Preliminary Results of a Pilot Study Using Validated Nutrition Screening Tools to Investigate the Nutrition Evolution of Patients with Acute Myeloid Leukemia

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Abstract

Introduction
At Mayo Clinic, adult patients with Acute Myeloid Leukemia (AML) are treated in hospitalized inpatient, hospital-based outpatient, and traditional ambulatory outpatient settings. Access to a registered dietitian (RDN) varies in these settings and we hypothesize that this contributes to late identification of patients with potential increased nutrition risk. Because research on the nutrition evolution of patients with AML throughout the full continuum of treatment (induction through transplant) does not exist, specific nutrition intervention guidelines have not been established.

Objectives
This descriptive pilot study will determine what nutrition risk patterns exist among patients being treated for AML, from diagnosis through transplant. The study will compare the Malnutrition Screening Tool (MST), Patient-Generated Subjective Global Assessment© (PG-SGA) and current hospital admission malnutrition screening tool for specificity and sensitivity in this population.

Methods
At two to four week intervals subjects answered eight questions about their nutrition status. Three questions constitute the MST, the fourth is part of our hospital's nutrition screening. The final four questions are the patient-generated portion of the PG-SGA©, or "short form" PG-SGASF©. Subjects completed the PG-SGASF© questions using a touchscreen application (Pt-Global v. 2.6, pt-global.org). Researchers conducted nutrition focused physical exam and chart review to complete the full PG-SGA©. Results will be compared for specificity and sensitivity in determining nutrition risk.

Results
We have preliminary results from five subjects as of 2/14/17 and will have results from at least ten patients by June of 2017.

Conclusions
Results of this pilot study may contribute to evidence-based nutrition care guidelines for this population.

Background

Treatment for acute myeloid leukemia (AML) often includes several cycles of induction and/or consolidation chemotherapy and possible hematopoietic stem cell transplant (HSCT), all of which have the potential to impact the nutrition status of patients. We hypothesize that nutrition risk and the need for targeted nutrition interventions will change throughout treatment.

In January 2017, Mayo Clinic began a descriptive pilot study with a goal accrual of 24 subjects in the first year. The aim of the study is to describe the nutrition evolution of patients undergoing treatment for AML and to compare nutrition screening and assessment tools in this patient population.

Methods

Adult patients admitted to Mayo Clinic (Rochester, MN) hematology service are identified through hospital census. Subjects must be consented and respond in person (inpatient, hospital based outpatient, or ambulatory setting) to the researcher. Researchers include Registered Dietitian Nutritionists (RDNs) and Dietetic Interns who have received training in conducting nutrition focused physical exams (NFPE).

Inclusion Criteria

- Adults ≥18 years
- New AML diagnosis
- Able to read and understand English
- Willing to answer questions using an iPad tablet

Subjects are asked a series of questions related to their nutrition intake and history to assess their overall nutrition status. This series of questions is repeated every two to four weeks as subjects are followed during active treatment and recovery. These questions represent two distinct sets of questions:

The first set of questions is a series of nutrition screening questions that constitute our hospital admission nutrition screening tool (Fig.1) and the validated Malnutrition Screening Tool (Fig.2), these questions are asked orally by the researcher.

BMI on admission
Percent weight loss in the past 6 months
Problems swallowing
Recently on tube feedings or parenteral nutrition, or have a nutrition access device in place

Figure 1. Current hospital nutrition screening questions

Have you recently lost weight without trying?	No	0
	Unsure	2
If yes, how much weight have you lost?	2-13 lb	1
	14-23 lb	2
	24-33 lb	3
	34 lb or more	4
	Unsure	2
Have you been eating poorly because of a decreased appetite?	No	0
	Yes	1
	MST score:	

Figure 2. Malnutrition Screening Tool (MST) questions

The second set of nutrition-related questions is the Patient Generated Subjective Global Assessment (PG-SGA©) and these questions are delivered via iPad tablet utilizing the Pt-Global (pt-global.org) digital platform of the PG-SGA© (Fig.3)

Subjects indicate their answers via touch screen to complete the weight, food intake, symptoms, and activities and functions portions (also referred to as the PG-SGA(SF). The researcher then completes the professional portion of the PG-SGA© to include disease, metabolic demand (chart review of fevers, use of corticosteroids) and a nutrition focused physical exam to determine changes in fat stores, muscle stores, and presence of edema.

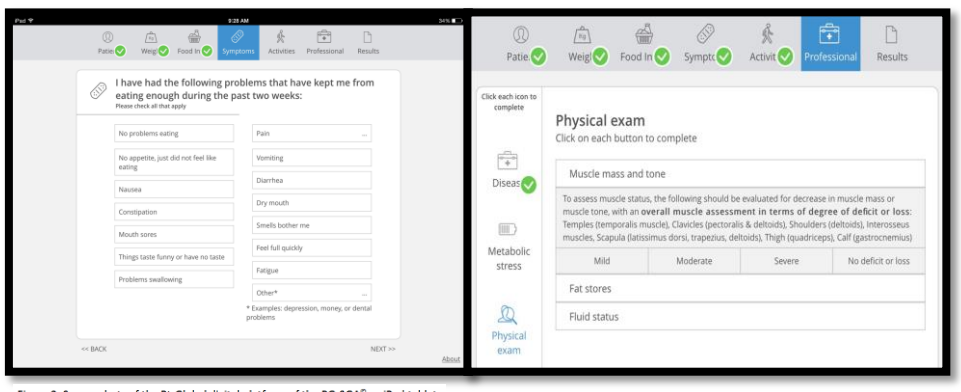

Figure 3. Screen shots of the Pt-Global digital platform of the PG-SGA© on iPad tablet

