NUTRITIONAL ASSESSMENT OF PANCREATIC CANCER PATIENTS

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INTRODUCTION

- Normal pancreatic function
- Malnutrition in pancreatic cancer
- Cancer cachexia
- Sarcopenia
- Nutrition Screening tools
- Prehabilitation

NORMAL PANCREATIC FUNCTION



- The pancreas is a gland that sits between the stomach and the duodenum.
- Exocrine function the pancreas secretes enzymes which are released into the duodenum to facilitate digestion e.g. lipase, proteases and amylase.
- Endocrine function the pancreas releases insulin to assist with the absorption of glucose from the blood into the cells of the body.
- Cancers in the pancreas reduce enzyme production / release this is known as Pancreatic Exocrine Insufficiency.
- Closer the tumour to duodenum, less exocrine function exponentially (Keller & Layer, 2005).
- 80-90% of patients display exocrine insufficiency.
- Cancers affecting the tail of the pancreas more likely to cause diabetes.
- Type 3C diabetes

POLL

HOW CONFIDENT ARE YOU AT IDENTIFYING MALNUTRITION IN PANCREATIC CANCER PATIENTS?

MALNUTRITION AND PANCREATIC CANCER

- Malnutrition is an "imbalance of energy, protein and other nutrients which causes adverse effects on body shape, size, composition, function and clinical outcome." (BAPEN, 2020)
- Multi-factorial including symptoms from the tumour, treatment side effects, cancer cachexia, sarcopenia and
 exocrine insufficiency so early screening, assessment and dietetic input is crucial for improving patient outcomes.
- More than a third of PC patients have experienced greater than 10% loss of body weight at diagnosis as a result of their presenting symptoms.
- This combined with the development of cancer cachexia and /or on a background of existing sarcopenia can mean poorer outcomes for people with pancreatic cancer including:
- Longer hospital stays, increased risk of complications, reduced response to treatment, reduced QoL, Increased morbidity and mortality (Gartner et al, 2016)

POLL:

DO YOU ROUTINELY USE A NUTRITION SCREENING TOOL WITH YOUR PATIENTS?

NUTRITION SCREENING TOOLS



- Several tools to consider.
- Malnutrition Universal Screening Tool (MUST) lots of educational resources / training programs UK wide to support its use.
- BAPEN offer "self MUST": <u>Worried About Weight Loss -</u> <u>Self-Screening for Malnutrition</u> (malnutritionselfscreening.org),
- Lower specificity and sensitivity in oncology population but widely used.
- No consideration of risk of sarcopenia or Nutrition Impact symptoms

NUTRITION SCREENING TOOLS

- PG-SGA validated in Oncology Settings
- Uses Nutrition Impact Symptoms and food intake as part of scoring so has some predictive value in terms of malnutrition developing as a result of symptoms / reduced food intake.
- Validated in oncology settings
- Considers activity / function as a step towards consideration of frailty / sarcopenia / performance status.

Scored Patient-generated Subjective Global Assessment (PG-SGA)	Patient identification information
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 inches tall One month ago I weighed about pounds Six month ago I weighed about pounds During the past two weeks my weight has: Decreased (1) Not changed (0) Increased (0) Box 1	 2. Food intake: As compared to my normal intake, I would rate my food intake during the past month as Unchanged (0) More than usal (0) Less than usal (1) I am now taking <i>Normal food</i> 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 nutribution by vein (0) Box 2
 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 problem eating (0) No appetite, just did not feel like eating (3) Vomiting (3) Nausea (1) Diarrhea (3) Constipation (1) Mouth sores (2) Smells bother me (1) Things taste funny or have no taste (1) Feel full quickly (1) Problems swallowing (2) Fatigue (1) Other (1)** **Examples: Depression, money, or dental problems Box 3 	 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 be little activity and spend most of the day in bed or chair (3) Pretty much bed ridden, rarely out of bed (3)
The remainder of this form is to be completed by your doctor, nurse, dietitian, or ©FD Ottery 2005, 2006, 2015 v3.22.15 email: faithotterymdphd@aol.com or info@pt-global.org	Additive score of boxes 1-4

