Medical Nutrition Therapy: Role of the RD in the HCT population

Nursing Management of the Blood and Marrow Transplant Patient
June 29, 2018
Paula Charuhas Macris, MS, RD, CSO

Identify RD nutrition assessment and monitoring parameters for adult and pediatric hematopoietic cell transplant (HCT) patients.

Understand the various types of weights and weight-based calculations. Understand the impact of pre-HCT weight/weight loss during treatment and outcome.

Discuss appropriate nutrition support recommendations & possible implications in gut GVHD.

Describe nutrition interactions associated with immunosuppressive medications.

Objectives

Weight and HCT Outcome

Actual Weight: Weight taken on a scale.

Ideal Weight:
For Adult Patients:
3900G CTN Female will be used to calculate ideal weight
- Male: (91 kg - [0.3 kg/inch over 7 feet])
- Female: (45.5 kg - [2.2 kg/inch over 7 feet])
- Patients less than 7 feet: subtract 0.3 kg/inch

Adjusted Weight: For both Adult and Pediatric Patients, adjusted weight will be calculated as follows:
Ideal weight = 0.25 (actual weight - ideal weight)

Body Surface Area (BSA): \[ \sqrt{\frac{\text{actual weight in kg} \times \text{height in cm}}{60}} \]

Body Mass Index (BMI): BMI = weight (kg)/[height(m)]^2

Weight and Weight-Based Definitions

Weight history
<95% ideal weight: significantly poor prognosis;
<85% ideal weight: even poorer prognosis

What’s happening now with obesity on the rise?
Weight and Adult HCT Outcome
Fuji S. Impact of pretransplant body mass index on the clinical outcome after allogeneic hematopoietic SCT. Bone Marrow Transplant. 2014;49:1505-1512.

- Pretransplant BMI affected the risk of relapse and NRM after allogeneic HCT (n=>12,000).
- Obesity = risk factor for NRM.
- ↑ risk of NRM in overweight and obese vs. normal wt (HR 1.19 and HR 1.43, respectively).
- Underweight = risk factor for poor OS because of an ↑ risk of relapse.
- ↑ risk of relapse in the underweight group and ↓ in the overweight and obese groups vs normal wt (HR 1.16, 0.86, and 0.74, respectively).
- ↓ OS in underweight group vs. normal wt (HR 1.10, P=0.018).
- ↑ Risk of GVHD in overweight group vs. normal weight.

Weight and Adult HCT Outcome

- Obese patients = ↑ risk of NRM at 3 years vs. normal weight patients. (n=~900)
- BMI was not significantly associated with acute or chronic GVHD.
- Obese patients = ↓ relapse vs. normal weight patients.

Weight and Adult HCT Outcome

- Low initial BMI and more pronounced weight loss during HCT are strong prognostic indicators associated with lower survival and worse disease outcomes (n=156 AML patients).
- 10 year follow-up.
- Compared to patients with a baseline BMI (kg/m2) of 20-25, a low BMI <20 was associated with ↑ long-term mortality (70 vs. 49%, adjusted hazard ratio 1.97, 95% CI 1.04-3.71, p = 0.036).
- A more pronounced weight loss during HCT (>7% vs. <2%) was associated with higher risk for bacterial infections (p = 0.059) and fungal infections (p = 0.032), and longer hospital stays (64 vs. 38 days, adjusted mean difference 25.6 days [15.7-35.5], p < 0.001).
- Intervention research is needed to investigate whether nutritional therapy can reverse these associations.

Role of the RD

Weight and Pediatric HCT Outcome

- High BMI associated with worsened survival.

- Anthropometry
  - Retrospective review of 733 pediatric HCT patients
  - Arm circumference and triceps skinfold
  - Association between low muscle reserves, pre-transplant, and poorer survival

SCCA HCT Medical Nutrition Therapy Model

Pre-HCT Nutrition Assessment
Serial Reassessment
Education
Multi-disciplinary Rounds
Clinical MNT Picture

RD assesses:
- Nutrient intake
- Intake vs output
- Weight trend
- GI symptoms
- Lab Trends

Role of Registered Dietitian (RD)

Assesses IV/electrolyte needs
Assesses input/output (emesis, diarrhea) and weight trend
Initiates calorie counts to determine intake vs needs
Determines appropriate timing to initiate/discontinue nutrition support
Educates patient regarding appropriate tolerable food sources pending regimen-related toxicity

Nutrient Goals

Adjusted weight used for patients >120% ideal weight
Calorie and protein requirements are significantly elevated during HCT:
  - Calorie needs = 30-35 kcal/kg
  - Protein needs = 1.1-1.5 g/kg
Fluid requirements are significantly elevated due to:
  - Nephrotic conditioning regimens
  - Immunosuppressive agents
  - Antimicrobial agents
  - Fluid needs = 1,500 mL x Body Surface Area (BSA)

Anthropometry

Oral Intake vs Enteral vs Parenteral

How to feed the HCT patient?
Immunosuppressed Pt Diet

- Washed fruit/vegetables are allowed.
- Follows CDC guidelines for pregnant women.
- Start if neutropenic, with conditioning regimen and duration of IMM meds.
- 10-year retrospective review found 12/4069 (0.3%) developed foodborne illness within 1st year post-HCT.

