

# Prehabilitation in Pancreatic surgery at Manchester Royal Infirmary (MRI)

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## Cachexia worsens prognosis in patients with resectable pancreatic cancer.

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### Abstract

**INTRODUCTION:** Pancreatic cancer is the fourth leading cause of cancer-related death in Western countries with a poor prognosis (5-year survival rates, 25% in patients after tumor resection with adjuvant treatment; overall, the 5-year survival rate is about 4%; Jemal et al., CA Cancer J Clin, 55:10-30, 2005). Many patients develop a cachectic status during the progression of the disease, and this syndrome accounts for up to 80% of deaths in patients with advanced pancreatic cancer. Remarkably, there are only a few data available on the impact of cachexia in patients with pancreatic cancer scheduled for tumor resection.

**MATERIAL AND METHODS:** Therefore, in this study, 227 consecutive patients with ductal adenocarcinoma of the pancreas were documented over an 18-month period regarding the prevalence of cachexia and its influence on perioperative morbidity and mortality with a special interest to postoperative weight gain and survival in a prospectively designed database and followed up.

**RESULTS:** In 40.5% of the patients, cachexia was already present at the time of operation. The cachectic patients did present in a worse nutritional status, represented by lower protein, albumins, and hemoglobin levels. Despite no significant differences in tumor size, lymph node status, and CA19-9 levels, the resection rate in patients with cachexia was reduced (77.8% vs. 48.9%) due to a higher rate of metastatic disease in patients with cachexia. The morbidity and in-hospital mortality revealed no significant difference. However, patients with and without cachexia lost weight after operation, and the weight gain started not until 6 months after operation. The survival in patients with cachexia was significantly reduced in patients undergoing tumor resection as well as in palliative treated patients.

**CONCLUSION:** Cachexia has a significant impact on survival and performance status in palliative patients as well as in patients operated for pancreatic cancer. But tumor-related cachexia is not necessarily dependent on tumor size or load and that metastatic dedifferentiation of the tumor might be a critical step in the development of tumor-associated cachexia.

## REVIEW ARTICLE

# Body composition assessment and sarcopenia in patients with pancreatic cancer: a systematic review and meta-analysis

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### Abstract

**Background:** Numerous studies have suggested an association between sarcopenia in pancreatic cancer and adverse outcomes. This systematic review examines the evidence for the impact of sarcopenia on post-operative complications and survival

**Methods:** A systematic literature search was conducted to identify randomised and non-randomised studies of sarcopenia in pancreatic cancer. Meta-analyses of intra- and post-operative outcomes were performed (operating time, all complications, major complications, pancreatic fistulae, peri-operative mortality, overall survival).

**Results:** Forty-two studies reported the assessment of body composition in 7619 patients. Methods used to assess body composition in patients with pancreatic cancers were computerized tomography (n = 34), bioelectrical impedance analysis (n = 7), and dual-energy-X-ray-absorptiometry (n = 1). Only 10 studies reported the impact of pre-operative sarcopenia upon post-operative outcomes. Sarcopenia was associated with increased peri-operative mortality (OR: 2.40, CI<sub>95%</sub>: 1.19–4.85, p < 0.01) and decreased overall survival by univariable (HR: 1.95, CI<sub>95%</sub>: 1.35–2.81, p < 0.001) and multivariable analysis (HR: 1.78, CI<sub>95%</sub>: 1.54–2.05). Sarcopenia was not significantly associated with all complications (OR: 0.96, CI<sub>95%</sub>: 0.78–1.19) or pancreatic fistula (OR: 0.95, CI<sub>95%</sub>: 0.59–1.54).

**Conclusions:** Assessment of sarcopenia in pancreatic cancer provides prognostic value but, more importantly, may provide a basis for therapeutic intervention. However, variation in the methods of assessing and reporting sarcopenia in this patient group limits the assessment of post-operative out-

Journal of Surgical Oncology 2013;107:702–708

## Frailty predicts risk of life-threatening complications and mortality after pancreatic resections



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**Background.** To assess the effect of frailty on morbidity and mortality after partial pancreatectomy.  
**Methods.** A retrospective analysis of National Surgical Quality Improvement Project from 2005–2010 was conducted. A modified frailty index was created based on previously validated methodology. Patients were classified as nonfrail, low frailty, intermediate frailty, and frail. Outcomes of pancreateoduodenectomy and distal pancreatectomy were examined.

**Results.** In the study, 13,020 patients were analyzed (8,729 pancreateoduodenectomy and 4,291 distal pancreatectomy). Among the pancreateoduodenectomy and distal pancreatectomy patients, frail patients regardless of the degree of frailty were older, more likely male, had a greater body mass index, lower serum albumin, and greater weight loss compared with the nonfrail patients (all P ≤ .05). Postoperatively, a stepwise increased risk of grade 4 complications (Clavien/Dindo) and mortality was noted from nonfrail to frail patients. Every 1-point increase in modified frailty index was associated with a significantly increased risk of grade 4 complications (~2–6 times) and mortality (~2–10 times) from low-frail to frail (adjusted for age, sex, body mass index, albumin, weight loss, and type of pancreatectomy). An abbreviated frailty index incorporating 8 variables was as predictive as the modified frailty index (P = .68).

**Conclusion.** An 11-point frailty index as measured in National Surgical Quality Improvement Project predicts serious complications and death after pancreatectomy. A modification of this index with 8 factors continues to have similar predictive ability. Consideration of frailty may be beneficial prior to the pancreatic surgeon and particularly in discussion of operative risk and selection of patients who might receive benefit from pre-operative optimization. (Surgery 2016;160:987-96.)

