The Psycho-social Outcomes following emergency Laparotomy (POLO) study: A study protocol for a multi-centre mixed method, prospective cohort study, assessing the psycho-social outcomes following emergency laparotomy in adults.

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ABSTRACT

Introduction

Morbidity from an emergency laparotomy (EmLap) is difficult to define and poorly understood. Morbidity is a holistic concept, reliant upon an interplay of bio-psycho-social outcomes that evolve long after discharge. To date, no previous study has explored the psycho-social outcomes following EmLap as a collective, nor their change over time. This study aims to describe the holistic morbidity following EmLap within the first year following surgery.

Methods and Analysis

This is a multi-centre, mixed-methods, prospective 12-month cohort study with two participant populations: patient participants and family caregivers (FCGs). A target of 160 adult patients who undergo EmLap and can give informed consent will be included in the patient participant group. Patient participants will be asked to complete 3 patient surveys, incorporating validated patient reported outcome measures (PROMs) to assess bio-psycho-social outcomes (EQ5D-5L, GIQLI-36, PHQ9, GAD7, ITQ, CIS, FSS) in the 12 months following surgery. A subgroup of 15 patient participants will be asked to take part in 2 semi-structured interviews at 6 and 12 months. A target of 15 associated family caregivers will be included in the FCG group. FCGs will be asked to take part in a semi-structured interview at 6 months to assess the EmLap impact on the wider support network. Primary outcome will be change in quality of life (EQ5D-5L) at 12 months. Secondary outcomes will be change in bio-psycho-social status at 3 and 12 months. Qualitative analysis will allow contextualisation of PROMS and further explore themes of EmLap morbidity. It is anticipated that the results of this study will help inform and develop standards of aftercare for future EmLap patients.

Ethics and Dissemination

This study has received ethical approval (Wales REC7;12/WA/0297) and will be undertaken in accordance with the principles of Good Clinical Practice (GCP). We intend to disseminate study results in peer-reviewed journals and medical conferences, as well as a lay report to study participants.

Strengths and Limitations

- This novel study will provide medium-term outcome data in an under-represented patient population.
- We anticipate that the study will inform the design of appropriate interventions for future studies.
- The study relies on PROMs that have not been developed nor validated in an EmLap cohort. This is a recognised limitation, but currently no such PROM exists.
- The exclusion of non-English speaking patients is a limitation of the study. This is due to funding constraints and availability of validated measures in different languages. We will seek to address this in future funding applications and projects.
- This study has coincided with the COVID pandemic, which may impact upon recruitment and data collection.

INTRODUCTION

Each year, more than 25,000 emergency laparotomies (EmLaps) are performed in England and Wales(1). The associated 30- and 90-day mortality from an EmLap has been the focus of much research and national quality improvement projects (1, 2).

Conversely, the rate of morbidity associated from an EmLap is less well understood. Perhaps this is in part because the concept of "morbidity" is difficult to define. Previous attempts to describe EmLap morbidity have quantified distinct objective outcomes, for example, the the average length of stay following EmLap is reported as 15.4 days(1); the rate of unplanned return to theatre is 4.8%(3); the rate of chronic postsurgical pain is considered to be 19%(4); and the rate of post-operative unemployment is published as 15%.(5)

However, the Oxford English dictionary defines morbidity as "the state of suffering from a disease" (or in this case from an EmLap).(6) This suggests that morbidity is both subjective and holistic; morbidity outcomes should not be limited to a biological domain, but should represent a bio-psycho-social whole. A clinician is well qualified to describe biological outcomes, but a clinician is not omniscient; a clinician is limited to appreciating the full impact on a patient's being i.e., psycho-social outcomes. It is therefore the patient that is most qualified to describe their own morbidity.

Patient reported outcome measures (PROMs) are a recognised means of describing patient morbidity, but they are not without limitations. Effectiveness is dependent upon both the sensitivity of inquiry across all bio-psycho-social domains, and also the specificity to the condition in question. At present, there is no PROM specific to EmLap. However, a handful of studies have reported an array of generic PROMs following EmLap; the majority of these are feasibility studies,(7, 8) limited by short-term follow up,(4, 9, 10) a single-method approach,(11-14), retrospective or focus solely on the elderly.(15) The holistic morbidity following EmLap continues to be poorly understood.

