Bone Marrow Transplant Diet

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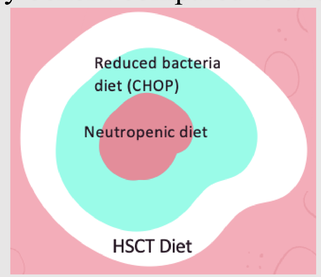
Background and Significance

Bone marrow transplants are widely used for a variety of conditions, including many cancers, to replace unhealthy marrow and promote the production of healthy blood cells. When a child undergoes chemotherapy conditioning prior to this procedure, they are at increased risk of infection. Therefore, their diet is heavily monitored to prevent risk of foodborne infections. Traditionally, children had to follow a strict regulatory diet that cut out many nutritious food options. This diet restricts food options for patients, many of whom already experience the challenge of eating with mucositis, nausea, and a lack of appetite. Furthermore, patients from diverse cultures face additional difficulty, as they often cannot eat home-cooked meals that may be more fitting for their appetites. Recent studies show that the traditional bone marrow transplant diet may not be necessary, and in fact may not have any benefit compared to a less restrictive diet.



Purpose

The purpose of this literature search was to find the best diet, compared to current practice, to influence infection rates in oncology patients undergoing a bone marrow transplant.

Interventions

A literature search was conducted using two databases: CINAHL and Cochrane. The inclusion criteria were within 10 years and English language. 5 total articles were evaluated.

Database	Search String	Filters	No. Results
CINAHL	"bone marrow transplant" or bmt or "stem cell transplant" or sct or "hematopoietic stem cell transplant" or hsct AND diet or food or nutrition AND infection" or "infection rate"	2014 to 2024	64
Cochrane	"bone marrow transplant" or bmt or "stem cell transplant" or sct or "hematopoietic stem cell transplant" or hsct AND diet or food or nutrition AND infection" or "infection rate"	07/01/2014 to 07/01/2024	4

	1 - Sonbol	2 - Van Dalen	3 - Taggart	4 - Ramamoorthy	5 - Lassiter
Level I: Systemic Review or Meta-Analysis	X*	X*		X* *3	
Level II: Randomized controlled trial	*3	*3		*5	X
Level III: Controlled trial without randomization	*1		X		
Level IV: Case-control or cohort study				*3	
Level V: Systematic review of qualitative or descriptive studies					
Level VI: Qualitative or descriptive study, CPG, Lit Review, QI or EBP project					

Evaluation

Each of the 5 articles compared a bone marrow transplant diet with a less restrictive diet. They all defined a bone marrow transplant slightly differently, illustrating the lack of standardized diets currently utilized at various institutions. All the outcomes (i.e. infection rates, mortality rates, quality of life, etc.) discussed were found to have a neutral effect with no significant difference.

Citation	Design/ method	Sample/ setting	Intervention/Variables studied	Outcome measurement	Data Analysis	Findings	Level/Quality of Evidence	Comments
(Sonbol et al., 2015)	Meta-Analysis	3 randomized controlled trials, 1 observational study	Effect of neutropenic diet vs regular diet	Infection and mortality rates	(See Table 1)	Neutropenic diet does not exert beneficial effects in neutropenic patients	Level I High Quality	Adult & pediatric study Specific to oncology
(van Dalen et al., 2016)	Systemic Review	3 randomized controlled trials	Low bacteria diet vs control diet	Infection rates, infection-related mortality, time to first febrile episode, need for empirical antibiotic therapy, diet acceptability, and quality of life	(See Figure 3, Figure 4, Figure 5)	No evidence from individual RCTs in children and adults with different malignancies underscores use of a low bacterial diet for prevention of infection and related outcomes	Level I High Quality	Adult & pediatric study Specific to oncology
(Taggart et al., 2019)	Quasi-Experimental (Before & After Study)	102 total patients underwent HSCT – 49 (48%) received neutropenic diet; 53 (52%) received BMT diet 46 subjects (45%) completed post-study questionnaire	Neutropenic diet vs modified BMT diet (food safety-based diet)	Incidence of bloodstream infections in first 100 days post-transplant, incidence of norovirus in first 100 days, total parenteral nutrition days through day 100, incidence of grade 3/4 GVHD at day 100, GI GVHD (any stage), 100-day overall survival Food cravings, nausea, diet limitations, quality of life	(See Table 3 & Table 4)	Our data demonstrate that patients on the modified BMT diet had similar outcomes to those on the neutropenic diet (no statistically significant differences). We believe these data demonstrate noninferiority of the modified BMT diet.	Level III High Quality	Pediatric & young adult study Specific to HST
(Ramamoorthy et al., 2020)	Systemic Review	3 meta-analyses, 5 randomized controlled trials, 3 cohort studies	Efficacy of neutropenic diet	Infection rates, infection-related mortality, and mortality of any cause	(See Table 1)	Neutropenic diet does not exert beneficial effects in neutropenic patients	Level I High Quality	Specific to oncology
(Lassiter et al., 2015)	Randomized Control Trial	Randomized, controlled prospective pilot study of 47 participants (49% response rate)	Neutropenic diet vs diet without restriction	Infection rates & nutritional status	(See Table 2)	No significant difference between infection rates or nutritional status	Level II Good Quality	Adult study Specific to HSCT

Discussion

Overall, there is little to no evidence that a bone marrow transplant diet decreases infection rate. Therefore, the key is to focus on safe food handing per FDA guidelines rather than restricting certain foods through diet regulations. Some recommendations going forward are to move towards a less restrictive diet, to focus on safe food handling methods, and to conduct further research with a focus on pediatric BMT patients as the target population.

Diet

	1 - Sonbol (4 total articles)	2 - van Dalen (3 total articles)	3 - Taggart	4 - Ramamoorthy (11 total articles)	5 – Lassiter	CHOP's current practice
Neutropenic Diet	X		X	X	X	
Reduced Bacteria Diet		X				X
HSCT Diet			X	X		

Legend: X Present but ineffective; X Present and effective

Outcomes

	1 - Sonbol	2 - van Dalen	3 - Taggart	4 - Ramamoorthy	5 – Lassiter
Infection rate	—	—	—	—	—
Mortality rate	—	—	—	—	
Time to 1st febrile episode		—			
Need for empirical antibiotic therapy		—			
Diet acceptability		—			
Quality of life		—	—		
Nutritional status			—		—
Graft-versus-host-disease			—		

Legend: — No significant difference; Neutral effect

Acknowledgements

I would like to thank the Flynn Foundation for funding and supporting my presentation, with a special thanks Children's Hospital of Philadelphia.

References