PREHABILITATION IN ADVANCED CANCER PATIENTS AND SERIOUS ILLNESS PRIOR TO MAJOR ELECTIVE ABDOMINAL SURGERY – AN INTERIM AUDIT OF A PILOT STUDY

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INTRODUCTION

Cancer survivors face multitude of side effects either related to the cancer or the various disease modifying treatments.

In Singapore, up to 40% of elective surgeries are performed in older adults (age ≥65 years) with serious illness (namely dementia, advanced cancer, or other life-limiting medical conditions. Proactive analysis and prehabilitation of patients with advanced cancer and serious illness may be critical to reduce mortality and morbidity. A pilot study, SURgical prehabilitation and PAlliative program for adults with SeriouS illness (SURPASS), was implemented in a tertiary hospital since July 2023.

Table 1: Definition of Serious illness in Surgery

Original definitions (United States of America)	Adapted and operationalized definitions (Singapore)
Vulnerable elder (older adult >84 years) Older adult >64 years with any functional or cognitive disability)	Older adults >84 years Older adults >64 years with any functional or hearing/ visual disability
Advanced cancer (Stage 3 or 4 solid cancers and haematologic malignancies) and ≥1 hospitalization in prior year	Diagnosis of advanced cancer via ICD10 codes and ≥1 hospitalization (within SingHealth cluster) in prior year
Oxygen-dependent pulmonary disease	Diagnosis by ICD10 codes & METs score ≤4
Heart failure with any all-cause hospitalization or or ≥2 visits to Emergency dept in prior 6 months	Diagnosis by ICD10 codes & any all-cause hospitalization or ≥2 visits to Emergency dept in prior 6 months
Cirrhosis with any Child-Turcotte-Pugh Class or Model of End-stage Liver Disease (MELD) score	Diagnosis by ICD10 codes
End-stage renal disease (ESRD) on dialysis or eligible for dialysis	Diagnosis by ICD10 codes
Dementia with impaired daily function and ≥1 hospitalization in prior year	Diagnosis by ICD10 codes with impaired function and ≥1 hospitalization in prior year
Frailty	Edmonton Frailty Score ≥ 6
Nursing home residents	Existing nursing home residents

METHODS

All patients (aged ≥18 years) undergoing elective major abdominal surgery by the SPRinT (Sarcoma, Peritoneal and Rare Tumors) surgical oncologists are screened for frailty (Edmonton Frail Scale), nutrition (Malnutrition Universal Screening Tool), psychological (Hospital Anxiety and Depression Scale) and serious illness (Serious Illness Criteria). The team, comprising of anesthetists, Rehabilitation Medicine (RMD) physicians, physiotherapists, psychologist and dietitian, aims to see the eligible patients at least four weeks before surgery. A retrospective interim audit on timeliness and acceptability of rehabilitation interventions (baseline functional assessment, exercise prescription) was conducted.

Table 2: Demographics and diagnoses of recruited patients

Patient number	Gender (M/F)	Age (years)	Oncological diagnosis	Type of Elective Major Abdominal Surgery	Waiting time to first RMD consult (days)	Duration of Prehab before Surgery (days)	Length of stay in acute hospital (days)	Remarks	Type of Surgery
1	F	68	Stage 3C ovarian cancer	CRS-HIPEC	14	64	27	post-operative complication: right pneumothorax	Elective
2	F	71	Stage 4 sigmoid cancer	Early Diagnostic laparoscopy, omentectomy, adhesiolysis, creation of transverse colostomy	NA	NA	15	inpatient RMD referral (emergent palliative surgery)	Emergency
3	F	57	Stage 4 rectosigmoid cancer	Elective Exploratory laparotomy, adhesiolysis, resection of bilateral Krukenberg tumours and primary repair of parastomal hernia	5	36	10	Mortality : day 30 post discharge	Elective
4	F	65	Stage 3C ovarian cancer	Early Exploratory laparotomy, small bowel resection and double barrel enteroenterostomy creation	NA	NA	16	inpatient RMD referral (emergent palliative surgery)	Emergency
5	F	61	Right retroperitoneal liposarcoma with intra-tumoral bleed	Resection of Right Bleeding Retroperitoneal Sarcoma, gastrojejunostomy	NA	NA	36	inpatient RMD referral (emergent palliative surgery); post-operative complication: Recurrent vomiting, high nasogastric bilious output	Emergency
6	F	75	primary peritoneal carcinoma	CRS-HIPEC	4	53	12	Required sub - acute rehabilitation in community hospital prior to discharge	Elective
7	M	54	Recurrent right retorperitoneal liposarcoma	Wide resection of recurrent right retroperitoneal liposarcoma with enbloc limited right hemicolectomy and cuff of psoas resection	19	42	7		Elective
8	F	61	Stage 3C ovarian cancer	CRS-HIPEC	8	10	11		Elective
9	F	72	Stage 3b colon cancer	CRS-HIPEC	31	8	8		Elective
10	M	47	Stage 4 lung cancer	Diagnostic laparoscopy , bowel resection and creation of stoma	NA	NA	NA	Patient declined surgery	Emergency
11	F	53	Stage 3 sigmoid cancer	CRS-HIPEC	42	95	13		Elective
12	M	60	Appendiceal adenocarcinoma (pT3 N0 Mx)	CRS-HIPEC	7	38	13		Elective
13	F	81	Stage 3C ovarian cancer	CRS	9	50	6		Elective