This is a multi-centre mixed methods prospective cohort study, aiming to profile the holistic morbidity of EmLap. The objectives of the study are to (1) describe psycho-social outcomes in the 12 months following EmLap and (2) understand their integrated relationship to one another.

METHODS

Study Design and Setting

This is an observational multi-centre mixed-methods prospective cohort study. The objectives are to profile the psycho-social outcomes of adult EmLap patients and their caregivers, in the 12 months following surgery, with the use of validated PROMs and semi-structured interviews.
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The study has three stems:

1. Patient surveys at baseline, +3months & +12months from discharge, in addition to +12months clinical assessment, for EmLap patients.
2. Semi-structured interviews at +6months and +12months from discharge, for a subgroup of EmLap patients.
3. Semi-structured interviews at +6months from discharge, for EmLap family caregivers (FCGs).

The study will be conducted at two tertiary centres in the UK: University Hospital Wales, Cardiff and Vale University Health Board, and the Royal Alexandra Hospital, NHS Greater Glasgow, and Clyde. The study will run between November 2021 and February 2023.

Participants

The study has two populations: patients and FCGs. Purposive sampling of patients will identify a subgroup to undergo semi-structured interviews. This will mean there will be a total of three study groups: all patients (group 1), a sampled patient subgroup (group 2) and family caregivers (group 3).

Group 1 – Patients (Total 160 participants)

Inclusion Criteria for Patients

- 18 years or above
- Able to communicate in English
- Cognitively able to complete the survey
- Able to provide informed voluntary consent
- Undergone an EmLap during admission
- Clinical team anticipate being “medically fit for discharge” within 48 hours.

Exclusion Criteria for Patients

- Any terminal diagnosis in which the clinical team do not anticipate life expectancy to exceed 6 months from the time of surgery
- Acutely unwell at the time of recruitment. These patients may still be eligible and can be re-screened and recruited later, should their condition improve.

Group 2 - Patient Subgroup (Total 15 participants)

Purposive sampling by the research team will identify a subgroup of patients in group 1 for semi-structured interviews. This will take place at the time of enrolment. This is on account of the patient population being hugely heterogeneous, and to ensure that a range of phenomena are explored. Efforts will be made to select patients for the semi-structured interviews to cover a range of variables, such as:

- Patient variables (age <65 years/>65 years, sex, affluence, pre-morbid employment status)

- EmLap operation (adhesiolysis, Hartmann's, right hemi-colectomy, perforated duodenal ulcer repair)
- New co-morbidity (colorectal cancer, inflammatory bowel disease, new stoma)
- Severity of acute illness (ITU admission, return to theatre)

Group 3 – Family Caregiver (FCGs) (Total 15 participants)

A family caregiver, who takes care and supports the patient for most of the time (whether physical or non-physical) in a non-professional capacity, will be identified by the recruited patient. FCGs do not necessarily need to be relatives.

Inclusion Criteria for FCGs

- Identified by patient participant
- 18 years or above
- Able to communicate in English
- Able to provide informed voluntary consent

Outcomes

Primary outcome is change in EuroQoL-5D-5L (EQ5D-5L) score at 12 months following EmLap. Currently there is no validated PROM to measure holistic morbidity following EmLap. EQ5D-5L was therefore decided as the primary outcome on account of its simplicity, its scope of inquiry, and its wide application in a clinical and health economical setting.(16) Additional outcomes and validated PROMs are summarised in Table 1. The authors decided upon these outcomes and use of validated PROMs based following the expansion of key themes which were identified from previous patient focus group work. These themes included: communication/relationships, incisional hernia, mental health, diet, and employment. All validated PROMs (except for the International Trauma Questionnaire for PTSD, where there will be no baseline measure) will be reported by patients at 3 endpoints to understand the trend of morbidity in the 12 months following EmLap. Patient definition of recovery and time to recovery will be recorded both using open questions in the patient survey and semi-structured interviews. A mixed methods approach will allow the contextualisation of validated PROMs.