Scored PG-SGA©

Triage Score

0-1	*no intervention required*
2-3	*patient or family education required*
4-8	*dietitian intervention required*
≥ 9	*critical need for nutrition intervention*

Results

Demographics of currently enrolled subjects (N=11)

73% male (N=8), 27% female (N=3)
Age at enrollment: 21 to 73 years old (mean 60, median 64)
BMI at enrollment:

- 9% (N=1) normal/healthy weight (BMI 18.5-24.9 kg/m^2)
- 55% (N=6) overweight (BMI 25-29.9 kg/m^2)
- 36% (N=4) obese (BMI ≥30 kg/m^2) including (N=1) with a BMI >40 kg/m^2

Description of weight changes over time (N=10)

- 91% (N=10) of subjects had at least one follow-up assessment
- Weight loss ranged from 4.9% to 9.9% of pre-enrollment weight
  - Mean weight loss was 7.4% (median wight loss of 7.2%)
  - Greatest weight loss occurred between post-enrollment week three and week seven
  - Subjects for whom weights are available beyond week seven (N=3) have shown weight stabilization or weight regain after this time
- 50% of subjects (N=5) had documented weight gain between enrollment and week 3, despite no edema noted on physical exam and worsening PG-SGA© scores
  - median PG-SGA© score increase in these subjects was +6 points

PG-SGA / MST / current screening comparison

The small number of study subjects limits comparability of scores at this point but observations from our initial results of the data (N=36) include:

At enrollment

- The current hospital admission nutrition screening tool did not identify any subjects (N=0) for RDN consult.
- 36% (N=4) of subjects had an MST score of ≥2 indicating need for RDN consult
- 91% (N=10) had a PG-SGA© score of ≥4 indicating RDN intervention required
- 45% (N=5) of subjects had a PG-SGA© score of ≥9, indicating critical need for improved symptom management and/or nutrient intervention options (median PG-SGA score was 9, range 1-16)

At first follow-up (week 3)

- 82% (N=9) of subjects had a PG-SGA© score of ≥9
  - Median PG-SGA© score was 13.5 (range 7-22)
- 64% (N=7) had a MST score of ≥2
- Of the five hospital-based outpatient assessment scores:
  - 60% (N=3) had PG-SGA© scores of ≥9
  - 40% (N=2) had a MST score of ≥2

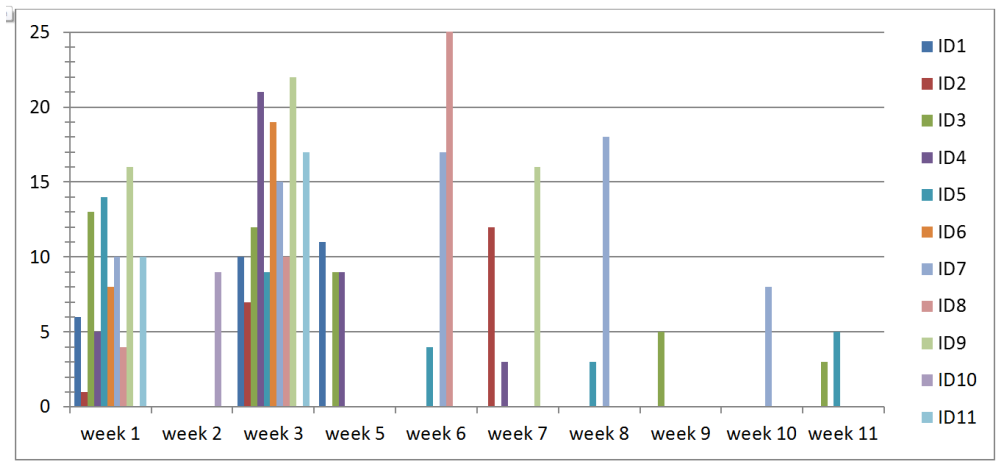

Figure 4. ***PG-SGA Scores by Subjects (ID 1-11) Over Time***

Discussion

- When compared to the MST and PG-SGA, the current hospital nutrition admission screening tool is not adequately identifying patients at risk for needing immediate RDN consult and intervention.
- The MST score is derived primarily from weight loss and appetite. While this makes for a simple tool, it does not account for changes in patient function or symptoms beyond appetite that may be impacting nutrient intake.

  The MST also does not take into account metabolic demand of disease, fever, or corticosteroids which are common in this patient population.
- The existing evidence base for use of the PG-SGA© in patients with cancer is robust. While the MST may be able to initially identify patients at nutrition risk, only the scored PG-SGA© has been shown to correlate with risk for adverse patient outcomes, including readmission rates, hospital stay, survival and quality of life.

  For our subjects, PG-SGA© scores in weeks one through seven were driven primarily by patient-identified symptoms, patient-identified changes in activities and function, and by the presence of fevers. PG-SGA© scores beyond week seven were driven primarily by professional screen, with fat and muscle loss noted on nutrition focused physical exam being the most prevalent factors.
- As we continue to enroll and follow subjects, there will likely be additional nutrition scoring trends identified. We expect that nutrition scoring trends will help identify patients at highest nutrition risk as early as possible.

  Because at Mayo Clinic patients receive AML follow up care in a variety of settings (hospitalized inpatient, hospital-based outpatient, and ambulatory) being able to identify the highest risk patients through a screening tool is likely to be most efficient and effective. Finding a tool that is also precise in identifying the specific contributors to nutrition risk will also be valuable in targeting nutrition interventions for this patient population.

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