

Malnutrition and Pancreatic Cancer

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Topics to be discussed

- Cachexia and Sarcopenia
- Impact of malnutrition in pancreatic cancer
- Causes and mechanisms
- Assessment and screening tools

‘Malnutrition → an **imbalance** of energy, protein and other nutrients which causes adverse effects on...

body shape, size, composition and **function** and **clinical outcome.**’

(BAPEN, 2020)

Cancer Cachexia

- Multifactorial syndrome
- ongoing loss of skeletal muscle mass (with or without loss of fat)
- not fully reversible using conventional nutritional support
- eventually leads to functional impairment

Malnutrition or cachexia present in 70–80% of all pancreatic cancer patients

(Basile et al., 2019)

Sarcopenia

Loss of lean muscle mass distinct from cancer-related generalised weight-loss, leads to loss of...

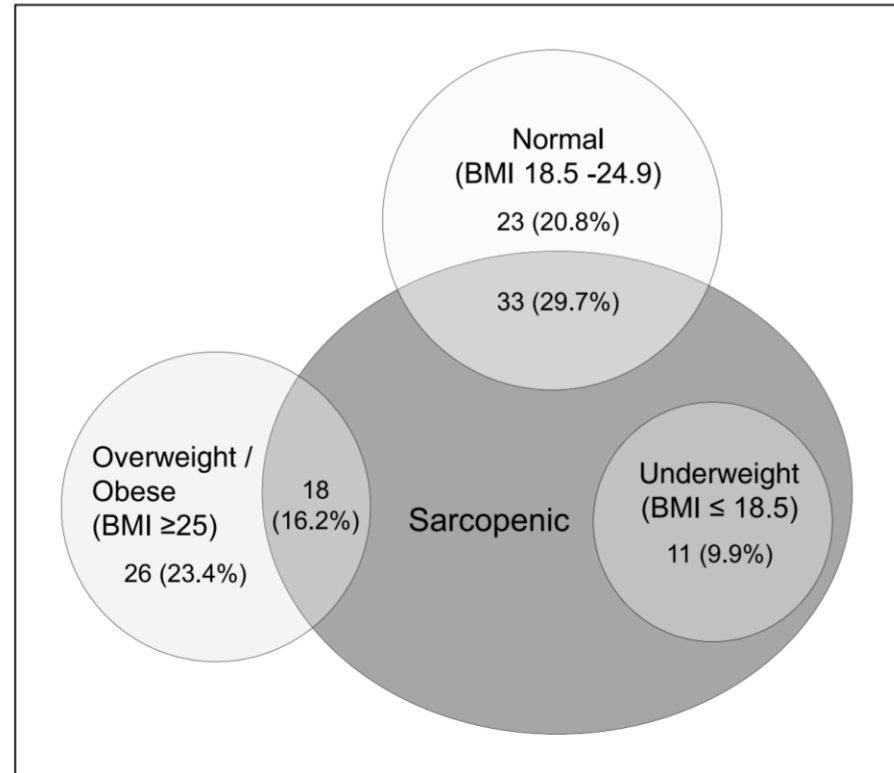
- **Strength**
- **Aerobic capacity**
- **Functional capacity**

Published OnlineFirst November 3, 2009; DOI: 10.1158/1078-0432.CCR-09-1525

Imaging, Diagnosis, Prognosis

Sarcopenia in an Overweight or Obese Patient Is an Adverse Prognostic Factor in Pancreatic Cancer

Benjamin H.L. Tan,¹ Laura A. Birdsell,² Lisa Martin,² Vickie E. Baracos,² and Kenneth C.H. Fearon¹



