2435. The Impact of Treatment Strategy and Toxin Status on Outcomes of Patients with Clostridioides difficile Infections
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Session: 254. HAI: C. difficile - Treatment
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Background. Clostridioides difficile infection (CDI) is an important cause of morbidity and mortality and management continues to evolve. For laboratories that diagnose by detection of toxin gene, it is unclear whether reporting toxin production is additive to patient care. Furthermore, is there still a role for metronidazole (MNZ) given the current guidance? We recommend CDI as first-line therapy for non-severe cases. We analyzed cases of CDI in our hospital to assess outcomes of patients on MNZ vs. VAN and with or without toxin production.
Methods. A retrospective chart review of inpatients with CDI (based on detection of C. difficile toxin gene by PCR) was conducted between November 2017 and August 2018. Comparison of demographics and outcomes was performed in a) cases that were toxin-positive by enzyme immunoassay vs. negative and b) non-severe cases initially managed with MNZ vs. VAN.
Results. 76 patients were included (46 toxin-positive, 30 toxin-negative). Toxin-positive patients were older (mean age 77 vs 62, p = 0.002) but had similar disease severity and initial treatment. A CDI recurrence occurred in 22% vs 0% in the toxin-positive cases (p = 0.006). Any CDI-related complication occurred in 23% of toxin-negative and 35% of toxin-positive cases (ns). After adjusting for toxin status, age, and severity, the odds ratio of the composite outcome of any complication with toxin-positive CDI was not significant (OR 1.45 95% CI 0.45-4.6, p = 0.52).
There were 37 (49%) patients with non-severe CDI (27 MNZ, 10 VAN). Patients treated with VAN had higher stooling/day (63 vs 4.4, p = 0.04) and heart rate (p = 0.02). Initial MNZ use was associated with treatment escalation in 48% of cases compared with 10% in those treated with VAN alone (p = 0.03). CDI-associated mortality was higher in the VAN group (21% vs 0.27, p = 0.017). The rate of other complications was not significantly different.
Conclusion. Although no difference in the composite outcome of any CDI-related complication was detected between toxin positive vs negative patients, toxin-in positivity may predict patients at risk for subsequent recurrence. Patients with non-severe CDI did not have increased risk of complications when managed with MNZ, however, they were more likely to require treatment escalation.
Disclosures. All authors: No reported disclosures.

2436. Real-world Evidence of Fecal Microbiota Transplant Use and Outcomes in Patients with Clostridioides difficile Infection
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Background. Clostridioides difficile infection (CDI) and recurrent CDI (rCDI) are associated with substantial economic burden, quality-of-life impairment, and increased morbidity and mortality. Fecal microbiota transplant (FMT) is an investigational, non-antibiotic approach to attempt to prevent recurrences in patients with multiple CDI. In controlled trials, efficacy rates of 62-76% have been reported with a single FMT, and up to 90% with multiple FMTs. This study evaluated real-world outcomes in patients with rCDI, most of whom had a single FMT.
Methods. Data from the Optum de-identified Integrated Claims-Clinical data set were extracted for patients with a first-observed CDI diagnosis between 4/2011 and 3/2018 that occurred within ≥7 days of initial CDI antibiotics. Each patient had a > 4-year look-back period with no CDI claims prior to the index episode. rCDI was defined as a subsequent antibiotic prescription between 7 and 365 days after the prior CDI episode. The proportion of patients with rCDI, use of FMT, and recurrences after FMT were reported.
Results. Of the 98,895 patients included in the analysis, 71,189 (72.0%) had one CDI episode, 27,706 (28.0%) had ≥ 1 rCDI, and 10,233 (10.4%) had multiple rCDI. The mean age was 64.2 years (56% ≥ 65 years), and 61% were female. Medicare was used by 48% of patients, and commercial insurance was used by 32%. A total of 522 (0.5%) patients (mean age, 61.9 years) received a total of 541 FMT procedures. 36% of the FMT procedures occurred after the first observed rCDI episode, 22% after the 1st rCDI, and 42% after the second and/or subsequent rCDI episode. Of those who received FMT, 71.4% (n = 373) of patients had no subsequent CDI events by 3/2018.