## Malnutrition and Pancreatic Surgery: Prevalence and Outcomes

MARCO LA TORRE, MD,<sup>1\*</sup> VINCENZO ZIPARO, MD,<sup>1</sup> GIUSEPPE NIGRI, MD,<sup>2</sup> MARCO CAVALLINI, MD,<sup>1</sup> GENEVEFFA BALDUCCI, MD,<sup>1</sup> AND GIOVANNI RAMACCIATO, MD<sup>2</sup>

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**Background:** Pancreatic surgery is associated with severe postoperative morbidity. Identification of patients at high risk may provide a way to allocate resources objectively and focus care on those patients in greater need. The Authors evaluate the prevalence of malnutrition and its effect on the postoperative morbidity of patients undergoing pancreatic surgery for malignant tumors.

**Methods:** Data were collected from 143 patients who had undergone pancreatic resection for cancer. Prevalence of malnutrition was evaluated by several validated screening tools and correlated to the incidence of surgical site infection, overall morbidity, mortality, and hospital stay.

**Results:** Overall, 88% of patients were at medium-high risk of malnutrition. Patients at high risk of malnutrition presented a fourfold longer postoperative hospitalization period and a higher morbidity rate (53.2%) than those patients at low risk of malnutrition. Malnutrition, evaluated by MUST and NRI, was an independent predictor of overall morbidity using multivariate analysis (P = 0.00145, HR = 2.6581, 95% CI = 1.3589–8.5698, and P = 0.07129, HR = 1.9953, 95% CI = 0.9723–13.548, respectively).

**Conclusion:** Malnutrition is a relevant predictor of post-operative morbidity and mortality after pancreatic surgery. Patients underwent pancreatic resection for malignant tumors are usually malnourished. Preoperative malnutrition screening is mandatory in order to assess the risk and to treat the malnutrition.

J. Surg. Oncol. 2013;107:702–708. © 2012 Wiley Periodicals, Inc.



# Specialist Nutritional Prehabilitation

- **Pre-emptive preparation** to enhance physical fitness to reduce risks and enhance recovery after a stressful event
- Person-centred, **tailored to the individual**. Aid the individual to build resilience, and empower them

## Nutrition Aims

- Treat/ prevent malnutrition
- Maintain or improve food intake
- Mitigate metabolic derangements
- Maintain skeletal muscle mass and physical performance
- Reduce risk of reduction or interruptions of scheduled anticancer treatment and reduced quality of life
- Prepare/ educate on ERAS, pancreatic enzyme replacement therapy (PERT), post op dietary needs



# Factors affecting nutritional status

- Increased REE
- Malabsorption due to pancreatic exocrine insufficiency or biliary obstruction
  - Abdominal pain, loose stools, Steatorrhea, lethargy, bloating, flatulence/burping
- Taste changes
- Weight/ muscle loss associated with chemotherapy/radiotherapy/surgery
- Low mood/ anxiety
- Misdiagnosed/undiagnosed Diabetes
- Nausea/Vomiting
  - Side effect from treatment
  - Secondary to delayed gastric emptying/gastric outlet obstruction



- Weight history, Anthropometrics, body composition
- Scored Patient Generated - Subjective Global Assessment (PG - SGA)
- Knowledge and understanding of PERT
- Gastrointestinal symptoms and impact on QOL
- Patient experience
- Assessment of functional status/ physical activity
- Nutritional deficiencies
  - Vitamin D, Vitamin B12, Folate , Ferritin, Iron, Zinc, Selenium, Copper, HbA1c, random blood glucose



## Scored Patient-Generated Subjective Global Assessment (PG-SGA)

**History** Boxes 1-4 are **designed to be completed by the patient**.  
[Boxes 1-4 are referred to as the PG-SGA Short Form (SF)]

Pt should complete if possible; not professional or family unless needs help (sight, literacy, etc.)

Patient ID Information

### 1. Weight (See Worksheet 1)

In summary of my current and recent weight:

I currently weigh about \_\_\_\_\_ pounds

I am about \_\_\_\_\_ feet \_\_\_\_\_ tall

One month ago I weighed about \_\_\_\_\_ pounds

Six months ago I weighed about \_\_\_\_\_ pounds

During the past two weeks my weight has:

decreased <sup>(3)</sup>  not changed <sup>(3)</sup>  increased <sup>(3)</sup>

Box 1

Box 1 max score = 5 points: up to 4 pts from wt loss + up to 1 point for past 2 wks

While height is not essential for scoring, the app calculates BMI

Complete both 1 & 6 months; for scoring, use 1 mo if available. Use 6 mos only if 1 mo is not available

### 2. Food Intake: As compared to my normal intake, I would rate my food intake during the past month as:

- unchanged <sup>(3)</sup>
- more than usual <sup>(3)</sup>
- less than usual <sup>(1)</sup>

I am now taking:

- normal food but less than normal amount <sup>(1)</sup>
- little solid food <sup>(2)</sup>
- only liquids <sup>(3)</sup>
- only nutritional supplements <sup>(3)</sup>
- very little of anything <sup>(4)</sup>
- only tube feedings or only nutrition by vein <sup>(3)</sup>

Score how the patient self-rates his/her intake during the past month; this helps to address recent deficit / current risk.