Outcome	Measure	Endpoint(s)			
		Baseline (discharge)	**+3 months**	**+6 months**	**+12 months**
Primary Outcome					
Change in **quality of life** in the 1 year following EmLap	EQ5D-5L	**X**	**X**		**X**
Secondary Outcome					
Patient **definition of EmLap recovery** following EmLap	Patient definition of recovery	**X**			**X**
	Time to patient reported recovery		**X**		**X**
	Patient reported factors that influence recovery	**X**	**X**	**X**	**X**
Change in **physical health** in the 1 year following EmLap	Fatigue severity score (FSS)	**X**	**X**		**X**
	Gastro-Intestinal Quality of Life Index (GIQLI)	**X**	**X**		**X**
	Prevalence of incisional hernia				**X**
	Rookwood Frailty Score (over 65 years only)	**X**			**X**
	BMI	**X**			**X**
Change in **mental health status** in the 1 year following EmLap	International Trauma Questionnaire (ITQ)		**X**		**X**
	Patient Health Questionnaire (PHQ9)	**X**	**X**		**X**
	Generalised Anxiety Disorder assessment (GAD7)	**X**	**X**		**X**
	Body Image Perception (Likert scale)	**X**	**X**		**X**
Change in **social status** in the 1 year following EmLap	Community Integration Questionnaire (CIQ)	**X**	**X**		**X**
	Time to return to pre-morbid sexual function				**X**
	Time to return to pre-morbid employment status				**X**
	New use of income support				**X**
Tertiary Objectives					
To describe the provision of **EmLap aftercare** and patient's experiences	NHS Wales Experience Questionnaire	**X**	**X**		**X**
	Number of points of care – scheduled/unscheduled and multi-professionals (patient diary)		**X**		
	Patient defined care priorities for future rehabilitation program	**X**		**X**	**X**

Table 1: POLO outcomes, measures, and endpoints.

Participant Timeline

Baseline assessments

Patient participants will complete a baseline survey in hospital, at the time of enrolment. Clinical variables will be obtained from the medical notes and documented into the Case Report Form (CRF; Supplementary Material 1) by the research team. Patient participants will be provided with a diary at the time of discharge and asked to record any further interaction with health/social care professionals prospectively for the forthcoming 3 months on a weekly basis (Supplementary material 2). FCG participants will complete a baseline questionnaire to gather demographics via post once enrolled onto the study. Reporting structure for the surveys are described in a strengthening the reporting of observational studies (STROBE) statement (Supplementary material 3).(17)

Follow-up assessments

Follow-up surveys will be posted to participants at +3months and +12months from discharge. Participants will be asked to return surveys in a pre-paid and addressed envelope to the sponsor. An end of study clinical assessment for patient participants will occur at +12months from discharge and will include BMI calculation, screening for incisional hernia and frailty assessment by a member of the research team.

Semi-structure interviews

Interviews will be conducted by trained clinical researchers within the POLO study group and scheduled to last between 30 and 60mins. Interviews for FCGs will occur at +6months only; interviews for patient participants will be repeated at +6 and +12 months. Interviews will either be face to face or virtual via secure videoconferencing, dependent upon participant preference. Non-participants will be permitted to attend. All interviews will be recorded and transcribed by an internal third party (Cardiff and Vale staff member trained in transcription). A semi-structured interview technique will enable the discussion of known core themes, but also facilitate the exploration of other themes not yet understood at this stage of the study (Supplementary Material 4). Reporting structure for the interviews are outlined in the consolidated criterion for reporting qualitative research (COREQ) Statement (Supplementary Material 5).(18)

Sample size

We aim to recruit 160 patient participants (group 1). This figure is reflective of a target 12-month recruitment time (total length of study 24 months), a combined EmLap annual frequency of 400, and an estimated pick-up rate of 40%. 15 of these will be included for the patient semi-structured interviews (group 2). A further 15 participants will be recruited for the FCG semi-structured interviews (group 3). Previous literature suggests that this should generate enough thematic data for qualitative analysis(19). However, if there is a need for further investigation of themes, additional participants will be interviewed until saturation is reached.

Recruitment

All patients who have undergone an EmLap will be screened and approached by the research team with a patient information sheet (PIS; Supplementary Material 6) and given a minimum of 24 hours for consideration. Patients will be recruited by the research team if they meet the eligible criteria and provide written informed consent (Supplementary Material 7). If a recruited

patient's clinical condition deteriorates shortly after recruitment, causing a delay to discharge, the patient will remain in the study. Baseline survey responses relate to pre-admission status and therefore will not need to be repeated, nor will consent. The researching team will be required to update medical history e.g., inpatient complications and the "start clock" for follow up surveys/interviews will need to be reset to the actual day that the patient is discharged from hospital. There is no time limit for re-inclusion.

