

Early prehabilitation in suspected locally advanced and metastatic lung cancer

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ABSTRACT

Objectives The most common treatment for locally advanced and metastatic lung cancer is best supportive care. Patients with lung cancer are often comorbid with a high symptom burden. We wanted to assess whether early prehabilitation was feasible in patients with likely lung cancer.

Methods Patients were offered prehabilitation if they were attending the new patient respiratory clinic, had a CT scan suggesting stage III or IV lung cancer and undergoing further investigations. Patients receiving palliative care were ineligible. All prehabilitation patients were referred to a palliative medicine physician, registered dietitian and rehabilitation physiotherapist.

Results 50 patients underwent prehabilitation between June 2021 and August 2022. The median age was 72 years (range 54–89 years). 48 patients had lung cancer. 84% of patients attended all three interventions.

Half of the palliative care consultations focused on pain. Half of the patients seen had a change in medication. 25% of patients' weights were stable, 32% required a food-first strategy and 33% required oral nutritional supplements. 57% of patients discussed managing breathlessness with the physiotherapist.

Conclusions Early prehabilitation is feasible alongside the investigation of locally advanced and metastatic lung cancer. Further work will aim to assess its impact on admission to the hospital, survival and treatment rates.

INTRODUCTION

Lung cancer is the most common cause of cancer death in the UK.¹ Many patients are not fit for anticancer treatment, due to a combination of burden of disease at presentation, patient fitness and comorbidities.^{2–5} Smoking increases the risk of

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Prehabilitation reduces the length of stay and surgical outcomes in cancer surgery. Less is known about the advantages of prehabilitation for patients with advanced cancer.

WHAT THIS STUDY ADDS

⇒ This is the first project that we are aware of, which undertakes a set of intensive prehabilitation interventions, while patients are undergoing investigation for likely locally advanced and metastatic lung cancer.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ We have shown that this methodology is feasible, and we hope to report objective outcomes for treatment rates, admissions and overall survival in the near future. This project should lead to a clinical trial.

common medical conditions such as ischaemic heart disease and chronic obstructive pulmonary disease, as well as lung cancer. These medical conditions can affect activity levels and performance status. Poorer performance status often means anticancer treatment is less well tolerated. We do not know whether prehabilitation can improve treatment rates in advanced lung cancer.

Despite an improvement in efficacious treatments, including new drugs such as immunotherapy and targeted tablet treatment, only half of patients (53%) in England receive active treatment.⁶

There is an understandable variation in the definition of what prehabilitation means. Optimal prehabilitation for cancer may appear very different depending on primary tumour type, patient fitness, stage



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of disease and treatment modality. Macmillan, a leading UK cancer charity, has developed generic guidelines, which suggest three prehabilitation domains. These are nutrition, activity and psychological support, with three levels of intervention: universal, targeted and specialist.⁷ Given the high symptom burden, high rate of comorbidities and probable need to see a dietitian, we identified specialist interventions to cover the three domains identified, with the addition of symptom control.^{2 3} For many patients with locally advanced and metastatic lung cancer, the principles of effective prehabilitation and good palliative care overlap significantly, particularly as there are data to suggest that early palliative care improves survival in non-small cell lung cancer.^{8 9}

We wanted to intervene as early as possible to maximise any potential prehabilitation benefit. As an example, a previous local audit showed that many patients lost weight between their new patient respiratory appointment and first oncology appointment, while they were being investigated for a likely diagnosis of lung cancer.¹⁰ Therefore, this prehabilitation project aimed to provide intervention as early as possible.

The aim of the pilot was to determine whether early assessment and intervention by a consultant in palliative medicine, registered dietitian and registered

physiotherapist was a feasible intervention, when run in parallel with the diagnostic pathway, for patients with a suspected diagnosis of lung cancer. This paper reports on the first 50 patients in the pilot.

METHODOLOGY

All patients with likely locally advanced or metastatic thoracic malignancy were offered an appointment at the prehabilitation clinic when they were seen as a new patient in the respiratory lung cancer clinic at a district general hospital in south-east Scotland. Inclusion was based on CT staging. Patients were included if they had involved mediastinal lymph nodes or overt metastatic disease on a CT scan, analogous to stage III or IV lung cancer or likely mesothelioma. All patients who were proceeding to further investigation were eligible. Patients who declined further diagnostic tests or whose management plan was best supportive care were not eligible to participate in the project.

The EPIC pilot was registered and approved by NHS (National Health Service) Lothian as a quality improvement project. It was decided that ethics approval was not required, because the three clinical interventions were already available at the cancer centre; however, they had not previously been grouped in a targeted way as a prehabilitation service. The pilot was funded as a joint working project with MSD (Merck, Sharp and Dohme), as a 2-year project with the first 12 months as the pilot. A formal steering group to oversee the delivery of the project was formed.