Box 2

Box 2 not additive; max = 4; use the highest score checked, no matter how many checked

### 3. Symptoms: I have had the following problems that have kept me from eating enough during the past two weeks (check all that apply):

- no problems eating <sup>(0)</sup>
- no appetite, just did not feel like eating
- nausea <sup>(2)</sup>
- constipation <sup>(1)</sup>
- mouth sores <sup>(2)</sup>
- things taste funny or have no taste <sup>(1)</sup>
- problems swallowing <sup>(2)</sup>
- pain; where? <sup>(2)</sup>
- other\*\* <sup>(1)</sup> \_\_\_\_\_
- vomiting <sup>(1)</sup>
- diarrhea <sup>(1)</sup>
- dry mouth <sup>(1)</sup>
- smells bother me <sup>(1)</sup>
- feel full quickly <sup>(1)</sup>
- fatigue <sup>(1)</sup>

\*\* Examples: depression, money, or dental problems

Box 3 Any symptoms that patient reports (checks off) that has kept them from eating enough during the past 2 weeks gets scored. Add all points for Box 3 total score

### 4. Activities and Function:

Over the past month, I would generally rate my activity as:

- normal with no limitations <sup>(3)</sup>
- not my normal self, but able to be up and about with fairly normal activities <sup>(1)</sup>
- not feeling up to most things, but in bed or chair less than half the day <sup>(2)</sup>
- able to do little activity and spend most of the day in bed or chair pretty much bedridden, rarely out of bed <sup>(3)</sup>

This is the WHO or ECOG performance status in patient terms. Patient rates his/her activity level over the past month regardless of the cause – inadequate intake, metabolic stress (corticosteroids, fever, inflammation, trauma) or significant inactivity. Remember, 1 week of complete bed rest is associated with up to 4% loss in lean tissue/muscle mass

Box 4

Additive Score of the Boxes 1-4  A



## Scored Patient-Generated Subjective Global Assessment (PG-SGA)

**Worksheet 1 - Scoring Weight (Wt) Loss**  
To determine score, use 1 month weight data if available. Use 6 month data only if there is no 1 month weight data. Use points below to score weight change and add one extra point if patient has lost weight during the past 2 weeks. Enter total point

Wt loss in 1 month	Points	Wt loss in 6 months
10% or greater	4	20% or greater
5-9.9%	3	10-19.9%
3-4.9%	2	6-9.9%
2-2.9%	1	2-5.9%
0-1.9%	0	0-1.9%

Numerical score from Worksheet 1

**Additive Score of the Boxes 1-4** (See Side 1)  A

**5. Worksheet 2 - Disease and its relation to nutritional requirements**

All relevant diagnoses (specify) \_\_\_\_\_  
Primary disease stage (circle if known or appropriate) I II III IV Other \_\_\_\_\_

One point each:  
 Cancer  AIDS  Pulmonary or cardiac cachexia  Presence of decubitus, open wound, or fistula  
 Presence of trauma  Age greater than 65 years  Chronic renal insufficiency

Numerical score from Worksheet 2  B

**6. Worksheet 3 - Metabolic Demand**  
Score for metabolic stress is determined by a number of variables known to increase protein & caloric needs. The score is additive so that a patient who has a fever of > 102 degrees (3 points) and is on 10 mg of prednisone chronically (2 points) would have an additive score for this section of 5 points

Stress	none (0)	low (1)	moderate (2)	high (3)
Fever	no fever	>99 and <101	>101 and <102	>102
Fever duration	no fever	<72 hrs	72 hrs	> 72 hrs
Corticosteroids	no corticosteroids	low dose (<10mg prednisone equivalents/day)	moderate dose (>10 and <30mg prednisone equivalents/day)	high dose steroid (>30mg prednisone equivalents/day)

Even short term use of corticosteroids can adversely impact protein status and muscle mass

Fever: Score fever intensity or duration, whichever is greater. (99°F = 37.2°C 101°F = 38.3°C and 102°F = 38.9°C)

See [www.pt-global.org](http://www.pt-global.org) for prednisone equivalents chart and metric and additional language version (as available)

Numerical score from worksheet 3  C

**7. Worksheet 4 - Physical Exam**  
Physical exam includes a subjective evaluation of 3 aspects of body composition: fat, muscle, & fluid status. Since this is subjective, each aspect of the exam is rated for degree of deficit. Muscle deficit impacts point score more than fat deficit. Definition of categories: 0 = no deficit, 1+ = mild deficit, 2+ = moderate 3+ = severe

**Muscle Status:**

	0	1+	2+	3+
clavicles (pectoralis & deltoids)				
intersosseous muscles				
thigh (quadriceps)				
<b>Global muscle status rating</b>	<b>0</b>	<b>1+</b>	<b>2+</b>	<b>3+</b>
orbital fat pads				
triceps skin fold				
<b>Global fat deficit rating</b>	<b>0</b>	<b>1+</b>	<b>2</b>	<b>3+</b>

**Fluid Status:**

	0	1+	2+	3+

These are examples of areas that can/should be considered in determining loss/deficit (or excess fluid). RELAX... One does NOT have to assess all of these to have a global sense for loss or deficit of muscle or fat. Remember the maximum point score for physical exam is only 3 points and you are not likely to be off by more than 1 point...