Nutrition Support

- Identify and prevent or correct protein-energy malnutrition and metabolic abnormalities.
- Preserve lean tissue.
- Promote growth and development in children.
- Maximize quality of life.

Refeeding Syndrome

- Refeeding syndrome = fluid, micronutrient, electrolyte, and vitamin imbalances that occurs within the first few days after refeeding nutritionally compromised patients.
- Potentially life-threatening.

Enteral Nutrition

- Intact GI tract
- Inability to meet needs via po route
- Chronic oral/esophageal GVHD with need for long-term nutrition support
- Ongoing weight loss
- Ventilation

Benefits of Enteral Nutrition

- Maintains mucosal integrity and gut barrier function
- Stimulates of mucosal repair
- ↓ incidence of hyperglycemia
- ↓ incidence of infection
- ↓ cost
- ↓ incidence of grade III-IV gut GVHD compared to PN use
Parenteral Nutrition

Indications for PN support during HCT:

- Myeloablative conditioning regimen with severe GI toxicity
- Severe intestinal GVHD or high-volume diarrhea
- Suboptimal nutrition support from enteral route
- Anticipated length of poor oral intake > than 3 days

Parenteral Nutrition—Nonmyeloablative vs Ablative Regimens vs RIC

- 73 nonmyeloablative vs 73 myeloablative HCT.
- Minimal need for PN in nonmyeloablative due to ↓ mucositis and other severe GI toxicities.
- RIC vs myeloablative HCT:
  - ↓ mucositis (46% vs 93%, p<0.0001)
  - ↓ need for PN (21% vs 77%, p<0.001)
- PN not uniformly indicated for all patients.

Provision of PN can be safely discontinued, without adverse effects during HCT, when:

- Patients consume at least 30% energy needs
- Patients are without evidence of malnutrition, malabsorption, or other significant GI toxicities

Discontinuation of PN results in earlier resumption of oral intake post-transplant.

Gastointestinal GVHD: Gut Microbiota Manipulation

- Intestinal microbiota helps to maintain the physical, functional, and immunologic barriers within the GI tract
- Diversity is important
- Intestinal microbiota is a modulator of GI immune homeostasis
- Growing evidence that the gut microbiota may contribute to the development of post-HCT complications, including GVHD
- Probiotics have the potential to change the gut flora to support the development and sustainability of a healthier microbiota
Gastrointestinal GVHD: Gut Microbiota Manipulation

Probiotics
- Live microorganisms
- Most common species: *Lactobacillus, Bifidobacterium*
- May alter the composition of the intestinal microflora and improve the mucosal barrier
- Examples: yogurt, kefir, acidophilus milk

*Prebiotics* are also important!

Medications

Impact on Nutrition/Diet

- MMF
  - Interaction with all calcium, not just "dairy"
  - Helpful to outline times patient can consume calcium
  - GI toxicity, consider myfortic
- Tacrolimus/CSP
  - Magnesium wasting
  - Also interactions with grapefruit + pomegranate juice/kiwi/Earl Grey tea (bergamot)
- Sirolimus
  - Elevated TG levels

Prednisone

- Glucose
- Bone Health
- Body Image
- Calcium
- Vitamin D
- Weight gain
- Decreased LBM

Medical Nutrition Therapy

Examples of interventions by RD
Diarrhea management

- Evaluate dietary fiber content
- Small, frequent meals
- Ensure patient is adequately hydrated
- Consider lactose-intolerance
- Consider oral magnesium supplementation
- Refer to RD for counseling/evaluation
- Late effects: pancreatic exocrine insufficiency

Hyponatremia

- Restrict free water
- Include sodium-containing fluids
- Do not tell patients to add salt to foods!
- Refer to RD for patient education

Hyponatremia

- Restrict free water
- Include sodium-containing fluids
- Do not tell patients to add salt to foods!
- Refer to RD for patient education

Metabolic Syndrome

- Metabolic syndrome appears early post-HCT
- 3:1 frequency of metabolic syndrome compared with NHANES data (n=86) in survivors >1 year post-transplant
- Statistically significant difference in the incidence of cardiometabolic traits in childhood survivors compared to controls

Metabolic Syndrome

- Increased risk of heart disease and DM
- Increased at day 80 and 1 year
- 1st treatment is diet modification
- All calories are not created equal

Thank you!