets following oesophagectomy in UGI centres in England, therefore it is unclear if failure to achieve these, is a local or national issue.

Aims and objectives of study

The aim of this benchmarking project was to determine the ERAS mobilisation targets that UGI centres in England set for oesophagectomy patients. A secondary aim was to determine how these targets were established and determine clinicians' views for failure to meet them.

Methods

This England based benchmarking service evaluation is reported, following the *Standards for quality improvement reporting excellence (SQUIRE) guidelines* (12).

Setting and sample

England based UGI centres were included if they were an institution of a similar size to the local trust and had an established ERAS pathway for oesophagectomy patients. Purposive sampling was used to identify and invite the centres to participate.

Data collection tools and methods

An online survey made up of two sections, including service provision and mobility targets was developed. The survey was piloted locally and adjusted based on feedback prior to dissemination. The survey was anticipated to take 20 minutes to complete based on the pilot with all invited centres being given a three-week period to complete the survey. The questions referred to oesophagectomy patients admitted between 1st May 2021 and 31st October 2021. This period was chosen due to pressures of the COVID-19 pandemic

causing disruption to the number of elective surgeries being conducted before this time. A follow up reminder email was sent one week before the deadline.

Data analysis

Data was transferred to an excel document and manually checked for completeness. Demographics were summarised using descriptive statistics. Non-numerical data was arranged into tables and a narrative synthesis was used to discuss the varying responses.

Ethical approvals

The research and development department at the local NHS trust were contacted and confirmed the project as a service evaluation which did not require ethical board review. The project was registered locally as a service evaluation (Ulysses number 5287). Participating centres were aware that participation in this project was entirely voluntary and they were free to withdraw at any point.

Results

Survey response

Of the twelve centres contacted, ten centres agreed to take part. Responses were received from seven centres across England, which along with data collated from the same date periods in the local trust, resulted in eight centres being included in the overall analysis (Table 1). The ten centres who agreed to participate all had established ERAS oesophagectomy pathways. All questions had a 100% completion rate with only two centres being unable to specify the number of oesophagectomies performed during the six-month period. Median survey completion time was 9.14 minutes with a minimum five and maximum 13 minutes.

Table 1: Location of participating centres.

Centre number	England region
1	Northwest
2	London
3	London
4	Southeast
5	Northeast
6	Southwest
7	Northeast
8	Southeast

Service provision characteristics

Six centres provided data on the number of oesophagectomies performed in the period analysed. The number ranged from a minimum of 21 to 50 maximum, with an average of 41

procedures in the six-month time frame. Patients were predominantly admitted post operatively to a closely monitored environment, either HDU or ICU, with one centre providing no further information on post-operative location for their patients (Table 2).

Table 2: Admission information.

Centre number	Are oesophagectomy patients routinely admitted to ICU or HDU post operatively?	If 'other' then where are they admitted?
1	Other	Post-operative care unit
2	Other	Critical care unit, does not specify L2/3 beds
3	ICU	
4	HDU	
5	HDU	
6	Neither	
7	Either	
8	Other	Critical care unit, with both L2 and L3 beds

Mobilisation provision

Two centres (25%) did not report standardising their post-operative day one and two mobilisation targets. As Table 3 demonstrates, there was wide-variation in who provided the mobilisation with the majority (67.5%) utilising an ICU/HDU physiotherapy team. Other responses included using a ward physiotherapy team with level 1 nursing staff or a combination of surgical therapists and critical care therapists. The final centre reported their nursing staff were predominantly responsible for providing mobility with physiotherapists only assessing and treating as indicated.

Table 3: Mobilisation provision and targets.

Centre number	Which team provide the mobility interventions?	How were the ERAS mobility targets for your centre determined?	Is compliance to mobility targets monitored?	Who completes the monitoring of mobility targets?
1	Other	Pathway development	Yes	Other
2	ICU/HDU physiotherapy team	Experience of patient group, clinical presentation, attachments, not evidence based	Yes	Surgeon/surgical team
3	ICU/HDU physiotherapy team	Set by Band 8 based on expert opinion and audit	Yes	ICU/HDU therapy team
4	Other	Expert opinion	Yes	Dedicated ERAS team
5	A combination	Consensus of group	Yes	Dedicated ERAS team
6	Other	Unknown	No	N/A
7	ICU/HDU Physiotherapy team	Unknown	No	N/A
8	ICU/HDU Physiotherapy team	Expert opinion	Yes	ICU/HDU therapy team

Mobilisation targets

There was wide variation in how the ERAS targets were determined by each centre with two reporting unknown and other answers ranging from expert opinion to group consensus with no clear evidence-based approach (Table 3). All the centres reported progressive targets from day one to day two post operatively (Table 4). There was no consensus in these targets with varying intensity levels aimed for by differing centres. Most distance targets were set in metres with only one centre reporting their goal in feet and one in steps. Distance targets varied from 50 steps on day one to 100 metres on day two. An epidural was used in three of the eight centres with two others detailing that they utilised either paravertebral blocks, long-acting infusions or patient controlled analgesia as alternative analgesic

methods for their patients. The remaining centres did not specify what alternative analgesic method to an epidural was used. Reasons to not meet mobility targets were numerous with the most common answers being hypotension ($n = 5$, 62.5%) and pain ($n = 4$, 50%).