Numerical score from Worksheet 4  D

**Total PG-SGA score**   
(Total numerical score of A+B+C+D above)  
(See triage recommendations below)

**Global PG-SGA rating (A, B, or C) =**

Clinician Signature \_\_\_\_\_ RD RN PA MD DO Other \_\_\_\_\_ Date \_\_\_\_\_

**Worksheet 5 - PG-SGA Global Assessment Categories**

Category	Stage A	Stage B	Stage C
Weight	Well nourished No wt loss OR Recent wt gain	Moderately malnourished <5% wt loss in 1 month (or >10% in 6 mos) OR Progressive wt loss	Severely malnourished > 5% wt loss in 1 month (or >10% in 6 mos) OR Progressive wt loss
Nutrient intake	No deficit OR Significant recent improvement	Definite decrease in intake	Severe deficit in intake
Nutrition impact symptoms	None OR Significant recent improvement allowing adequate intake	Present of nutrition impact symptoms (PG-SGA Box 3)	Present of nutrition impact symptoms (PG-SGA Box 3)
Functioning	No deficit OR Recent improvement	Moderate functional deficit OR Recent deterioration	Severe functional deficit OR recent significant deterioration
Physical Exam	No deficit OR Chronic deficient but tissue, recent improvement	Evidence of mild to moderate loss of muscle mass / SQ fat / tissue, recent improvement	Obvious signs of malnutrition (e.g., severe loss muscle, SQ possible edema)

**Nutritional Triage Recommendations:** Additive score is used to define specific nutritional interventions including patient & family education, symptom management including pharmacologic intervention, and appropriate nutrient intervention (food, nutritional supplements, enteral, or parenteral triage).  
*First line nutrition intervention includes optimal symptom management.*

**Triage based on PG-SGA point score**

0-1	No intervention required at this time. Re-assessment on routine and regular basis during treatment.
2-3	Patient & family education by dietitian, nurse, or other clinician with pharmacologic intervention as indicated by symptom survey (Box 3) and lab values as appropriate.
4-8	Requires intervention by dietitian, in conjunction with nurse or physician as indicated by symptoms (Box 3).
>9	Indicates a critical need for improved symptom management and/or nutrient intervention options.

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Worksheet 5 may be helpful to circle relevant statement for each PG-SGA category to visually help identify the overall global assessment



- Handgrip strength



- Sit to stand



- Duke activity status index

	Yes	No
1 Can you take care of yourself (eating, dressing, bathing or using the toilet)?	2.75	0
2 Can you walk indoors, such as around your house?	1.75	0
3 Can you walk a block or two on level ground?	2.75	0
4 Can you climb a flight of stairs or walk up a hill?	5.50	0
5 Can you run a short distance?	8.00	0
6 Can you do light work around the house, such as dusting or washing dishes?	2.70	0
7 Can you do moderate work around the house, such as vacuuming, sweeping floors or carrying in groceries?	3.50	0
8 Can you do heavy work around the house, such as scrubbing floors or lifting and moving heavy furniture?	8.00	0
9 Can you do yard work, such as raking leaves, weeding or pushing a power mower?	4.50	0
10 Can you have sexual relations?	5.25	0
11 Can you participate in moderate recreational activities, such as golf, bowling, dancing, doubles tennis or throwing a baseball or football?	6.00	0
12 Can you participate in strenuous sports, such as swimming, singles tennis, football, basketball or skiing?	7.50	0

Duke Activity Status Index (DASI) = sum of "Yes" replies \_\_\_\_\_

$VO_{2peak} = (0.43 \times DASI) + 9.8$

$VO_{2peak} = \text{_____ ml/kg/min} \div 3.5 \text{ ml/kg/min} = \text{_____ METS}$



# Characterising the impact of body composition change during neoadjuvant chemotherapy for pancreatic cancer

Oonagh M. Griffin <sup>a, b, \*</sup>, Sinead N. Duggan <sup>a</sup>, Ronan Ryan <sup>c</sup>, Raymond McDermott <sup>d</sup>, Justin Geoghegan <sup>b</sup>, Kevin C. Conlon <sup>a, b</sup>