The aim was for patients to have the first prehabilitation consultation within 10 days of their new patient appointment.

Patients underwent a range of assessments, including Patient-Generated Subjective Global Assessment, EORTC Quality of Life Questionnaires C30 and LC13, Eastern Cooperative Oncology Group performance status and Charlson Comorbidity Index. These will be reported at a later date. Each patient was given three specialist personalised interventions, one by each member of the prehabilitation team, based on standard formal assessments by a palliative care physician, physiotherapist and dietitian. The aim of these consultations was not to provide long-term care but to bridge the gap between diagnosis and the start of treatment. Patients requiring further intervention were referred to the appropriate community team.

For the formal project impact assessment, four objective outcomes were identified: weight change, active treatment rates, admission rates and overall survival. Themes were identified from consultation annotations and a thematic framework was used as a basis for analysis of this pilot work.¹¹

RESULTS

The pilot phase of the prehabilitation clinic ran from June 2021 to August 2022. Forty-seven of the 50 patients (94%) attended at least one of the three

Table 1 Demographics of first 50 patients in prehabilitation cohort for EPIC project

Category	Sub-category	Result
Gender	Male	21 (42%)
	Female	29 (58%)
Age	<50 years	1 (2%)
	50–59 years	7 (14%)
	60–69 years	19 (38%)
	70–79	10 (20%)
	≥80	13 (26%)
PS	0	6 (12%)
	1	24 (48%)
	2	16 (32%)
	3	4 (8%)
	4	0 (0%)
Comorbidities	0	15 (30%)
	1	14 (28%)
	2	9 (18%)
	3	11 (22%)
	≥4	1 (2%)
Confirmed radiological or tissue diagnosis of malignancy	Lung cancer	48 (96%)
	Urothelial malignancy	1 (2%)
	Follow-up for possible malignancy	1 (2%)
Stage	I–II	3 (6%)
	III	20 (40%)
	IV	27 (54%)
PS, performance status.		

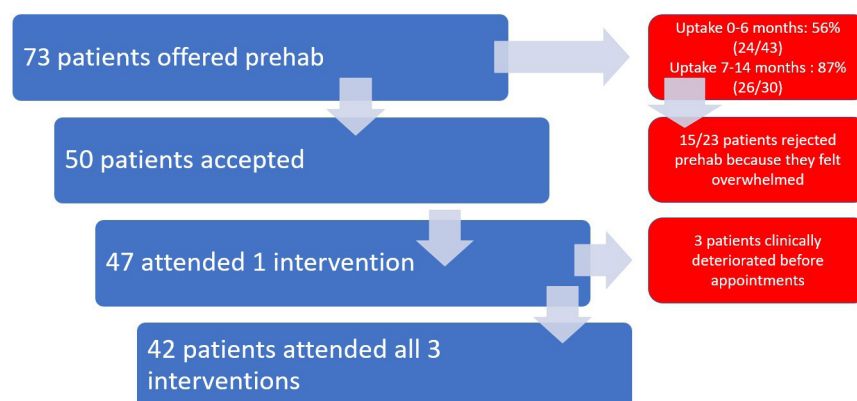


Figure 1 Patient flow for patients who were offered prehabilitation within the EPIC project.

assessments (palliative care consultant, dietitian and physiotherapist). See [table 1](#) for further details. All three appointments were completed by 84% of patients. [Figure 1](#) shows patient flow through the project. Three patients were unable to attend because of clinical deterioration during the initial investigations of their lung cancer. The major themes of each of the three appointments are outlined in [figure 2](#).

Resource impact of interventions

Palliative care: 47 patients were reviewed (18 by telephone); 20 required follow-up (all by telephone), 8 of whom required more than one contact. Medication changes were made in 25 consultations and specific symptom advice was given in 16 consultations.

Dietetics: 46 patients were reviewed (16 by telephone); 19 required one further follow-up appointment and 19 required more than one follow-up appointment.

Physiotherapy: 44 patients were reviewed (13 by telephone); 89 interventions were delivered to these patients. Six patients were assessed once without

follow-up, 9 had one follow-up and 29 had more than one follow-up.

[Figure 2](#) shows the main themes of discussions during the consultations with the three health professionals. Although the assessment was qualitative, it showed that pain was the dominant symptom and area of discussion within the palliative care consultation, followed perhaps unsurprisingly by respiratory symptoms, which included cough and shortness of breath. Only 3 of 49 patients did not have an obvious dominant symptom.