Conclusion. As an investigational procedure, only a very small proportion of patients with CDI were identified as undergoing FMT, and the timing of the procedure for some patients may not have aligned with current guidance. This study provides data on real-world efficacy outcomes after a single FMT, with an efficacy rate of 71.4%, which is consistent with previous reported results in controlled trials. A small number of patients received more than one FMT procedure, potentially due to treatment failures. Further research is needed to examine potential improvements in efficacy with multiple FMTs.
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2437. First-line Fidaxomicin Use in High-risk Inpatients Reduces Recurrence Rates
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Background. Fidaxomicin is recommended by the 2018 Infectious Diseases Society of America (IDSA) guidelines as a first-line treatment in adults with uncomplicated Clostridioides difficile infection (CDI). Carillon Roanoke Memorial Hospital (CRMH) implemented a clinical decision order set directing providers to initiate fidaxomicin for CDI in patients at high risk of recurrence. The purpose of this study was to assess the impact of fidaxomicin (VAN) vs metronidazole (MNZ) as first-line therapy for non-severe cases.
Methods. This quasi-experimental study included adults with a first episode or first recurrence of CDI before and after order set implementation. Patients receiving laxatives within 24 hours of testing and those with fulminant CDI were excluded. Pre-implementation was defined as May 2017 to November 2017 and post-implementation as May 2018 to November 2018. The primary endpoint was recurrence (diarrhea and a positive GDH with toxin or PCR within 30 days post-treatment). Secondary endpoints were clinical cure (resolution of symptoms within 2 days of completing therapy), global cure (cure with no recurrence at 3 months), mortality, and readmissions. Partial courses of fidaxomicin (i.e., patients discharged on another agent) were also evaluated.
Results. A total of 282 patients were included. In the pre-group, 59.1% received metronidazole, 39.6% oral vancomycin, and 1.3% fidaxomicin. In the post-group, fidaxomicin use increased to 52.3% and oral vancomycin was 44.5%. There was a significant improvement in recurrence (30.2% vs 17.1%, P = 0.019). Global cure and CDI upon readmission also improved in the post-group (Table 1). In patients receiving partial courses of fidaxomicin, recurrence (9.3% vs 25%, P = 0.19), global cure (86% vs 75%, P = 0.44), and infection on readmission (28.6% vs 37.5%, P = 0.67) were similar.
Conclusion. Fidaxomicin as first-line agent in high-risk CDI patients decreased recurrence and increased global cure.

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2438. Using Artificial Neural Networks to Predict Intra-Abdominal Abscess Risk Post-Appendectomy
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Background. Applying Artificial Intelligence techniques to healthcare data are gaining momentum. Early identification of patients at risk of surgical site infections is a major clinical goal. Our objective for this study was to determine whether deep learning AI techniques could identify patients at risk of intra-abdominal abscess development post-appendectomy using clinical data for pediatric patients undergoing appendectomy.
Methods. A dataset of 1,574 patients classified by surgeons as negative (1,328) or positive (246) for Intra-Abdominal Abscess Post-Appendectomy for Appendicitis were selected from a database containing 6,127 patients less than 19 years-old who had appendectomy at our institution between 2009-2018. Demographic, clinical, and surgical information were extracted. 34 Independent variables were identified to be useful for the study. Using Random Forest methodology 12 variables with the highest influence on the outcome were selected for the final dataset. Data imputation (MICE algorithm) was used to replace missing data points. Two "Reproducible" Artificial Neural Networks with different architectures were developed to predict the risk of developing Intra-Abdominal Abscess Post-Appendectomy: Model (1) 12 Inputs, 3 hidden layers with 12 Neurons each, and 1 Output. Model (2) 12 Inputs, 2 hidden layers with 18 Neurons each and 1 Output.
Results. For the 1,574 patients (80% 20% used as training and test sets), Model (1) achieved Accuracy of 89.84%, Sensitivity of 70%, and Specificity of 93.61% on the test set while Model (2) achieved Accuracy of 84.13%, Sensitivity of 81.63%, and Specificity of 86.6%. The difference in the models was clear. To see the minority class (using SMOTE algorithm) to balance both classes which helped the model to learn both classes without bias and improved sensitivity over Model (1).
Conclusion. Deep learning algorithms applied to enough clinical variables can identify patients with high probability for the risk of developing intra-abdominal abscess post-appendectomy. While further test sets are necessary to validate the models, Artificial Neural Networks can be an important addition to current medical review.