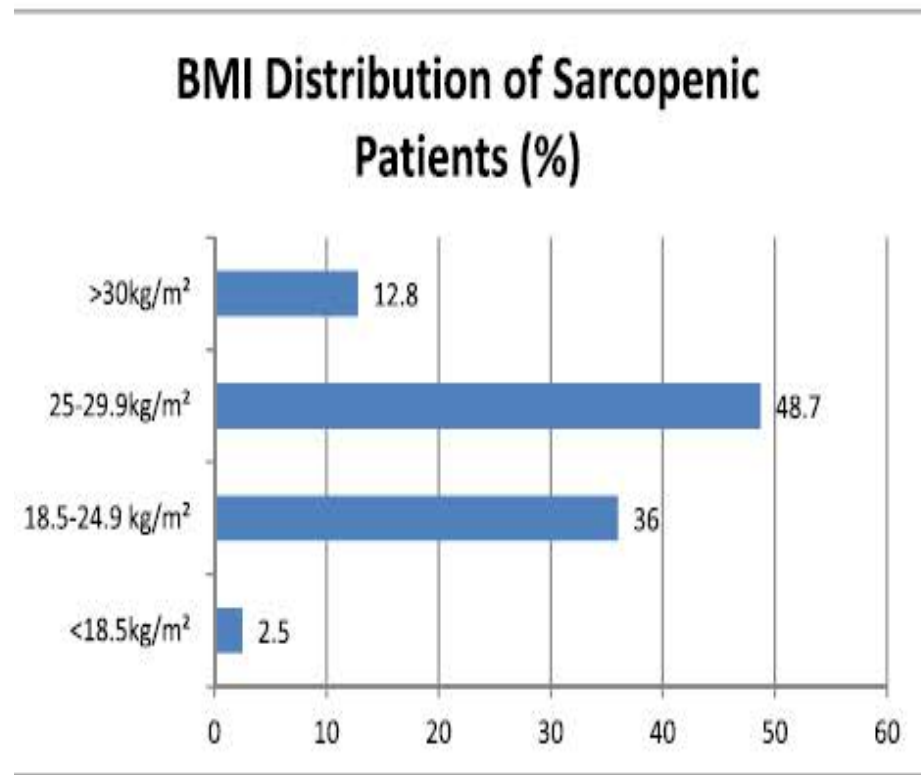


Fig. 1. BMI distribution of Sarcopenic Patients.

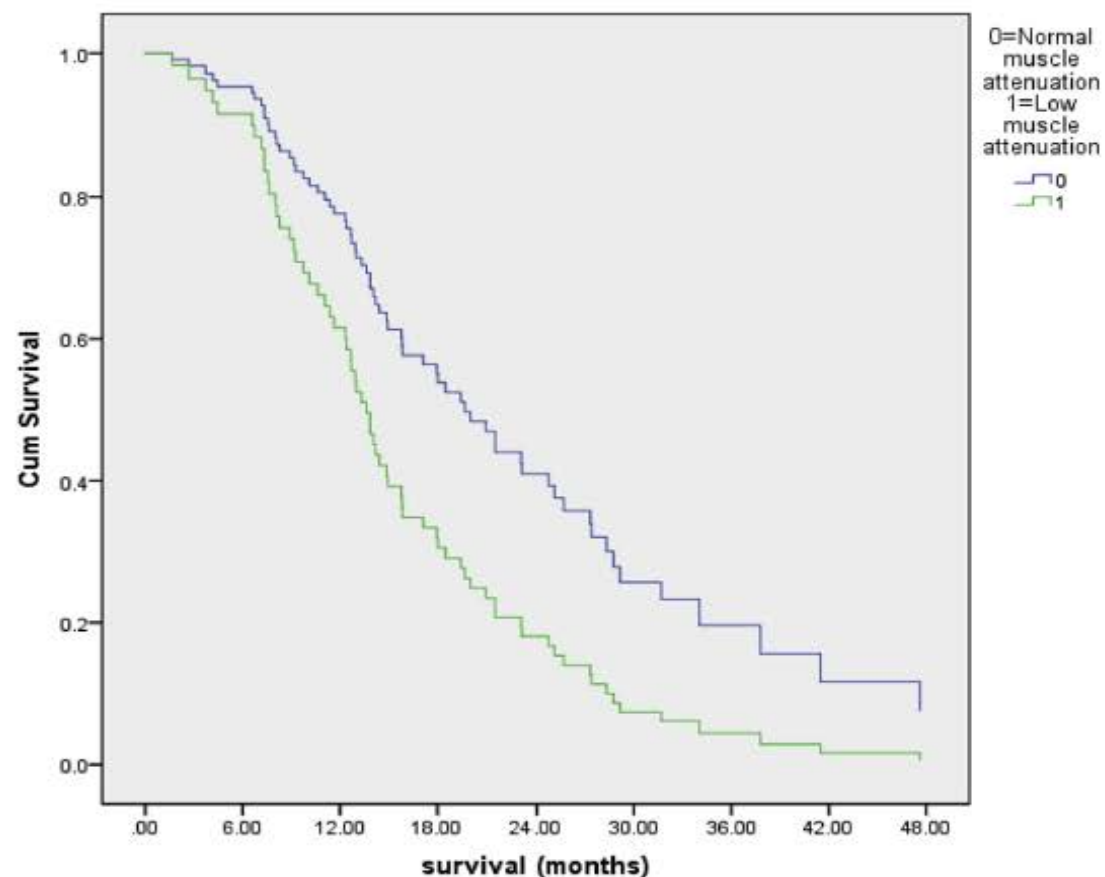


Fig. 2. Impact of low muscle attenuation at diagnosis on mortality risk (cox regression).



Date:

Gastrointestinal symptom questionnaire

This questionnaire is designed to establish how severe your gastrointestinal symptoms are. This information allows us to advise you appropriately on your treatment

1. Please rate your symptoms during the last week by placing a tick in the box that best describes your symptoms

	Never	Occasional (once a week)	Frequent (2-3 times a week)	All the time (every day)
1. Abdominal pain after eating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Abdominal bloating/ distention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Increased flatulence/ wind	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Belching or burping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Stomach/abdominal gurgling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Heartburn or acid reflux	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Nausea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Vomiting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Urgency to open bowels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Incomplete evacuation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Greasy/oily/ Pale/foamy stools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Foul smelling stools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Tiredness/ lethargy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Date:

2. Currently how often do you open your bowels?

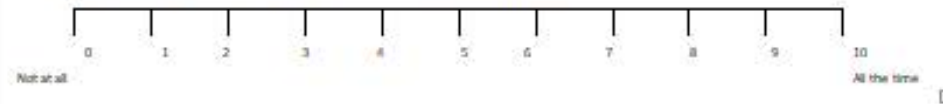
- less than once a week
- Once every 4-7 days
- Once every 2-3 days
- Once a day
- 2-3 times a day
- 4-6 times a day
- 7 or more times a day

3. Please pick the box(es) which best describe(s) your stool:

**Bristol stool chart**

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on its surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges (passed easily)
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces. Entirely liquid


4. How much do your bowel symptoms affect your quality of life?



Total score: / 53

Please turn over



## Pancreatic Enzyme replacement Questionnaire

This questionnaire is designed to establish how much you understand about the pancreatic enzymes you have been prescribed. This information allows us to advise you appropriately on your treatment.

