Assessing Longitudinal Body Fat Change in a Cohort of Patients with Advanced Cancer

Christopher Fraser[1], Stephanie Chevalier[1,2], Jessica Murphy[3], Lin Yang[3], and Bruno Gagnon[3]

[1]School of Dietetics and Human Nutrition, [2] McGill Nutrition and Food Science Centre [3]Division of Clinical Epidemiology, MUHC

Background

- The Cancer-Anorexia Syndrome (CACS) is defined by anorexia and ongoing loss of skeletal muscle mass, with or without loss of fat mass[1]
- Advanced CACS is refractory to conventional nutritional support and leads to progressive functional impairment[1]
- Research indicates that maintaining body fat may confer a survival advantage[2], and contribute to the preservation of skeletal muscle mass[3,4]
- Longitudinal research assessing changes in body fat in patients with advanced cancer is scarce in the literature

Objectives

- To estimate to which extent body fat mass distribution differs between men and women at diagnosis of advanced cancer
- To identify the change in body fat over time in a cohort of patients after diagnosis of advanced cancer

Hypothesis

- It is expected that there will be different distributions of fat between men and women
- It is expected that subgroups of patients will demonstrate different patterns of body fat change

Methods

Study Population (N=101) recruited from the JGH and MUHC

Measures

- CT Scans: tissue volume measured at 3rd lumbar vertebrae (L3) as cross-sectional surface areas
  - total fat at L3 was used to estimate whole body fat mass from regression equation[5]
- Dietary energy intakes are from 3-day food intake diaries

Statistical Analysis

- Group-based Trajectory Modeling: assumes population is composed of distinct developmental trajectory groups for a given outcome
- Groups are comprised of individuals who have followed similar patterns of development for the outcome of interest (fat mass change)

Results

Table 1. Patient Characteristics

	Men	Women
Gender (n)	67	34
Age (years)	65.4 ± 1.5	63.4 ± 1.9
BMI	24.7 ± 0.6	24.9 ± 1.1
Cancer Type (n)		
Pancreatic	18	16
NSCLC	13	5
Hepatobillary	11	4
Upper Gastrointestinal	10	3
Colorectal	10	5
Other	5	1
Daily caloric intake (kcal)	1929 ± 88	1547 ± 119
Caloric Intake (kcal)/ day/body mass (kg)	27.3 ± 1.6	28.0 ± 2.8

Values reported as mean ± SEM, unless noted otherwise

Table 2. Patient Body Fat Characteristics

	Men	Women
CT-derived whole body fat mass (kg)	23.0 (21.4-24.6)	23.2 (20.6-25.8)
CT-derived % body fat	30.4 (29.0-31.8)	36.2 (34.4-38.0)
Visceral Fat Surface Area (cm^2)	133.0 (110.4-155.6)	85.2 (60.8-109.6)
Subcutaneous Fat Surface Area (cm^2)	134.6 (116.2-153.0)	184.4 (144.4-224.4)
Fat Index (cm^2/m^2)	91.4 (78.2-104.6)	112.9 (88.5-137.3)

Values reported as mean (95% CI)

Acknowledgements:

References:

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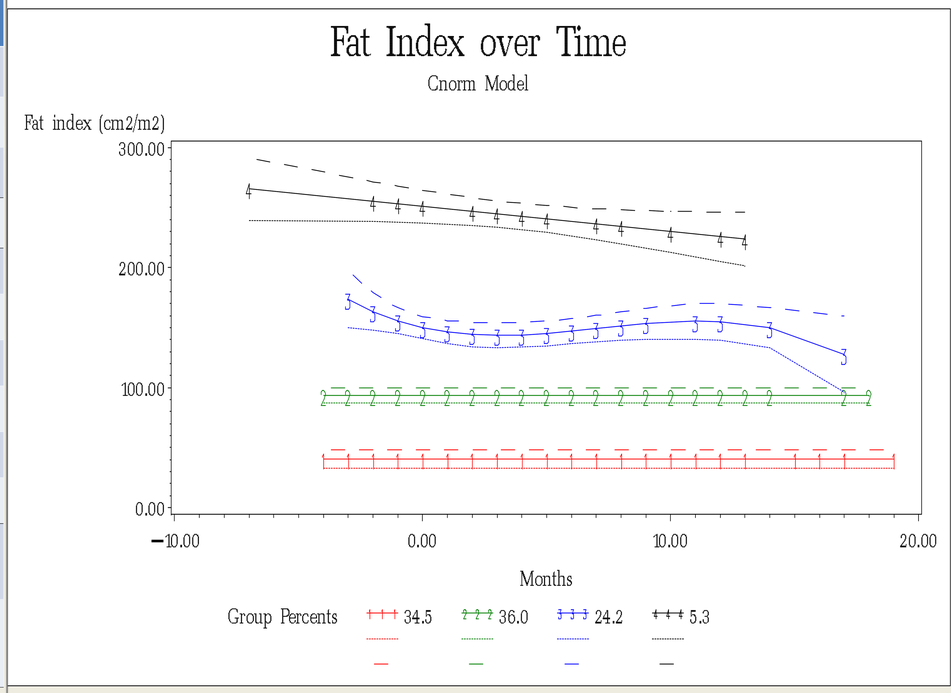
Figure 1. Trajectories of the fat surface area indexed to height over time



Our trajectory described 4 groups of fat change

- Group 1 and 2: stable, differing only by amount of fat at baseline
- Group 3: early and late decline separated by period of stability
- Group 4: linear decline

There was no effect of age or sex

Discussion

- Differences in fat distribution between men and women were expected and are similar to those seen in healthy populations
- Classifying trajectory groups by stages of cancer cachexia[1]:
  - **Precachexia**: Groups 1 and 2
  - **Cachexia**: Group 3 (with period of possible response to treatment)
  - **Refractory Cachexia**: Group 4
- Most patients had stable body fat, while those who had losses also had more fat at baseline
- Fat loss may occur closer to death
  - Mean difference between last CT scan and death/final assessment was > 2 months

Future Considerations

- Compare characteristics of individuals between groups
- Evaluate death dates of patients in each group to interpret effect of fat change pattern on survival