Once a patient has been enrolled into the study, they will be asked to identify one potential FCG and provide their contact details. A patient may be recruited even if they do not wish/cannot identify an FCG for screening. If a potential FCG is identified, the research team will approach the FCG via telephone about the study. Should the potential FCG show interest at the initial telephone call, a PIS (Supplementary Material 8) and consent form (Supplementary Material 9) will be posted to the potential FCG for further information. FCGs will be enrolled upon receipt of return written consent.

Data Collection

Participants will be assigned a subject identification number (SID). Their corresponding data will be kept anonymous and coded with the same assigned SID for consistency. All data will be collected, handled, and stored in accordance with the Data Protection Act (2018).
Patient surveys will incorporate a total of 9 validated questionnaires as instrument measures (Supplementary Material 10). All survey assessments will be carried out by the participant themselves to minimise bias. The research team will review all surveys to ensure completeness. If any incomplete surveys are returned, efforts will be made by the research team to obtain these from the participant as soon as possible via telephone (follow-ups) or face to face (baseline). A maximum of 2 telephone reminders will be made if there are delays in returning postal surveys to minimise attrition bias. All exit 12 month clinical assessments will be completed by GCP trained surgical practitioners.

Data Analysis

Quantitative Analysis

Validated PROMs will be scored in accordance with their scoring manuals. Missing data within each PROM response will be handled using mean substitution. Dropouts will be handled with case deletion for that endpoint only.
In general, demographic variables will be presented as descriptive summaries; non-parametric as median and interquartile range (IQR); parametric data as mean and standard error of the mean (SEM); categorical data will be described in percentage or frequency. For inferential analysis, univariate and multivariate linear regression analysis will be conducted to determine associations for continuous variables (change in EQ5D-5L score at 12 months, change in FSS at 12 months, change in CIS at 12 months) and logistical regression for dichotomous outcomes (new diagnosis of PTSD, depression, anxiety, new unemployment). P values of <0.05 will be considered statistically significant.

Qualitative Analysis

Transcribed data and field notes will be analysed using Clark and Braun's approach to thematic analysis(20) by 2 researchers. Patterns will be identified initially by the repetitive reading of transcripts to ensure data familiarity and construct summary notes. Systematic coding will capture elements of the data relevant to the research aim. Initial themes and sub-

themes will be developed and refined until the identification of final themes which capture meaningful patterns in relation to the research aim.

Patient and Public involvement

All participant material has been reviewed by 2 PPI representatives, supported by Involving People, Wales.

Ethics and Dissemination

This study has been reviewed and received ethical approval from NHS Wales REC7 (ref. 21/WA/0297) as well as Health Research Authority/Health and Care Research Wales. The study will be conducted in accordance with the principles of Good Clinical Practice (GCP) and all other appropriate regulatory guidance.

All participants will be required to provide valid informed consent in writing before enrolment into the study. We intend to publish the results of this research in peer-reviewed medical and scientific journals. Results will also be presented at medical conferences at a regional, national, and an international level. Participants will have the opportunity to receive newsletters with study updates and results.

Trial Registration

ClinicalTrials.Gov: NCT05281627

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Authors contributions

JC conceived the study. LS designed the study design, wrote the protocol and ethical application. SA/SM/JT/JB/TW/AM helped with study design and protocol development; AM/JH were involved in study management. All authors have reviewed and approved this manuscript.

Competing Interests

There are no competing interests from any of the authors to declare.

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Supplementary material: The following documents are enclosed as supplementary material:

Supplementary material 1: Case Report Form v1.1

Supplementary material 2: Patient Diary v1.0

Supplementary material 3: STROBE statement checklist

Supplementary material 4: Semi-structured interview questions for patient and FCG participants v1.0

Supplementary material 5: COREQ statement checklist

Supplementary material 6: Patient PIS v1.2

Supplementary material 7: ICF v1.1

Supplementary material 8: FCG PIS v2.0

Supplementary material 9: FCG ICF v1.1

Supplementary material 10: Supplementary Table 1, Details and description of validated tools used.

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