### 1. What Pancreatic Enzyme Replacement are you currently taking?

- Name Creon
- Strength 25000
- Dose 1-4

/3

### 2. How confident do you feel in relation to pancreatic enzyme replacement? (0=not confident, 10= very confident)

0 1 2 3 4 5 6 7 8 9 10

/10

### 3. What is your understanding of why you have been asked to take pancreatic enzymes?

- 
- 
- 

/3

### 4. Which of these would you normally take enzymes with? (highlight)

- |                     |                          |               |                          |  |                          |
|---------------------|--------------------------|---------------|--------------------------|--|--------------------------|
| Cake                | <input type="checkbox"/> | Milky coffee  | <input type="checkbox"/> | Fruit squash                                       | <input type="checkbox"/> |
| Glass milk          | <input type="checkbox"/> | Wine/beer     | <input type="checkbox"/> | Toast  | <input type="checkbox"/> |
| Small plain biscuit | <input type="checkbox"/> | Sugary sweets | <input type="checkbox"/> | Nutritional supplement<br>(i.e Complian/ factisip) | <input type="checkbox"/> |
| Small portion fruit | <input type="checkbox"/> |               |                          |  |                          |

/10

### 5. How many pancreatic enzymes would you take with the following?

Breakfast..... Lunch..... Evening meal..... Snacks.....

/4

### 6. When would you take your pancreatic enzymes? (highlight)

30 minutes before food  At the start of food   
During food  After food

/4

### 7. What symptoms have you been advised to keep an eye on?

- 
- 
- 
- 
- 
- 
- 

/8

### 8. What would you do if you still had symptoms after taking pancreatic enzymes?

- 
- 

/2

Total score: /44



## THE NUTRITION AND DIETETIC PATIENT OUTCOMES QUESTIONNAIRE ADULT PATIENT (NDPOQ-A)

We would like you to tell us how much you agree or disagree with the following statements about the advice and support you have received when attending the Dietetic Department.

There are no right or wrong answers so please choose the answers which are right for you. Please answer each statement by ticking the box that best describes your answer.

Thank You.

<i>The advice and support you got from the Nutrition and Dietetic Department:</i>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neither Disagree or agree</b>	<b>Disagree</b>	<b>Strongly disagree</b>
1. Helped you get a better understanding of your condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Was tailored to your lifestyle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. You were able to put into practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Reassured you in managing your condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Made you feel you were treated as an individual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Provided everything you needed to manage your condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



- 78 year old female- newly diagnosed with head of pancreas adenocarcinoma

## Initial assessment

- Weight- 61kg BMI: 23.6kg/m<sup>2</sup>
- Weight loss 19.7% over 2 month
- Handgrip- 15.1kg (60% of normal)

## Patient Generated Subjective Global Assessment (PG-SGA ©FD Ottery 2015 v3.22.15)

- Reduced food intake, no appetite, nausea, taste changes, smells of food putting off eating and early satiety
- Able to do little activity and spending most of the day in bed/chair past month
- Physical exam- evidence of muscle wasting
- **Overall score 20**



# Case study

- Already started on creon - taking 75,000 units with meals and 50,000 snacks. Nil with glasses of milk. Ongoing symptoms of malabsorption
- Started on nutritional supplements, Ensure - dislikes

## Initial CPET

- Does not have adequate reserves
- Very high risk of either perioperative death or a significant decrement of her quality of life



# Dietetic Diagnosis

1) Severe malnutrition related to suboptimal energy protein intake, no appetite, nausea, taste changes, aversion to food smells, early satiety and malabsorption as evidenced by SGA C, weight loss >10% in past 6 months, muscle wasting, low handgrip strength and reduced physical function

2) Altered GI function related to inadequate pancreatic enzyme replacement therapy as evidenced by steatorrhea and abdominal bloating.



# Intervention

- Aim 25-30kcal/kg and 1.5 g protein/kg
- Address nutrition impact symptoms, including anti-emetics
- High energy/protein diet- little and often
- Sample ONS packs requested, aim twice daily
- Multivitamin and vitamin D replacement
- Pancreatic enzyme replacement therapy education
- Physical activity advice
- Written information provided
- Ongoing regular dietetic review



# Case study

## Repeat CPET after 28 days prehabilitation

- Better test and just outside the normal range for her age group
- Able to proceed to surgery

