Metformin: Does It Have A Role In The Treatment Of Inflammatory Bowel Disease

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Introduction

- Patients with inflammatory bowel disease (IBD) are known to have gut dysbiosis, where disease progression leading to acute flares has been correlated with decreased commensal bacterial diversity
- Recent studies have demonstrated that metformin increases Akkermansia muciniphila, one of the bacterial species promoting gut homeostasis in animal and human subjects
- However, no studies have evaluated the effectiveness of metformin preventing flares of IBD
- The purpose of our study was to compare IBD flares in metformin users and non-users

Methods

- IRB exempt retrospective study
- Sample size: A total of ninety-five patients with IBD, including 43 patients with Crohn's disease and 52 patients with Ulcerative colitis (UC)
- The patient's exposure to metformin was ascertained through chart review
- Charts were systematically reviewed and confirmed that diarrhea, hematochezia, abdominal pain, arthralgia, and melena were due to IBD flare
- The number of patients who received metformin in Crohn's and UC was 5 and 12, respectively
- Statistical analyses: SPSS for Windows version 26. Comparison between metformin and non-metformin groups were performed using the Mann-Whitney U test.

Results

- The mean age of Crohn's and UC patients were 58.09 ±16.58 (30-91) years and 60.77 ±14.62 (27-87) years, respectively
- In the Crohn's group, 33 were females, and in the UC group, 34 were females
- The mean number of flares was significantly lower (p= 0.003) in metformin users at 0.41 ±0.71 compared to the non-metformin users 2.2 ±4.49 in IBD patients (Figure 1)
- On further analysis, the mean number of flares were significantly decreased (p= 0.022) in the UC group using metformin 0.33 ±0.65 compared to the non-metformin users 1.3 ±1.42 (Figure 2)
- There was no significant difference (p = 0.13) in the mean number of flares noted in the Crohn's patients using metformin 0.6 ±0.89 compared to the non-metformin users 3.1 ±6.1 (Figure 3)

Figure 1: The acute flares in metformin users and non-users with IBD.

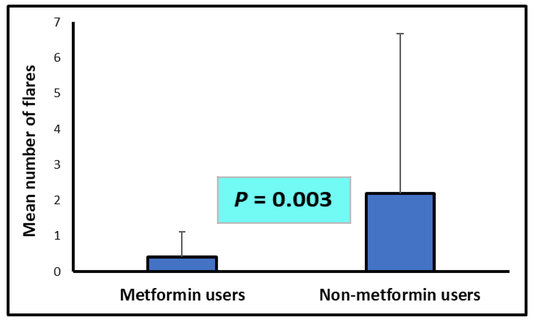


Figure 2: The acute flares in metformin users and non-users with Crohn's.

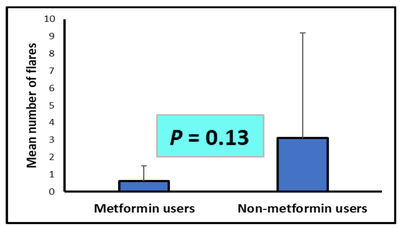
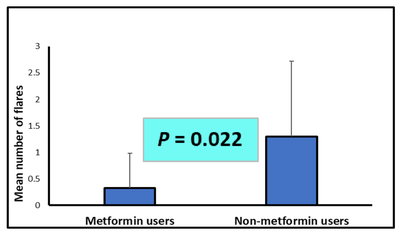


Figure 3: The acute flares in metformin users and non-users with Ulcerative colitis.



Discussion

- We found a significantly reduced number of acute flares in patients using metformin with IBD
- On sub-analysis, a significantly decreased number of flares was observed in patients with UC
- Patients with IBD have relatively low proportions of gut-beneficial microbes such as Firmicules and Bacteroides and higher proportions of Enterobacteriaceae, Actinobacteria, Ruminococcusgnavas, and Ruminococcustorques, which lead to gut dysbiosis
- Metformin causes the up-regulation of mucin-producing goblet cells, which act as substrates promoting the growth of Akkermansia muciniphila, helpful to regulate gut homeostasis
- Akkermansia is predominantly found in the colon compared to the small bowel
- Our results, therefore, may reflect the anatomical difference in disease distribution amongst our patient population, as UC patients universally have disease beginning in the rectum, while patients with Crohn's may have disease activity anywhere along the alimentary tract
- Since Akkermansia is predominantly found in the colon,
- metformin may be more effective in reducing flares in UC compared to Crohn's
- Further studies with a larger cohort are required to determine the usefulness of metformin in IBD

References

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