Effects of *Lactobacillus salivarius UCC118* in Reducing Symptoms of Small Intestinal Bacterial Overgrowth

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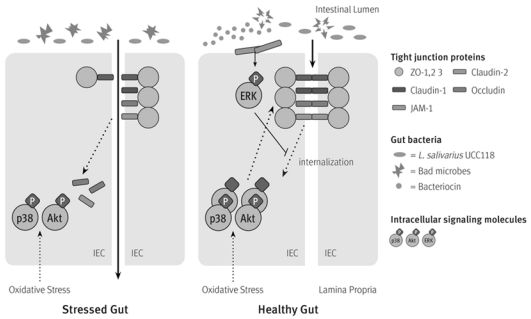
INTRODUCTION

Patients with small intestinal bacterial overgrowth (SIBO) often suffer from gastrointestinal symptoms such as chronic diarrhea, bloating, constipation, excessive flatulence, foul stool or body odor, and foamy/frothy stool. Definitive treatment recommendations and effective therapies are not well defined for patients with SIBO. Typical practice involves an antibiotic prescription, and patients often require several rounds of antibiotic therapy before SIBO symptoms improve. Continual use of antibiotics is associated with decreased diversity of the gut microbiota, which places the patient at risk for overgrowth of potentially pathogenic bacteria, future antibiotic resistance and compromised intestinal health and integrity.

Prior studies indicated that probiotic treatment using Lactobacillus species may be useful in relieving SIBO symptoms. Probiotic mechanisms are known to be strain-specific. Laboratory studies indicate that *L. salivarius UCC118* secretes bacteriocins, which kill or inactivate pathogenic bacteria, as well as protect intestinal integrity during pathogenic bacteria exposure.



UCC118 supports intestinal barrier function via preventing the oxidative stress-induced internalization of tight junction proteins. Upon adhesion to intestinal epithelial cells (IEC), UCC118 also produces ABP-118, a bacteriocin that is effective at inactivating or killing several species of pathogenic bacteria.

PROJECT AIM

This quality improvement project was designed to determine *L. salivarius UCC118*'s ability to improve SIBO-related GI symptoms (e.g., stool characteristics, bloating, flatulence) in patients being followed in a gut rehabilitation outpatient clinic.

SUMMARY AND FUTURE DIRECTION

Daily consumption of *L. salivarius UCC118* was effective in relieving GI symptoms consistent with SIBO, as well as negating or delaying the need for antibiotic therapy in patients being followed in an outpatient gut rehabilitation and transplant service.

Future investigations to determine if *L. salivarius UCC118* can replace antibiotic therapy as a treatment for SIBO are warranted.

References:
Miyauchi, et al. *Am J Physiol Gastrointest Liver Physiol* 303: G1029–G1041, 2012

Corr, et al. *PNAS* 104: 7617–7621, 2007

Neville and O'Toole, *Future Microbiol* 2010; 5:759-774.

Acknowledgments: Probiotics provided by Metagenics, Inc.; Gig Harbor, WA 98332

METHODS & DESIGN

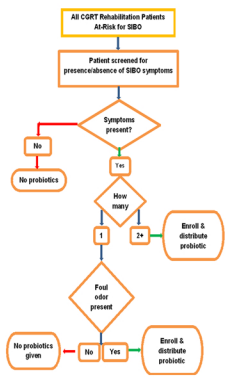
Patients who presented to the Cleveland Clinic Center for Gut Rehabilitation and Transplantation outpatient clinic after January 1, 2015 were assessed and considered for inclusion in this Quality Improvement project based upon SIBO symptoms.

A treatment algorithm was developed and used to identify symptoms consistent with SIBO.

In addition to standard therapy, participants were provided and instructed to orally consume *L. salivarius UCC118 (10^8 CFU/capsule)* probiotic supplement daily for 90 days.

Using a Likert scale, patients self-reported severity of SIBO symptoms assessed at baseline (in clinic), and at 30, 60 and 90 days via phone or email. Other information obtained included additional therapies taken to relieve SIBO symptoms (e.g., antibiotics, fermented foods, prebiotics). Also monitored were patients' comments regarding changes to their SIBO treatment while taking the probiotic.

Probiotic Treatment Algorithm



SIBO Symptoms Likert Scale Rating System

0	1	2	3
None	Mild	Moderate	Severe
Not affected	Easily tolerated, do not interfere with usual activity	Cause some discomfort and sometimes interfere with usual activity	Cause much discomfort and interfere considerably with usual activity

How would you describe your experience with bloating?
What is your experience with excessive flatulence?
How often are your bothered by a foul stool or body odor?
How would you qualify your experience of diarrhea?
How would you qualify your experience of constipation?
How does oily/greasy/foamy/frothy stool affect your daily life?

RESULTS

	Participants (n=29)
Gender:	
Male	9
Female	20
Age (years)*	56 ± 12
Weight (kg)*	77±33
BMI (kg/m^2)*	25.9±8.8
Ethnicity	
Not Hispanic	29
Hispanic	0
Antibiotic Prescribed	
Yes	14
No	15
Diagnosis	
Short bowel syndrome	26
Gastroparesis	1
Irritable Bowel Syndrome	2

*Data listed as means of standard deviation

Table 1: Patient Demographics

Antibiotic	Number Patients Prescribed
Metronidazole	5
Ciprofloxacin	3
Rifaxamin	3
Bactrim	2
Augmentin	1

Table 2: Antibiotics prescribed to patients during the project time period

Fermented Food	Number Patients Reported Consuming
Yogurt	16
Kefir	1
Kimchi	1

Table 2: Fermented foods patients self- reported consuming sometime during the 90 day project monitoring.

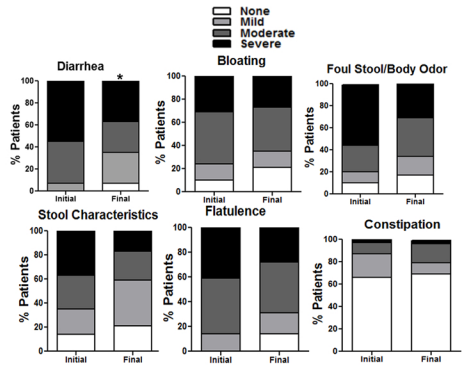


Figure 1. SIBO symptoms at initial patient visit and at the end of 90 days of probiotic supplementation represented as percent of patients self-reporting each symptom. * p<.05 difference for initial vs. final symptoms

"Before, my diarrhea was so severe I couldn't make it out of the house. Now I can make it to the grocery store. "

"I have not had diarrhea since midway through the trial"

"The foul odor of my stool has really gone away since taking the probiotic."

"I can tell my gas symptoms have worsened since I stopped taking the probiotic"

"I was able to get off antibiotics for 3 months"

"I have been symptom-free of SIBO for 2 weeks. I am amazed, astounded, and ecstatic!"

"My symptoms disappeared after 30 days and I was able to resume my daily activities"

"My diarrhea is no longer present and my stool is much more consistent"

"My SIBO symptoms improved in first 1-2 weeks and have been the same since."

"I was symptom free for 18 hours after starting the probiotic - that's the longest relief I've had in years."

Figure 2. Select comments from patients regarding their experience with taking the probiotic for SIBO symptoms.