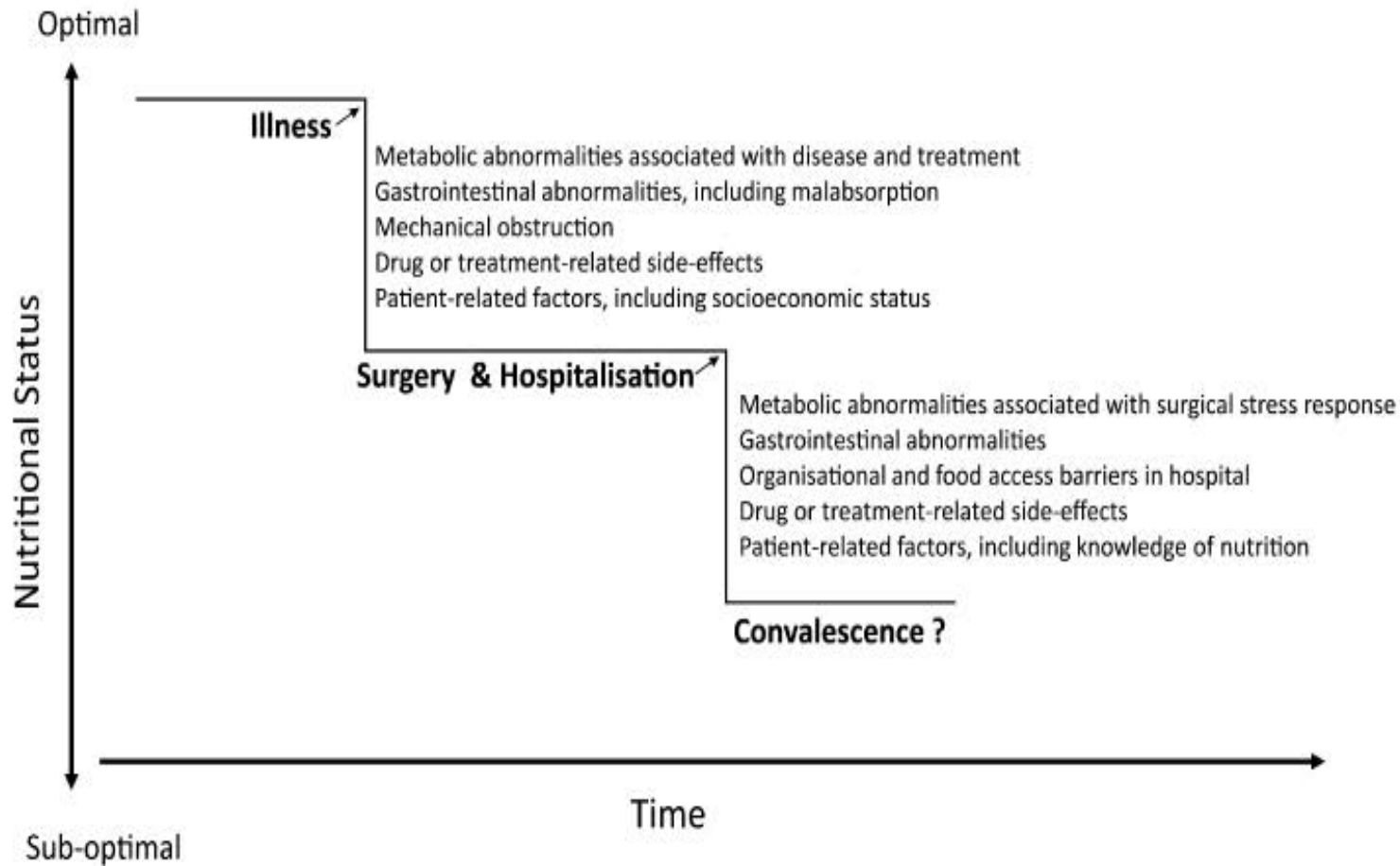
## Pre- surgery

- Weight- 60.2 (stable)
- Handgrip- 18.3kg (increase 3.2kg)
- Oral intake and symptoms significantly improved
- Patient generated subjective global assessment score- **7**



Don't forget about rehabilitation and long term follow up!!!





ORIGINAL ARTICLE

## An explorative study of the views and experiences of food and weight loss in patients with operable pancreatic cancer perioperatively and following surgical intervention

C. Cooper • S. T. Burden • Alex Molassiotis

Six themes emerged from the data that represented the patients' views and experience of foods and weight loss after surgery:

- “struggling with weight loss”,
- “being pressured to eat”,
- “experiences with nutrition support therapy”,
- “perception of the role of the dietitians”,
- “lacking appropriate dietary instructions”
- “road to recovery”.



## Impact of Postoperative Weight Loss on Survival After Resection for Pancreatic Cancer

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and Hideo Baba, MD, PhD<sup>1</sup>

### Abstract

**Background:** The aim of this study was to assess the effects of postoperative body weight loss on long-term survival after resection for pancreatic cancer. **Methods:** A total of 93 patients with primary pancreatic cancer underwent pancreatic resection between April 2005 and December 2011. Patient characteristics, preoperative body mass index, and changes in postoperative body weight were evaluated retrospectively and correlated with long-term survival. **Results:** There was no significant association between survival and preoperative body mass index. Body weight fell by 8.4% at 2 months after surgery and by 9.0% at 4 months after surgery. Severe postoperative body weight losses, both at 2 months ( $P = .033$ ) and 4 months ( $P = .014$ ) after surgery, were significantly associated with poor prognosis, especially among patients with stage IA–IIA pancreatic cancer ( $n = 43$ ) ( $P = .005$  at 2 months and  $P < .001$  at 4 months). Additionally, severe body weight loss tended to be associated with shorter survival among patients with stage IIB–III pancreatic cancer ( $n = 50$ ), although the difference was not significant. Multivariate analysis revealed that postoperative body weight loss was an independent prognostic factor. **Conclusions:** The results of this study demonstrated that pancreatic cancer patients with severe postoperative body weight loss have poorer postoperative outcomes. (*JPEN J Parenter Enteral Nutr.* XXXX;xx:xx-xx)