Impact of Malnutrition

ORIGINAL ARTICLE

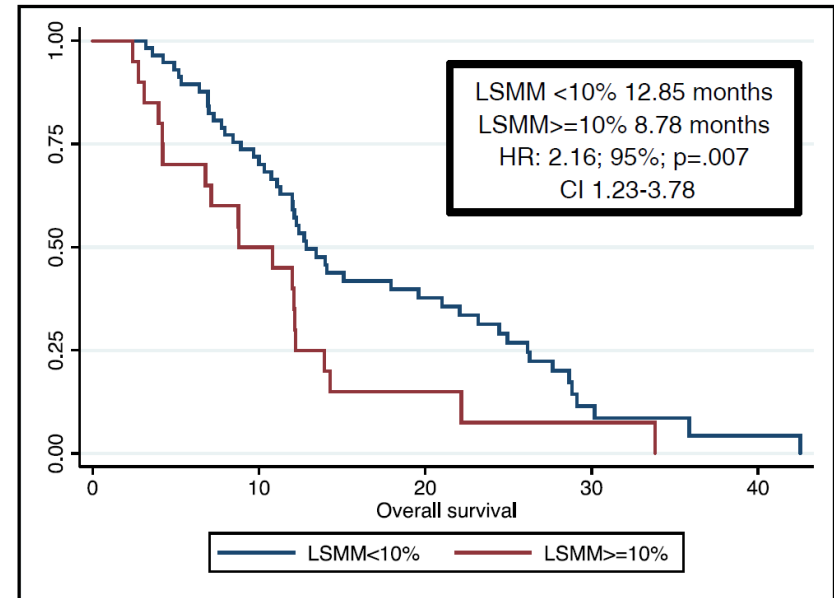
Journal of Cachexia, Sarcopenia and Muscle 2019; 10: 368–377
Published online 4 February 2019 in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/jcsm.12368

The IMPACT study: early loss of skeletal muscle mass in advanced pancreatic cancer patients

Debora Basile^{1,3}, Annamaria Parnofiello^{1,3}, Maria Grazia Vitale^{1,3}, Francesco Cortiula^{1,3}, Lorenzo Gerratana^{1,3}, Valentina Fanotto^{1,3}, Camilla Lisanti^{1,3}, Giacomo Pelizzari^{1,3}, Elena Ongaro^{1,3}, Michele Bartoletti^{1,3}, Silvio Ken Garattini^{1,3}, Victoria Josephine Andreotti^{1,3}, Anna Bacco², Donatella Iacono³, Marta Bonotto³, Mariaelena Casagrande³, Paola Ermacora³, Fabio Puglisi^{1,4}, Nicoletta Pella³, Gianpiero Fasola³, Giuseppe Aprile^{5**†} & Giovanni G. Cardellino^{3†}

- Loss of skeletal muscle mass significantly associated with worse overall survival
- 73% of patients sarcopenic at baseline
- median BMI: 24.1kg/m²
- **Skeletal muscle wasting masked**

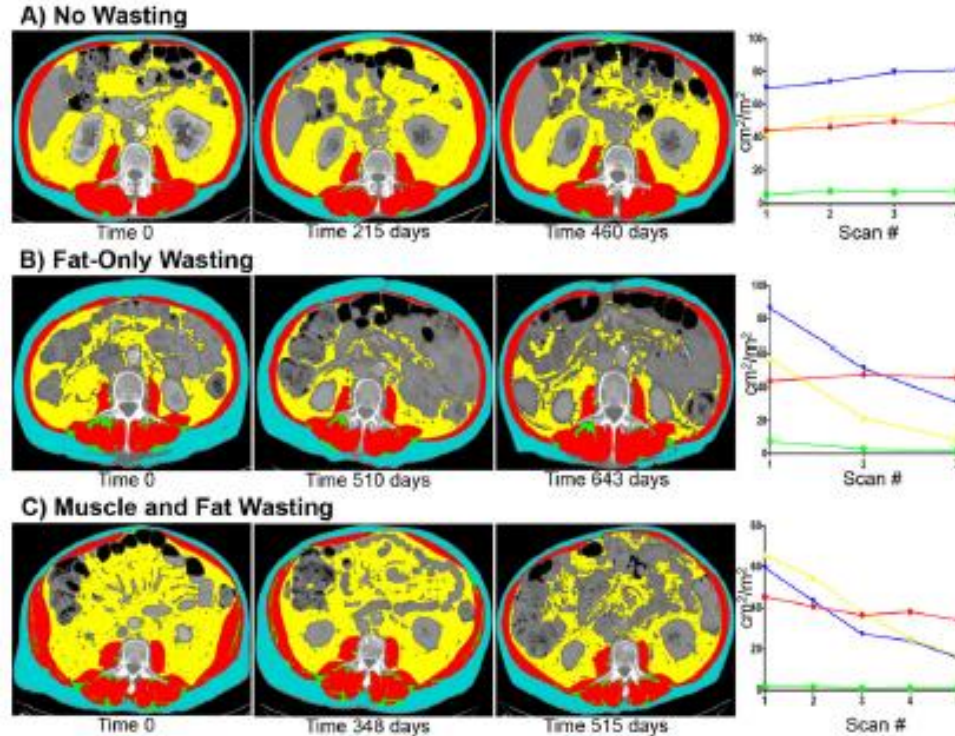
Figure 1 Overall survival. CI, confidence interval; HR, hazard ratio; LSMM, loss of skeletal muscle mass.





