

Background. *Clostridium difficile* infections (CDI) in the US have markedly increased. Disturbances to the gastrointestinal (GI) microbiome due to antibiotic use predisposes patients to CDI. Probiotics are recommended to prevent GI microbiota changes during CDI antibiotic treatment, but efficacy is unknown. We conducted a randomized, double-blinded, placebo-controlled, examination of clinical and GI microbiota changes in subjects administered probiotics during a primary episode of CDI.

Methods. 33 subjects with a primary episode of CDI were randomized to once daily oral probiotic, consisting of four different bacterial strains, or placebo for 4-weeks (week 0-4) concurrent to antibiotic treatment. Subjects completed a daily stool diary, and stool samples were collected at enrollment (week 0), at the end of the probiotic or placebo adjunct regimen (week 4), and 4 weeks post-treatment (week 8). DNA was extracted for 16S rRNA sequencing with Illumina MiSeq. Microbial diversity, richness, and community structure were compared using analysis of variance and permutational analysis of variance. Similarity percentage analysis identified the operational taxonomic units driving the variation in β diversity.

Results. The duration of diarrhea ($P = 0.039$) and total days of diarrhea ($P = 0.005$) both decreased in the probiotic group compared with the placebo group. Analysis of community structure showed significant differences between treatment groups overall ($P = 0.017$) and in both groups over time ($P = 0.007$), but not between groups at each individual time point. Subjects in the probiotic group had a higher abundance of the family *Lachnospiraceae* at week 4 than subjects in the placebo group. By week 8 the abundance of *Lachnospiraceae* did not differ between subjects administered probiotic or placebo.

Conclusion. Lack of difference in overall community structure between groups at each time point is likely due to concurrent antibiotic therapy. The differential abundance of *Lachnospiraceae* likely contributes to the differences in the diarrheal outcomes observed between groups, as it has previously been associated with attenuated *C. difficile* pathology. Shortening the duration of diarrhea from an initial CDI may reduce the spread of *C. difficile* and improve clinical outcomes.

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1269. Endogenous Serum IgG Antibodies to *Clostridium difficile* Toxin B Are Associated with Protection against *C. difficile* Infection Recurrence

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Background. MODIFY I/II were global trials of the efficacy and safety of bezlotoxumab (BEZ), a monoclonal antibody (mAb) against *C. difficile* toxin B, alone and with actoxumab (ACT), a mAb against *C. difficile* toxin A. BEZ was superior to placebo (PBO) at preventing recurrent CDI (rCDI) in patients (patients) receiving antibacterials for CDI. The addition of ACT did not improve efficacy. The aims were to explore potential biomarkers for rCDI risk in the patients receiving PBO by measuring endogenous IgG Abs against Cd toxins A and B (eAb-A and eAb-B); it was expected that patients with low eAb levels might be at increased risk of rCDI.

Methods. Serum samples were collected pre-dose (PRE), at Week 4, and Week 12 postdose. eAb titers were measured using an electrochemiluminescence immunoassay. **Results** were reported as <1:1000, 1:1000, 1:5000, 1:25000, and \geq 1:125000. As there is no clearly defined immunological surrogate of efficacy for rCDI tied to a specific eAb-A or eAb-B level, eAb levels were arbitrarily categorized as low (\leq 1:1,000), medium (1:5000), or high (\geq 1:25000). The rCDI rate was summarized by eAb category at each time point.

Results. The proportion of patients with higher eAb-A and eAb-B titers increased following the initial CDI episode (Tables 1 and 2). There was no evident correlation between eAb-A titers and the rCDI rate at any time point. The proportion of patients who experienced rCDI within 12 weeks after randomization was highest in patients with low eAb-B titers PRE and at Week 4. rCDI rate in those with low eAb-B titer at all timepoints and in patients who had low titer only at PRE was similar.

Conclusion. The rise in eAb-A and eAb-B titers over time is consistent with a convalescent humoral immune response to toxins A and B following CDI. The lack of correlation between eAb-A titers and rCDI is consistent with the lack of efficacy of ACT in prevention of rCDI. Conversely, higher eAb-B titers are associated with lower risk for rCDI, consistent with the efficacy of BEZ. 22.1% of patients with high eAb-B titers at PRE experienced rCDI. Therefore, eAb-B titers may have marginal utility as a biomarker for rCDI risk and are not likely to improve predictive value over clinical and demographic characteristics such as advanced age, compromised immunity, and CDI history.

