

STRONG CHILDREN'S RESEARCH CENTER

Summer Research Scholar

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ABSTRACT

Title: *Current usage of metronidazole in Pediatric Inflammatory Bowel Disease*

Background: Metronidazole (Flagyl) is a commonly prescribed antibiotic used to treat a variety of bacterial infections. It is commonly used in pediatric gastroenterology patients to treat small intestinal bacterial overgrowth (SIBO), intestinal abscesses and flares of Inflammatory Bowel Disease (IBD). In studies on IBD flares, specifically Crohn's disease, in the adult population, metronidazole has shown to be an effective treatment. However, the efficacy of metronidazole in the pediatric IBD population has not been conclusively demonstrated. In addition, the indications for diagnosing a flare are not clearly defined, as a flare is difficult to distinguish from bacterial overgrowth, viral infection, or IBS symptoms. While the majority of cases resolve with a course of metronidazole, there is concern for an increasing association between the over-prescription of metronidazole and antibiotic resistance and/or lack of response.

Objective: The present study sought to establish better parameters for prescribing metronidazole in the pediatric IBD population. We aimed to determine accurate indicators that a patient is in a flare. We investigated the presenting symptoms as well as efficacy of metronidazole across the different subtypes of IBD (Crohn's disease, Ulcerative colitis, and indeterminate colitis). Finally, we hypothesized that patients prescribed metronidazole on repeated occasions increase their risk of antibiotic resistance as well as lack of efficacy in repeated courses.

Results: This retrospective cohort study screened 119 pediatric IBD patients between the ages of 6 months and 21 years, diagnosed between the years of 2010 and 2021. Data collected from the electronic charting system included: age, age at diagnosis of IBD, sex, Inflammatory Bowel Disease subtype (Crohn's Disease, Ulcerative Colitis, or Indeterminate Colitis), weight, length, BMI, medications used to treat IBD, NSAID use, steroid use, CMP, CBC, CRP, ESR, fecal calprotectin, biologic levels and antibodies, small bowel and/or large bowel biopsies, hydrogen breath test results, and any prescribed metronidazole (past or present). We determined efficacy based on a change in laboratory markers pre and post metronidazole course. The inflammatory markers in patients receiving multiple courses were compared to those in patients only receiving one course to determine changes in efficacy across multiple courses.

Out of our cohort of 119 patients, 82 patients had received at least one course of metronidazole. The minimum number of courses of metronidazole was 1 and the maximum number of courses across this population was 21. Only one course of metronidazole per patient was analyzed. The majority of patients, regardless of IBD subtype, experienced diarrhea and/or abdominal pain prior to prescription of metronidazole. Based on our data, there was a statistically significant difference between albumin ($P < |t| 0.0006$), CRP ($P < |t| 0.0021$), ESR ($P < |t| 0.0041$), and hematocrit ($P < |t| 0.0228$) pre and post course of metronidazole. There was no statistical significance across the three different IBD subgroups in regard to albumin, CRP, ESR, and hematocrit.

Conclusion: Based on our results, we can conclude that abdominal pain and diarrhea are good indicators of an IBD flare, and that metronidazole is an effective treatment for these flares, as

multiple inflammatory markers showed significant improvement after each course. In addition, the IBD subtype does not have a significant impact on metronidazole efficacy shown by the lack of significant changes in inflammatory markers across subtypes. Finally, we found that in patients receiving multiple courses of metronidazole there was less of an improvement in their hemoglobin over time compared to those who only received one course ($p=0.0471$). In the future, increasing the statistical power by adding more patients to the cohort would be beneficial. It would be interesting to investigate impact of IBD maintenance medications. Determining if patients had symptom resolution after their course and whether another medication such as a steroid was prescribed would provide additional insight into the efficacy of metronidazole in the pediatric IBD population. Our goal is to be able to provide pediatric gastroenterologists better guidelines for administration of metronidazole in the IBD population and minimize unnecessary use of antibiotics.

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