NUTRITION SCREENING TOOL

- Royal Marsden Nutrition Screening Tool
- Validated in Oncology
- Considers Nutrition Impact Symptoms

Question	If answer to the question is yes, then score
1. Has the patient experienced unintentional weight loss in the last 3 months?	
(>7 kg in men or >5.5 kg in women)	10
If not, unintentional weight loss less than the above	5
2. Does the patient look underweight?	5
3. Has the patient had a reduced food intake (less than 50 % of meals) in the last 5 days (this may be due to mucositis, dysphagia, nausea, bowel obstruction, vomiting)?	5
4. Is the patient experiencing symptoms that are affecting food intake, e.g. mucositis, nausea, vomiting, diarrhoea and constipation?	3
Total score	Maximum 23

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Score 0-4, well-nourished, score 5-9, moderately malnourished, score >10, severely malnourished

NUTRITION SCREENING TOOL

- R-MAPP: Combination of MUST and the SARC-F tool in the form of a free app
- Developed during COVID 19 to assist with remote nutrition screening
- Considers malnutrition risk as well as detection of sarcopenia.





CANCER CACHEXIA

- A complex combination of metabolic abnormalities
- Caused by a systemic inflammatory response



- Leads to ongoing loss of skeletal muscle mass (with or without loss of fat mass)
- Unable to completely reverse with conventional nutritional support
- Leads to progressive functional impairment / frailty.
- Compounded by poor oral intake from tumour related causes / cancer treatment side effects
- Cachexia syndrome can develop progressively through various stages—pre-cachexia to cachexia to refractory cachexia. (Fearon et al, 2011)
- Thought to be present in up to 65% or more of people with pancreatic cancer (Kordes et al 2021).

CANCER CACHEXIA – A SYNDROME



Fearon, 2008

PHARMACOLOGICAL MANAGEMENT OF CACHEXIA

As well as dietary counselling and exercise, pharmacology can be useful such as:

Corticosteroids e.g. Dexamethasone / Prednisolone

•For short-term improvement of appetite.

•Rapid effect but tends to decrease after 3 to 4 weeks.

•May also help to reduce nausea, improve energy and general feeling of wellbeing.

•However, there is often no significant effect on nutritional status.

•Consider need for gastric protection e.g. PPI

•Multiple side effects.

Progestogens e.g. MegAce

•May stimulate appetite and weight gain

•May take a few weeks to take effect but benefit is more prolonged than steroids.

•More appropriate for patients with a longer prognosis.

•For appetite stimulation, lower doses are as effective as higher doses but for weight gain there does appear to be more of a dose-response relationship.

•Side effects include nausea, fluid retention and risk of pulmonary embolism

(Health Improvement Scotland, 2021)

MENAC TRIAL

- "Multimodal Exercise, Nutrition and Anti-inflammatory medication for Cachexia" Trial
- Non Steroidal Anti-Inflammatory Drugs to influence several inflammatory pathways including: IL-1, which reduces appetite and tumour necrosis factor α, which might influence muscle and fat catabolism.
- Eicosapentaenoic Acid and Docosahexaenoic Acid to reduce inflammation, stabilise weight and improve QOL
- Physical exercise programme using resistance and aerobic training to increase anabolism
- Dietary counselling and oral nutritional supplements to promote energy and protein balance.
- Aiming to prevent cachexia or attenuate cachexia progression.
- Awaiting results.

Review

Cancer cachexia: rationale for the MENAC (Multimodal—Exercise, Nutrition and Anti-inflammatory medication for Cachexia) trial

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SARCOPENIA

"Sarcopenia is a progressive and generalised skeletal muscle disorder that is associated with increased likelihood of adverse outcomes including falls, fractures, physical disability and mortality."

Probable sarcopenia is identified by Criterion 1.
Diagnosis is confirmed by additional documentation of Criterion 2.
If Criteria 1, 2 and 3 are all met, sarcopenia is considered severe.
1.Low muscle strength
2.Low muscle quantity or quality
3.Low physical performance

(EWGSOP 2018)

POLL:

Are you routinely using a screening tool to detect sarcopenia in your practice?