Three cachexia phenotypes and the impact of fat-only loss on survival in FOLFIRINOX therapy for pancreatic cancer

Joshua K. Kays¹, Safi Shahda^{2,7,8}, Melissa Stanley², Teresa M. Bell¹, Bert H. O'Neill^{2,8}, Marc D. Kohli³, Marion E. Couch^{4,7,8}, Leonidas G. Koniaris^{1,7,8} & Teresa A. Zimmers^{1,5,6,7,8*}



Quality of Life

- Difficulty in managing gut symptoms and complex dietary issues impacts QoL (Gooden, 2013)
- Levels of depression and anxiety higher in patients with pancreatic cancer compared with population norms (Carrato et al., 2015)
- QoL after diagnosis can also be a **prognostic** indicator (Deng et al., 2018)

Scope to improve supportive care of patients

Pancreatic cancer in adults: diagnosis and management (NG85)

1.4 Psychological support

1.4.1 Throughout the person's pancreatic cancer care pathway, specifically assess the psychological impact of:

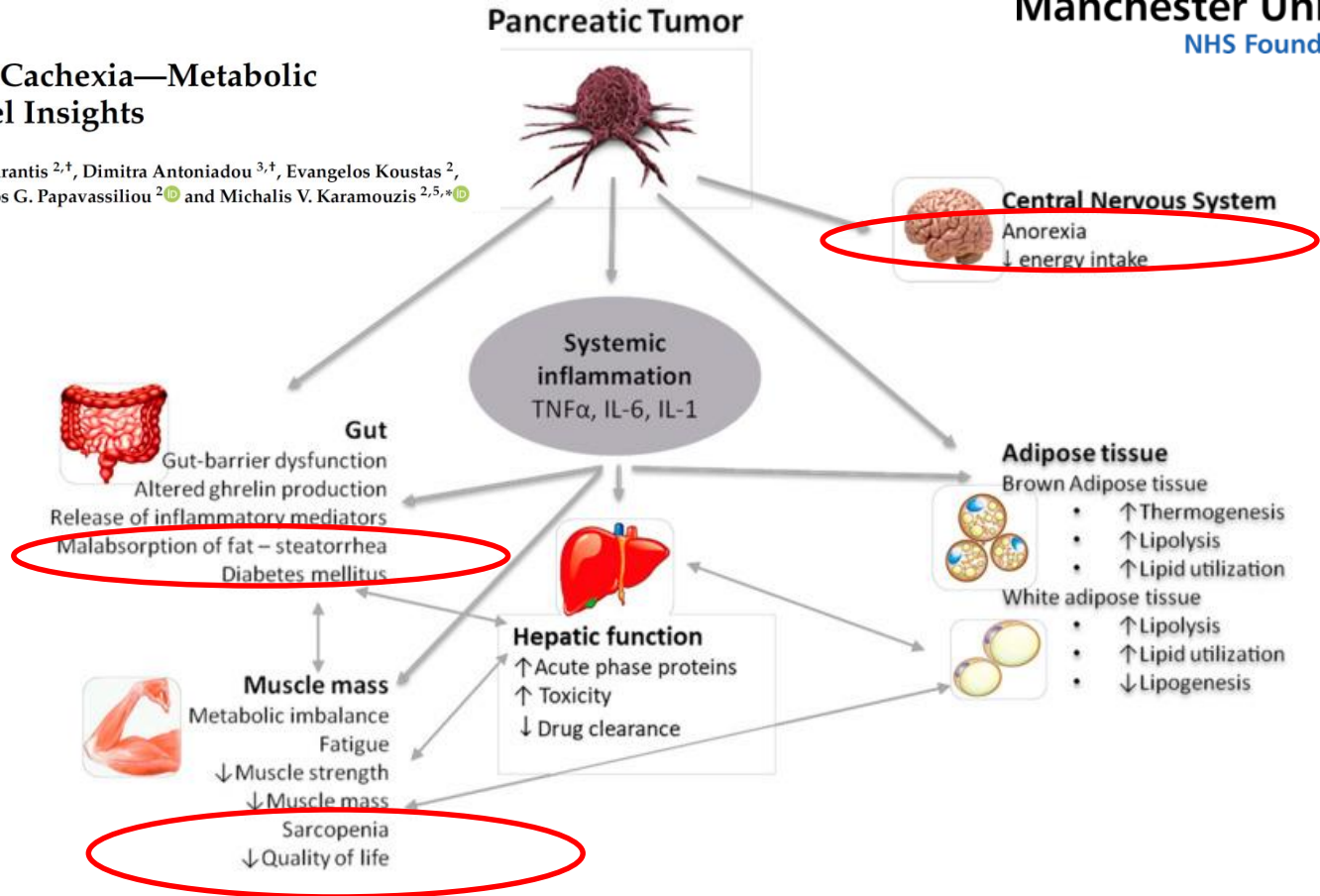
- fatigue
- pain
- gastrointestinal symptoms (including changes to appetite)
- nutrition
- anxiety
- depression.