Table 1. Distribution of PBO Patients by eAb-A titer Category and Proportion of PBO Subjects with rCDI by eAb-A titer Category at each Scheduled Timepoint (MODIFY I/II, mITT Population who Achieved Initial Clinical Cure and so were Eligible to develop rCDI)

Timepoint # in Pop	Percentage of placebo group (n)			% rCDI (m/n)		
	PRE N=606	Week 4 N=548	Week 12 N=497	PRE* N=606	Week 4* N=548	Week 12* N=497
Low	37.1 (1251)	30.1 (165)	32.0 (159)	34.7 (178/225)	36.4 (160/165)	35.2 (156/159)
Medium	50.8 (1308)	52.2 (286)	49.3 (244)	29.9 (192/308)	31.1 (189/286)	31.1 (176/244)
High	12.0 (173)	17.7 (97)	18.9 (94)	45.2 (133/73)	40.2 (139/97)	44.7 (142/94)

*Odds Ratio (95% CI) for trend Test p-value = 0.78, 0.62, and 0.88 at PRE, Week 4 and Week 12, respectively.

Timepoint # in Pop	Percentage of placebo group (n)			% rCDI (m/n)		
	PRE N=604	Week 4 N=545	Week 12 N=494	PRE* N=604	Week 4* N=545	Week 12* N=494
Low	38.1 (1230)	30.8 (168)	23.9 (118)	38.7 (189/230)	38.1 (164/168)	34.7 (141/118)
Medium	44.7 (1270)	40.9 (223)	40.9 (202)	32.6 (188/270)	35.0 (178/223)	35.1 (171/202)
High	17.2 (104)	28.3 (154)	35.2 (174)	22.1 (123/104)	27.2 (142/154)	33.9 (159/174)

*Odds Ratio (95% CI) for trend Test p-value = 1.60E-03, 0.02, and 0.45 at PRE, Week 4 and Week 12, respectively.

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1270. Comparative Effectiveness of Vancomycin vs. Metronidazole in Mild *Clostridium difficile* Infections, and Potential Impact on Subsequent Vancomycin-Resistant *Enterococcus* (VRE) Isolation

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Background. The epidemiology and clinical characteristics of *Clostridium difficile* infections (CDI) have evolved dramatically in the past decade. Vancomycin is the treatment of choice for moderate to severe CDI, with superior cure rates observed in comparative trials. However, controlled comparative efficacy data pertaining to mild CDI is lacking. Furthermore, the potential impact of vancomycin treatment on subsequent Vancomycin-Resistant *Enterococcus* (VRE) isolation rates remains unknown at the individual patient level.

Methods. A Retrospective cohort analysis was executed at the Assaf Harofeh Medical Center, Israel, from 2010 to 2015. Adult patients (>18 years) with a first episode of acute CDI, determined per pre-established criteria, were enrolled. The efficacy of vancomycin vs. metronidazole was evaluated in the subset of patients with mild CDI. The outcomes of patients, who received vancomycin or metronidazole (but not both), were compared by Cox regression. A prediction score was used to control for possible confounders associated with being treated with vancomycin. The independent association of oral vancomycin treatment during the acute CDI and later (up to 18 months) VRE isolation was analyzed using Cox regression.

Results. A total of 413 patients with CDI were included in the study. The majority were elderly (median age 75 years, range 19-120), and had extensive comorbidities (mean Charlson's combined condition score 6.7 ± 3.4) and significant acute illness indices (35% with severe to fulminant Horn index). Among 126 patients with mild disease, no differences were observed in terms of clinical outcomes between vancomycin or metronidazole treatment. Metronidazole remained non-inferior even after incorporating a prediction score to control for confounders associated with being a "vancomycin case". Ten patients had new post-CDI VRE isolation. In multivariable analysis, oral vancomycin treatment during the acute CDI was the strongest independent predictor for later isolation of VRE (aOR=6.7, $P = 0.04$).

Conclusion. Our study suggests that metronidazole should remain the recommended treatment of choice for mild CDI, due to clinical non-inferiority and an apparent association between vancomycin therapy and subsequent VRE isolation on an individual patient level analysis.

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1271. Bezlotoxumab (BEZ) for Prevention of *Clostridium difficile* Infection (CDI) Recurrence (rCDI): Distinguishing Relapse from Reinfection with Whole Genome Sequencing (WGS)

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Background. Bezlotoxumab (BEZ) and actoxumab (ACT) are monoclonal antibodies against *C. difficile* toxins B and A, respectively. Patients receiving a single infusion of BEZ alone or with ACT in the MODIFY I/II trials showed an absolute 10% (relative ~40%) reduction in rCDI over 12-weeks compared with placebo (PBO). The addition of ACT did not improve efficacy. This *post hoc* analysis investigated whether BEZ prevented relapse with the same strain and/or reinfection with a new strain.

Methods. *C. difficile* strains isolated from patient stool samples were typed by PCR ribotyping, PCR free library construction and Illumina whole genome