SARCOPENIC OBESITY

- Obesity epidemic in the western world.
- Patients with cancer diagnoses can present with a high BMI so nutritional concerns may be taken less seriously than those with lower BMIs.
- People with high BMIs can still be at risk of malnutrition as a result of weight loss, reduced oral intake, pancreatic exocrine insufficiency and other symptoms associated with their disease.
- The term Sarcopenic Obesity was coined to define low muscle mass/strength in obese individuals (Benjamin, 2009).
- High BMI can mask sarcopenia as shown in these two CT scans (Gruber et al, 2019)



IMPACT OF SARCOPENIA – PALLIATIVE PATIENTS ON CHEMOTHERAPY

- Folfirinox is one of the main types of chemotherapy used neoadjuvantly, adjuvantly and palliatively for Pancreatic cancer.
- In this study by Kurita et al, Patients undergoing Folfirinox chemotherapy for Advanced PC with sarcopenia had worse overall survival.
- Those with Sarcopenic obesity also had increased toxicities from the treatment.
- The IMPACT Study preliminary findings show >10% loss of lean muscle mass has a negative prognostic role in PC (Basile et al, 2019) but more prospective studies needed.



Pancreatology Volume 19, Issue 1, January 2019, Pages 127-135



Sarcopenia is a reliable prognostic factor in patients with advanced pancreatic cancer receiving FOLFIRINOX chemotherapy

Yusuke Kurita ^{a, b}, Noritoshi Kobayashi ^b A ⊠, Motohiko Tokuhisa ^b, Ayumu Goto ^b, Kensuke Kubota ^a, Itaru Endo ^c, Atsushi Nakajima ^a, Yasushi Ichikawa ^b > J Cachexia Sarcopenia Muscle. 2019 Apr;10(2):368-377. doi: 10.1002/jcsm.12368. Epub 2019 Feb 4.

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

Debora Basile ^{1 2}, Annamaria Parnofiello ^{1 2}, Maria Grazia Vitale ^{1 2}, Francesco Cortiula ^{1 2}, Lorenzo Gerratana ^{1 2}, Valentina Fanotto ^{1 2}, Camilla Lisanti ^{1 2}, Giacomo Pelizzari ^{1 2}, Elena Ongaro ^{1 2}, Michele Bartoletti ^{1 2}, Silvio Ken Garattini ^{1 2}, Victoria Josephine Andreotti ^{1 2}, Anna Bacco ³, Donatella Iacono ², Marta Bonotto ², Mariaelena Casagrande ², Paola Ermacora ², Fabio Puglisi ^{1 4}, Nicoletta Pella ², Gianpiero Fasola ², Giuseppe Aprile ⁵, Giovanni G Cardellino ²

IMPACT OF SARCOPENIA - SURGERY

- Increased perioperative mortality
- Increased overall mortality (Bundred et al, 2019)
- Patients with sarcopenia and sarcopenic obesity undergoing resection for PDAC have a significantly shorter overall survival and a higher complication rate.
- The assessment of body composition in these patients may provide a broader understanding of patients' individual condition and guide specific supportive strategies in patients at risk (Gruber et al, 2019).
- Further prospective studies are needed to confirm the prognostic role of sarcopenia and the effects of multimodal interventions in patients with pancreatic cancer (Choi & Yoon, 2022).

HPE



HPB Volume 21, Issue 12, December 2019, Pages 1603-1612

Review article

Body composition assessment and sarcopenia in patients with pancreatic cancer: a systematic review and metaanalysis



Sarcopenia and sarcopenic obesity are independent adverse prognostic factors in resectable pancreatic ductal adenocarcinoma

Elisabeth S. Gruber 🖾, Gerd Jomrich, Dietmar Tamandl, Michael Gnant, Martin Schindl, Klaus Sahora 🖾

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World Journal of Gastrointestinal Oncology

<u>World J Gastrointest Oncol.</u> 2022 Dec 15; 14(12): 2302–2312. Published online 2022 Dec 15. doi: <u>10.4251/wjgo.v14.i12.2302</u> PMCID: PMC9782618 PMID: <u>36568942</u>