1.4.2 Provide people and their family members or carers (as appropriate) with information and support to help them manage the psychological impact of pancreatic cancer on their lives and daily activities. This should be:

Review

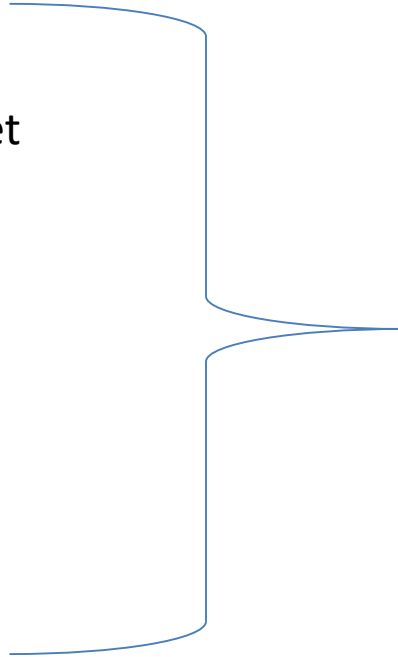
Pancreatic Cancer and Cachexia—Metabolic Mechanisms and Novel Insights

Kalliopi Anna Poulia ^{1,†}, Panagiotis Sarantis ^{2,†}, Dimitra Antoniadou ^{3,†}, Evangelos Kostas ², Adriana Papadimitropoulou ⁴, Athanasios G. Papavassiliou ² and Michalis V. Karamouzis ^{2,5,*}



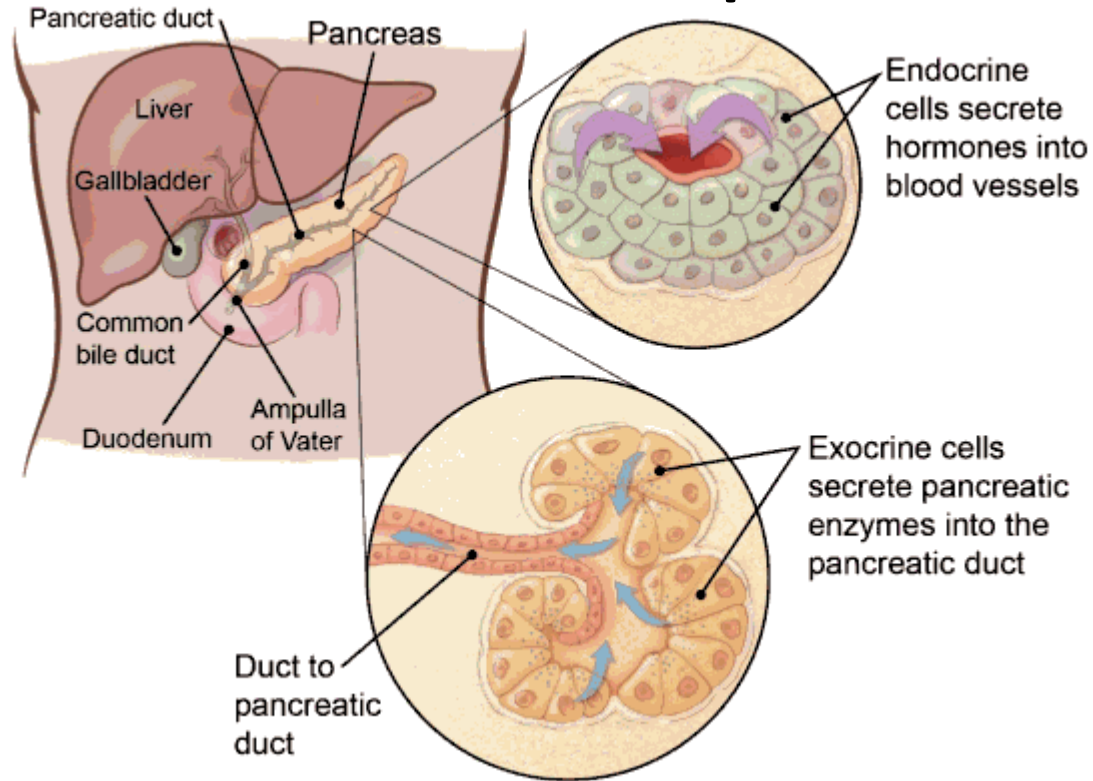
Negative energy and protein balance

Abdominal pain
Nausea
Vomiting – gastric outlet
obstruction
Acid reflux/indigestion
Steatorrhoea
Constipation
Taste Changes
Early satiey
Fatigue
Hyperglycaemia
Low mood