Figure 1: Proposed study protocol

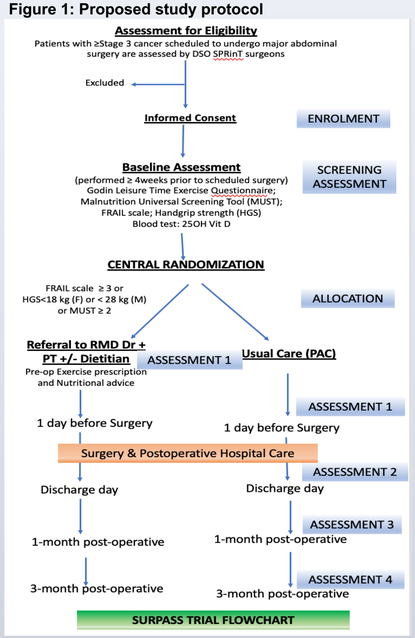
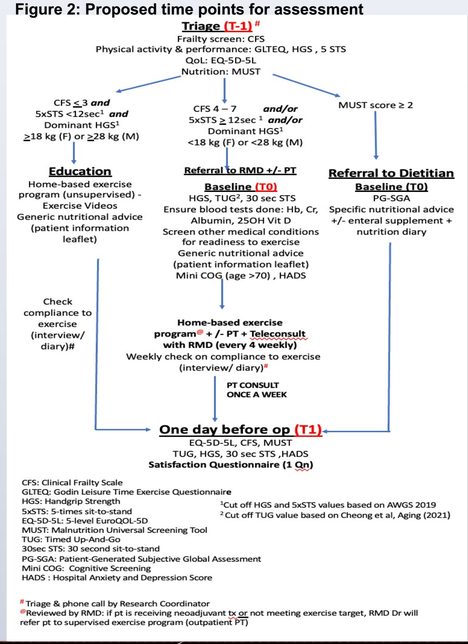


Figure 2: Proposed time points for assessment



RESULTS

Based on a retrospective interim audit conducted from July 2023 to Dec 2023, 13 patients were referred to RMD (Table 2). There were 4 patients who were warded with emergent complications related to disease progression, requiring surgical intervention. Total of 9 patients attended RMD clinic prior to the surgery(69%). The mean and median wait time were 15 and 9 days, respectively. The mean and median length of stay in acute hospital were 12 and 10 days, respectively. The mean and median duration of prehabilitation (time from first RMD consult to surgery) were 44 and 42 days, respectively.

DISCUSSION

Prehabilitation interventions of this pilot study focused on changing and supporting patient behaviors with the specific purpose building physiological reserves, function performance and psychological resilience before surgery. Survivorship starts at the point of diagnosis and rehabilitation plays a vital role in advanced cancer survivorship. Even in advanced cancer it is feasible to implement prehabilitation program as the waiting time to surgery and the neo adjuvant treatment phase are opportunistic time frames to improve patient's physiological and psychological reserve which may improve quality of life.

The strengths of this study includes the availability of specialized and coordinated multi-disciplinary core group of doctors and allied health professionals with clinical experience management of complex cancer patients, the presence of a research coordinator to facilitate patient's visits to the various clinical services for prehabilitation interventions and ensure efficient navigation through the continuum, The limitations of this study are small sample size, single center small retrospective audit and a non-randomized study. The authors plan to conduct a large-scale randomized study with proposed study protocol and time points for assessment (Figures 1 and 2).

Multimodal prehabilitation should be incorporated as standard of care within cancer survivorship, including patients with advanced cancer. Larger studies are needed to assess if timely delivery of prehabilitation reduces complications, hospital length of stay in patients with advanced cancer and serious illness who undergo major elective abdominal surgery.

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