Table 4: Mobilisation targets and reasons for failure.

Centre number	What is the day 1 mobility target?	What is the day 2 mobility target?	Is an epidural commonly used as pain relief?	What is the most common reason for failure to meet mobility targets?
1	Sit out-of-bed	Sit out-of-bed, mobilise on spot	Yes	Pain, attachments (epidurals and chest drains), oxygen requirements
2	Sit out-of-bed	Mobilise 50m	No	Hypotension, pain, ventilation/trache/ movement restrictions
3	50 steps minimum, sit out-of-bed	50–100 steps, sit out-of-bed	No	Intubation
4	2 × walks (25/50m)	3 × walks (25/50m)	No	Pain
5	Walk 50–100 feet	Walk 3 times (no set distance)	No	Hypotension
6	Sit out-of-bed (aiming for 6 hours)	Mobilise 10m	No	Hypotension
7	Out of bed mobilisation	Mobilise 60m × 2	Yes	Pain, hypotension, respiratory deterioration
8	Sit out-of-bed, 2 × 2 hours, mobilise 40m × 2	Sit out-of-bed 2 × 2 hours, mobilise 2 × 100m	Yes	Hypotension

Discussion

This service evaluation has demonstrated the lack of standardisation and wide-variety of post-operative mobility targets set for ERAS oesophagectomy patients across England. Mobilisation was provided by a variety of teams and professional groups with no centre

identifying a clear evidence base for how local targets were set. Failure to achieve targets was often due to pain and hypotension with epidurals being used by some centres as recommended in the 2018 ERAS guidelines for first line analgesia.

The lack of standardisation makes it difficult to compare targets between centres and establish any consensus on the optimal mobilisation target in the immediate post-operative days. This finding is consistent with other studies investigating upper GI ERAS protocols, where there is no standard definition of early mobilisation ranging from sitting out of bed to early ambulation (10, 13). This could lead to possible high interpretation bias when attempting to assess overall unified compliance rates between centres (10, 13).

ERAS adherence assessment varies with local protocols being able to be modified according to clinical requirements and centre capabilities (13). Adherence has commonly been assessed either as the proportion of patients achieving their target discharge date (14) or alternative methods include calculating the number of preoperative and postoperative elements fulfilled with high compliance suggested as fulfilling >70% and low (<70%), though again this definition can vary making comparison of protocol elements difficult (13). With no regional agreement or evidence base appearing to exist for mobility targets to be based on, it is recommended that local data collection is used establish baseline local performance and subsequent targets.

Wide-variation in the professions providing early mobilisation was reported from the survey including ICU physiotherapy teams, surgical therapists, and nursing staff. Previous research has demonstrated that mobilisation delivery time may be impacted by differing professions (15, 16). As the primary reasons reported by the centres for not achieving the targets set were pain and hypotension with oesophagectomy patients often having numerous attachments, it may be that some clinicians have a lower threshold to stop the sessions and thus not achieve the set targets. Other considerations for why reported targets are not achieved may be that published studies underestimate nurse-led activity by only focusing on physiotherapy-led activities and reported levels of mobility achieved during physio sessions. Nurses can perform out-of-bed transfers later in the day or early evening so this may lead to improved adherence to the goals, but it is not recognised in the data collection of studies (17).

Epidurals have been advocated by the guidelines as the first line approach to post-operative analgesia to enable earlier extubation, deep breathing and mobilisation (5). Complications can include postural hypotension from sympathetic blockade, that in-turn can limit mobilisation of these patients post-operatively (17, 18). The 2018 guidelines state that paravertebral blocks (PVB) can be a good alternative, given the reduced impact on mobilisation with evidence from systematic reviews stating hypotension was less of an issue when PVBs were utilised (5, 19). Only three of the surveyed centres reported using epidurals as first line analgesia although those that reported used alternative analgesic methods, such as PVB also

reported hypotension being an issue with mobilisation. This warrants further investigation along with other potential contributory factors such as intra-operative fluid restriction.

Limitations of this study include a purposive sampling method which leaves this paper open to potential researcher bias. However, all efforts were made to contact as many centres as possible that matched a similar sized oesophagectomy cohort to the local trust. Not all the contacted centres responded but those that did had 100% completion rate of questions included in the survey. Actual adherence rates to the mobilisation ERAS element were also not fully assessed with only suggestions being made by each centre for the factors contributing to failure meeting the targets set and number of oesophagectomies performed. The survey was kept short to assist with a greater response rate, so detailed data comparison was unable to be performed.

Conclusion

There was no consensus in post-operative mobility targets across centres despite mobilisation being advocated in oesophagectomy ERAS guidelines. In the absence of evidence, mobility targets were informed by expert opinion. Future research should focus on investigating the optimum level of post-operative mobilisation on days one and two for oesophagectomy ERAS pathway patients.

Key points

- Poor standardisation of data collection limits detailed comparison between centres and the sharing of best practise.
- Local standards continue to be informed by expert opinion.
- Audit of local pathways could help optimise delivery of enhanced patient recovery.

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Conflict of interest disclosure

The authors declare that there is no conflict of interest.

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