Journal of Parenteral and Enteral  
Nutrition  
Volume XX Number X  
Month 201X 1–6  
© 2014 American Society  
for Parenteral and Enteral Nutrition  
DOI: 10.1177/0148607114520992  
jpen.sagepub.com  
hosted at  
online.sagepub.com



## Body weight loss after surgery affects the continuity of adjuvant chemotherapy for pancreatic cancer

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### Abstract

**Background:** Postoperative chemotherapy is beneficial for many pancreatic cancer patients. However, some patients require dose reduction or the discontinuation of adjuvant chemotherapy because of adverse treatment-related effects. In this study, we aimed to evaluate two main outcomes. First, we evaluated the clinicopathological factors affecting patient disease-free survival (DFS) and overall survival (OS) following upfront surgery. Second, we evaluated the factors that influence the continuity of adjuvant chemotherapy.

**Methods:** Fifty-four patients with resected pancreatic cancer were enrolled. First, we evaluated the clinicopathological factors affecting postoperative survival using the Kaplan-Meier method and Cox regression method. Next, factors affecting the continuity of adjuvant chemotherapy were analyzed using multiple logistic regression analysis.

**Results:** Univariate and multivariate analyses revealed that positive LN metastasis (HR (95% CI) 6.329 (2.381–16.95);  $p < 0.001$ ) and relative dose intensity (RDI)  $< 80\%$  for adjuvant chemotherapy (HR (95% CI) 5.154 (1.761–15.15);  $p = 0.003$ ) were independent predictive factors for DFS. Regarding OS, extended dissection of the nerve plexus around the superior mesenteric artery (SMA) (HR (95% CI) 4.504 (1.721–11.76);  $p = 0.002$ ), positive microscopic surgical margin (HR (95% CI) 5.565 (1.724–17.96);  $p = 0.004$ ), and adjuvant chemotherapy of RDI  $< 80\%$  (HR (95% CI) 3.534 (1.135–2.667);  $p = 0.029$ ) were also independent predictive factors. Moreover, the level of RDI significantly correlated with DFS and OS. Multiple logistic regression analysis revealed that low RDI was significantly associated with postoperative body weight loss (BWL)  $\geq 10\%$ .

**Conclusions:** The following factors were significantly associated with poor survival: extended dissection of the nerve plexus around the SMA, lymph node metastasis, residual tumor, and RDI of the adjuvant chemotherapy. Patient's prognosis with adjuvant chemotherapy of RDI  $< 80\%$  was worse. BWL  $\geq 10\%$  was the most important factor affecting the continuity of adjuvant chemotherapy. Perioperative nutritional intervention is necessary for patients who receive adjuvant chemotherapy for advanced pancreatic cancer.

**Keywords:** Adjuvant chemotherapy, Body weight loss, Continuity, Pancreatic cancer



# Ongoing gastrointestinal symptoms

- Ongoing diarrhoea and other GI symptoms can significantly impact on QOL
- If taking high dose PERT and PPI with no improvement other conditions should be investigated
- Bacterial overgrowth and bile salt malabsorption can occur

## Long-term Quality of Life and Gastrointestinal Functional Outcomes After Pancreaticoduodenectomy

Allen, Casey J., MD; Yakoub, Danny, MD, PhD; Macedo, Francisco Igor, MD; Dosch, Austin R., MD; Brosch, Jessica, BS; Dudeja, Vikas, MD; Ayala, Ronda, RN; Merchant, Nipun B., MD

Annals of Surgery: October 2018 - Volume 268 - Issue 4 - p 657-664  
doi: 10.1097/SLA.0000000000002962  
PAPERS OF THE 138TH ASA ANNUAL MEETING

**Objective:** To perform a comprehensive assessment of long-term quality of life (QOL) and gastrointestinal (GI) function in patients following pancreaticoduodenectomy (PD).

**Summary of Background Data:** Survival after PD has greatly improved and thus has resulted in a larger population of survivors, yet long-term QOL and GI function after PD is largely unknown.

**Methods:** Patients were identified from a global online support group. QOL was measured using the Short Form-36, while GI function was assessed using the Gastrointestinal Symptom Rating Scale. QOL and GI function were analyzed across subgroups based on time after PD. QOL was compared with preoperative measurements and with established values of a general healthy population (GHP). Multivariate linear regression was used to identify predictors of QOL.

**Results:** Of the 7605 members of the online support group, 1102 responded to the questionnaire with 927 responders meeting inclusion criteria. Seven hundred seventeen (77.3%) of these responders underwent PD for malignancy. Mean age was  $57 \pm 12$  years and 327 (35%) were male. At the time of survey, patients were 2.0 (0.7, 4.3) years out from surgery, with a maximum 30.7-year response following PD. Emotional and physical domains of QOL improved with time and surpassed preoperative levels between 6 months and 1 year after PD (both  $P < 0.001$ ). Each GI symptom worsened over time (all  $P < 0.001$ ). Independent predictors of general QOL in long-term survivors (> 5 years) included total GSRS score [ $\beta = -1.70$  (-1.91, -1.50)], female sex [ $\beta = 3.58$  (0.67, 6.46)], and being a cancer survivor [ $\beta = 3.93$  (0.60, 7.25)].

**Conclusions:** Long-term QOL following PD improves over time, however never approaches that of a GHP. GI dysfunction persists in long-term survivors and is an independent predictor of poor QOL. Long-term physical, psychosocial, and GI functional support after PD is encouraged.



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**Questions?**