Sarcopenia in pancreatic cancer: Effect on patient outcomes

Moon Hyung Choi and Seung Bae Yoon

ASSESSMENT OF SARCOPENIA

- **SARC-F tool** questionnaire used to detect signs of sarcopenia
- 5 Questions: patient's ability to lift, climb up a flight of stairs, experience with falls, walking ability and rising from a chair.
- Hand grip strength to measure muscle strength
- Used as a surrogate measure for arm / leg muscle strength as good correlation with grip strength.
- Values less than 85% of normal range suggest high risk of severe postoperative morbidity and mortality.
- Low HGS associated with poor 1 year survival for those with cancer cachexia (Song et al, 2021)
- **Calf Circumference** correlates strongly with MRI, <33cm for men and women diagnostic of sarcopenia (EWGSOP 2016)
- DXA, MRI, US or CT can be used to assess muscle quantity but not used routinely as high costs / training needs / not very practical – research setting.
- Bioelectrical Impedance Analysis estimate of muscle mass based on whole-body electrical conductivity.
 (Cruz-Jentoft et al, 2019)







MANAGEMENT OF SARCOPENIA

- More research needed
- Exercise everything from aerobic exercise, HIIT training, Whole body vibration and resistance exercise beneficial
- Dietary counselling
- Correct protein deficits 1-1.5g/kg
- Vitamin D = increased muscle fibres and strength, reversal of muscle atrophy
- Antioxidants = may help improve strength and physical performance
- Amino acids = leucine may reverse suboptimal protein synthesis in older adults
- Drug therapy more research needed but use of Testosterone, ACE inhibitors and selective androgen receptor modulators e.g. myostatin / thalidomide may be beneficial.
- (Papadopoulou, 2020)



PREHABILITIATION

- Defined as "supporting people living with cancer to prepare for treatment. It promotes healthy behaviours and
 prescribes exercise, nutrition and psychological interventions based on a person's needs, to help them find their
 best way through."
- Ideally should be implemented in the early stages soon after diagnosis and well in advance of treatment.
- Some pilot studies have shown that benefits can still be seen in as little as two weeks prior to surgery.

PRINCIPLES AND GUIDANCE FOR PREHABILITATION WITHIN THE MANAGEMENT AND SUPPORT OF PEOPLE WITH CANCER

📮 Guides

Published: 30 Nov 2020 Next review: 30 Nov 2021 Edition: 1

This guide will support healthcare professionals to integrate prehabilitation services into the cancer pathway.

BENEFITS OF PREHAB

- Personal empowerment giving pts a sense of control and purpose and enhances QOL
- Physical and psychological resilience an opportunity to improve physical function and psychological well being helping people cope better with treatments and surgery, enhancing the quality of recovery and living better after treatments.
- Long term health a teachable moment to reflect on the role of healthier lifestyle practices after a diagnosis to promote positive behavior change.
- Several programs underway across the UK such as: Prepwell

 community based programme in NE England, Fit 4 Surgery
 - Royal Surrey, 5 week rolling program, bit of a postcode lottery.
- Programs demonstrate reversal of sarcopenia, improved fitness levels, improved lifestyle choices and better mental health.



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Original Article

Prehabilitation prior to surgery for pancreatic cancer: A systematic review

James R. Bundred^a, Sivesh K. Kamarajah^{b c}, John S. Hammond^b, Colin H. Wilson^b, James Prentis^d, Sanjay Pandanaboyana^{b e} 2

CONCLUSION

- Early Nutrition screening, consideration of cancer cachexia and screening for sarcopenia can allow for earlier specialist dietetic support, referral to formal prehabilitation programs or referral to other routes of increasing exercise such as Macmillan Move More / Exercise on prescription schemes and improving lifestyle.
- Early nutritional assessment and development of treatment plans to tackle these issues can improve tolerance of treatments, surgical outcomes and overall survival.
- More evidence is needed for treating sarcopenia and cancer cachexia in pancreatic cancer patients.
- Using a standardised approach to prehabilitation for pancreatic cancer patients as part of further prospective trials will help to strengthen the evidence base behind its likely benefits to patient outcomes.

THANK YOU

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