For the dietetic consultation, discussions broadly fell into three equal topics: need for oral nutritional supplements 33% (15/42), need for 'food first' fortification advice 33% and those with stable weight 27% (4 unknown) who received general dietary advice. The dominant theme for patients assessed by the physiotherapist was the management of breathlessness (24/42, 57%); these patients were usually too frail for a dedicated exercise programme, with only two patients suitable for referral to a gym. This shows the level of

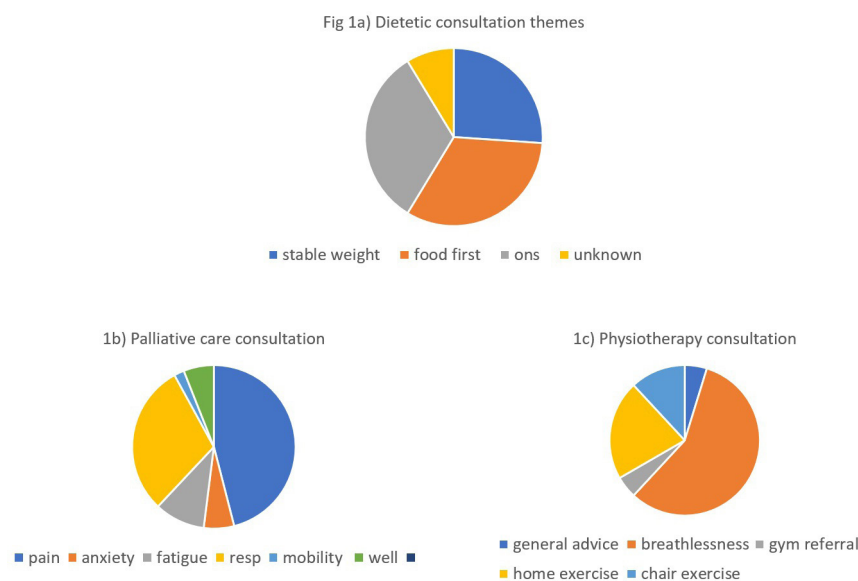


Figure 2 The major themes of the consultations in those attending prehabilitation.

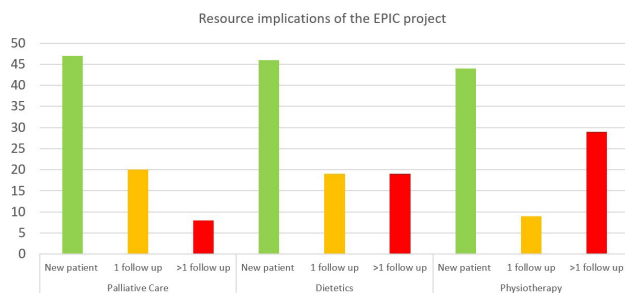


Figure 3 Resource implications for the EPIC project.

need in the population of patients undergoing investigation of lung cancer. **Figure 3** shows the resource implications for the project, for the palliative care and dietetic interventions fewer than half of patients required follow-up.

DISCUSSION

Prehabilitation appears feasible in tandem with a diagnostic pathway for lung cancer. All three assessments were attended by 84% of patients who accepted the invitation to join the project. We are not aware of other projects, intervening as early as this in this prehabilitation model.

During the second 6 months of the project, we reframed the explanation of the clinic and divided up the three appointments. This involved altering how we presented the project, from an optional extra to a central part of patients' clinical care. These changes resulted in an increase in uptake from 56% to 87%. The explanation of the importance of prehabilitation appeared to have a significant effect on uptake. It is difficult to estimate to what extent the lifting of legal restrictions related to the COVID-19 pandemic allowed attendance to increase.

Initially, all three interventions were grouped at the same appointment, but informal feedback suggested that patients found the amount of information provided overwhelming. From January 2022 (after 6 months of the project), the appointment with the palliative care consultant was moved to within a week of the new patient respiratory appointment.

Dietetic and physiotherapy reviews took place the following week, to allow time for any symptom/palliative care intervention to be initiated and for patients to receive any new medications for symptom control.

This feasibility study shows that prehabilitation can successfully be delivered in parallel with the investigation of a likely diagnosis of lung cancer.

One of the aims of this project is to help identify endpoints for a prehabilitation clinical trial. Possible robust endpoints could include treatment rates, overall survival and reduction of hospital admissions following prehabilitation. We hope to explore this as the project progresses. In the first year of the project,

we have established that prehabilitation can be delivered in parallel with the investigation of suspected lung cancer.

Twitter Lindsey Allan @LindseyAllan6

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Contributors The project was conceived by IP, CB, NM and AW. The prehab intervention was carried out by JM, LP, AW, DM and CP. MVV and RP collected and analysed the data. MM, PH and LA contributed to the concept of the project and reviewed the manuscript.

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Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants but was not approved. Participants gave informed consent to participate in the study before taking part.

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