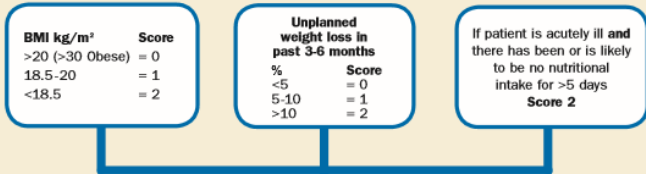
**Increased
nutritional
losses
+
Decreased
nutritional
intake**

Malabsorption



Step 1 + **Step 2** + **Step 3**

BMI score Weight loss score Acute disease effect score



If unable to obtain height and weight, see reverse for alternative measurements and use of subjective criteria

Acute disease effect is unlikely to apply outside hospital. See 'MUST' Explanatory Booklet for further information

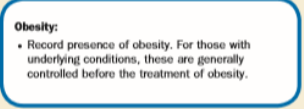
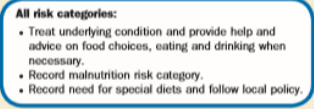
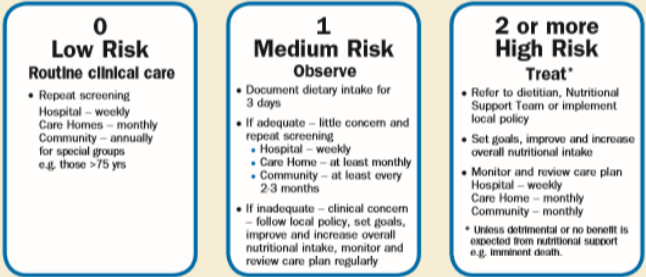
Step 4

Overall risk of malnutrition



Step 5

Management guidelines



Re-assess subjects identified at risk as they move through care settings

See The 'MUST' Explanatory Booklet for further details and The 'MUST' Report for supporting evidence.

Screening Tools

Percent of body WL loss over time and BMI should be assessed routinely.

If used, **more than 1** of the existing malnutrition assessment scores, such as NRI, NRS-2002, MNA-SF, SGA, MUST, and ESPEN malnutrition criteria, should be calculated.

Nutritional support and therapy in pancreatic surgery: A position paper of the International Study Group on Pancreatic Surgery (ISGPS)

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

Patient ID Information

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

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)]

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 ⁽⁰⁾ not changed ⁽⁰⁾ increased ⁽⁰⁾ 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 ⁽⁰⁾
 - more than usual ⁽⁰⁾
 - less than usual ⁽¹⁾
- I am now taking:
- normal food* but less than normal amount ⁽¹⁾
 - little solid food ⁽²⁾
 - only liquids ⁽³⁾
 - only nutritional supplements ⁽³⁾
 - very little of anything ⁽⁴⁾
 - only tube feedings or only nutrition by vein ⁽⁰⁾ Box 2

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

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

** 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 ⁽⁰⁾
- not my normal self, but able to be up and about with fairly normal activities ⁽¹⁾
- not feeling up to most things, but in bed or chair less than half the day ⁽²⁾
- able to do little activity and spend most of the day in bed or chair pretty much bedridden, rarely out of bed ⁽³⁾

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

The remainder of this form is to be completed by your doctor, nurse, dietitian, or therapist. Thank you.

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



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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. Work Sheet 3 - Metabolic Demand

Score for metabolic stress is determined by a number of variables known to increase protein & calorie 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	moderate dose	high dose steroid
		(<10mg prednisone equivalents/day)	(≥10 and <30mg prednisone equivalents/day)	(≥30mg prednisone equivalents/day)

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

Numerical score from worksheet 3 C

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

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

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:

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

Fluid Status:

	0	1+	2+	3+
	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	None	Present of nutrition impact symptoms (PG-SGA Box 3)	Present of nutrition impact symptoms (PG-SGA Box 3)
Symptoms	OR Significant recent improvement allowing adequate intake		
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 / muscle tone on palpation	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

Thank you

Any Questions?



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