Retrospective Analysis of Probiotic Effectiveness in AML and Transplant Patients Receiving Chemotherapy

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Background

- Due to the high doses of chemotherapy they receive, AML and transplant patients are at a high risk of infection and prolonged hospital stay.
- Currently, practice differs from physician to physician, where some utilize probiotics while others do not.
- Few studies have truly determined the effectiveness of probiotics, especially in patients receiving chemotherapy.
- However, some of these studies have proven that probiotics are an effective treatment for many diarrheal illnesses, including antibiotic associated diarrhea.
- Contrary to this, a few case studies indicate that probiotics may cause adverse effects such as bacterial sepsis, fungal sepsis, and probiotic sepsis.

Objective

- Determine if probiotics prevent infection in patients at risk for prolonged neutropenia

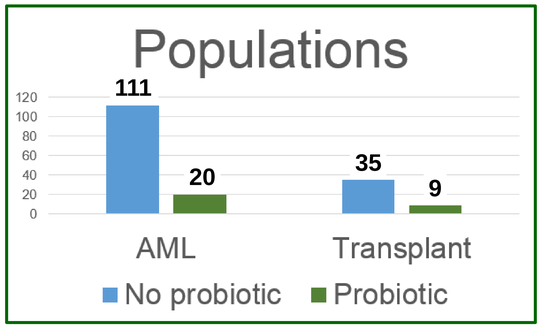
Methods

- Retrospective review of adult AML and transplant patients who received induction chemotherapy at St. Vincent Hospital from January 2008 to January 2015
- Excluded patients who were less 18 years old, or received probiotics more than 7 days after chemotherapy
- Patients categorized based on if they were treated with a probiotic.

Primary outcome:
- Incidence of febrile neutropenia

Secondary outcomes:
- Incidence of *Clostridium difficile*
- Time to first fever
- Incidence of documented infection
- 30 day readmission for infectious issue

Results



P value: 0.48

Baseline characteristics

	Probiotic	No probiotic	P value
Gender, Male (%)	14 (48)	85 (58)	0.32
Prior chemotherapy (%)	14 (48)	67 (46)	0.81
Mucositis (%)	15 (52)	76 (52)	0.97
Prophylatic antibiotics (%)	26 (90)	126 (86)	0.77
Gastric acid suppressant (%)	25 (86)	110 (75)	0.16
GCSF (%)	17 (59)	65 (45)	0.36
Tretinoin (%)	1 (4)	10 (7)	0.69
Height (IQR)	170.2 (17)	172.7 (17)	0.94
Weight (IQR)	84.8 (33)	85.8 (30)	0.41
Length of Stay (IQR)	33 (27)	26 (19)	0.02
Neutropenic days (IQR)	16 (19)	17.5 (19)	0.50
Age (IQR)	59 (18)	58.5 (19)	0.60

Outcomes

	Probiotic	No probiotic	P value
Febrile neutropenia (%)	23 (79)	103 (71)	0.34
C. diff (%)	3 (10)	9 (6)	0.42
Documented infection (%)	14 (48)	42 (29)	0.04
UTI (%)	3 (10)	14 (10)	1.00
Bacteremia (%)	13 (45)	31 (21)	0.007
Pneumonia (%)	1 (3)	0	0.17
30 Day Readmission (%)	8 (28)	64 (44)	0.10
Time to first fever (IQR)	10 (4)	9 (8)	0.61
Time to *C. diff* (SD)	16 (±16.5)	6.44 (±4.6)	0.12

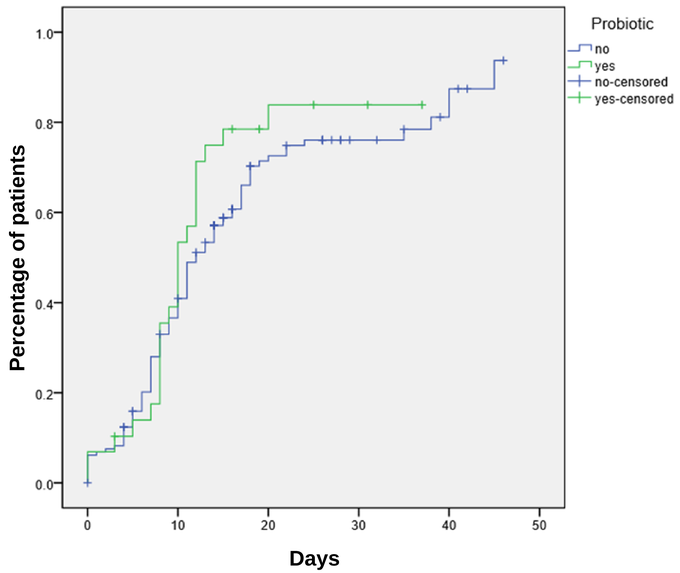
Factors affecting febrile neutropenia

	Odds ratio (CI)	P value
Mucositis	0.44 (0.20-0.93)	0.033
GCSF	1.63 (0.75-3.53)	0.22
Probiotic	0.63 (0.23-1.72)	0.37
Neutropenic Days	1.04 (1.01-1.08)	0.011

Factors affecting *Clostridium difficile* infection

	Odds Ratio (CI)	P value
Probiotic	1.08 (0.23 – 5.00)	0.924
Mucositis	6.43 (1.11 – 37.36)	0.038
Neutropenic days	1.13 (1.01 – 1.26)	0.034
Antibiotic duration	0.91 (0.84 – 0.99)	0.019
PPI	0.61 (0.13 – 2.87)	0.535

Time to first fever



Conclusions

- There was no association between probiotics and incidence of febrile neutropenia, incidence of *Clostridium difficile*, time to first fever, or 30 day readmission.
- However, there was an association between probiotics and documented infection (p=0.04). Bacteremia (p=0.007) was most notably increased in patients taking probiotics.
- Limitations: Relying on interpretation and documentation from physicians and nurses; difference in sample size; increased length of stay in the probiotic group
- Further research is needed to determine probiotic effectiveness in immunocompromised patients

References

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