



Exploring the Pathogenic Role of Stress in Inflammatory Bowel Disease and its Management

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Every organism is constantly adapting to changes happening in the environment. This adaptation helps in maintaining homeostasis. All organisms must adapt at molecular, cellular, physiological, and behavioral levels. Amongst many factors which act as a threat to homeostasis, one of them is stress. The organism has to bring about both physiological and behavioral changes. The various researches in recent years have shown that adverse life events, along with chronic stress, and depression leads to increased likelihood of relapse in patients with quiescent IBD. Many studies of experimental stress in animal models of colitis support this. Till date, the therapeutic successes of stress reduction therapies have not been explored largely. This is also due to methodological difficulties in going ahead with such studies. This paper tries to explore the recent researches in enhancing our understanding of the pathogenic role played by psychological stress in inflammatory bowel disease and focuses our attention on the need for controlled studies on the curative prospective of stress reduction therapies for IBD.

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1. INTRODUCTION

Inflammatory bowel disease (IBD) is a term that refers to a group of conditions characterized by chronic inflammation of the digestive tract. Ulcerative colitis and Crohn's disease fall under the umbrella concept of IBD. Both of these conditions are chronic, relapsing, and remitting, with a high level of mucosal inflammation. During remission, the mucosa looks almost fine, but during relapse, it becomes severely ulcerated. Etiology is thought to be the product of a dynamic relationship between genes and environment [1,2] Though there has been a good amount of progress in research to identify the genes responsible which predisposes a person to develop IBD [3] but the factors in the environmental which act as triggers at the initial phase and responsible for subsequent relapses, as well as the mode of action are not well understood. Psychological stress has often been reported as having a relationship with relapse of IBD [4].

2. LITERATURE REVIEW

Tian, Wang and Zhang, in their 2017 study found that there was an active sign of oxidative stress in the onset and progression of IBD and its relationship to genetic predisposition and immune response [5] Similar to Brzozowski et al. it shows that increased microbial load on colonic tissues, excessive cytokine excretion and slow regeneration seen as a response to stress also negatively affect IBD. The machine here is direct and / or indirect communication that includes the intermediate enteric system, the immune system, and the gut microbiota. This fact supports the idea that IBD is a complex multifactorial disease, with a strong stabilizing stress that affects the intestinal / microbiota / axis of the brain through its mechanism to reverse intestinal infiltration and cytokine closure, thereby affecting the recurrence and severity of IBD symptoms [6] Oligschlaeger et al. found in their study that in the immune system (re-) and inflammation, which may be promoted by further reduction of vaccine microorganisms in today's rapidly stressful society, may be factors in resolving the development and persistence of stress-related pathologies such as IBD [7] Langgartner et al. found that cellular stress enhances TLR5 responses in IECs, leading to an increase in DC activity, indicating an previously unknown

association between epithelial ER stress and immune function in IBD [8] Rees et al. and found that stress is a contributing factor to IBD [9].

Kubesch et al. in their research on German individuals found that patients with IBD suffer more often from emotional stress, often they have a recognized disability, the strongest indicator being a poor academic status [10,11]. Ramos et al. demonstrated the importance of the combination of genetic predisposition and environmental effects on the microbiota, which contributes to the overuse of the intestinal immune system through a suspended intestinal barrier. (Ninth) Increased oxidative stress is a major factor contributing to the dysbiosis of the microbiome detected in IBD, according to Hall et al. Ruminococcus gnavus may play an important role in altered intestinal IBD, according to Hall et al. [12].

In their study, Bernstein et al. discovered that IBD was rated as a highly frequent source of stress by 20-30% of the consistently active group versus 1-2% of the inactive group. In the regularly active community, finances, jobs, and family were all graded as high frequency stresses on par with IBD stress [13] Sun et al. , discovered that stress increases the severity of IBD symptoms [14] and early life adverse experiences are risk factors for IBD, stress-induced inflammation exacerbation, and relapse Abautret-Daly et al. [15] Psychosocial stress, according to Wang et al. enhances intestinal autophagy by modulating gut microbiota and inflammation, which contributes to IBD aggravation [16]. IBD patients are particularly vulnerable to disease-related stress, which can lead to mental impairments. Low mentalization may be a key factor in the development of attachment vulnerability and emotional disturbances in people with IBD (Agostini et al. [17] One study, Araki et al., 2020, looked at the relationship between psychological stress and disease activity in IBD patients, taking into account their mental and sleep states, and found that a worsened mental state correlates positively with disease activity in IBD patients, particularly in those who believe their disease is aggravated by psychological stress [18] .

Sexton et al. discovered bidirectional relationships between perceived stress and IBD symptoms, but no relationship between

perceived stress and fecal calprotectin changes in intestinal inflammation [19] Colonnello et al. found a correlation between IBD and unstable attachment style, mediated by reduced mentalizing abilities, in their attachment style studies. This may be a risk factor for IBD-related psychiatric problems as well as a reduction in medication adherence, all of which may lead to a worsening of disease management [20] The results of Wlodarczyk et al. indicate that family pattern anomalies associated with stress in early life can have a significant impact on health balance [21] Bernstein et al. found that stress has an effect on IBD symptoms [22] According to Reed-Knight et al., family stress can put children at risk for more expressed pain-related distress due to effects on coping and depressive symptoms [23]. According to Sgambato et al. emotional problems are more common in Crohn's disease and ulcerative colitis patients than in the general population. Furthermore, depression and anxiety have an effect on the severity and course of the underlying intestinal condition [24,25].

Jordan et al. found a connection between personality traits (such as neuroticism), perceived tension, emotions, and emotional regulation, and IBD cognitions such as disease perceptions and negative adjustment outcomes in their study. Focusing on coping mechanisms, perceived tension, and strengthening cognitions related to IBD may help with IBD changes and result in positive outcomes. (25 points) In comparison to IBD, there appears to be a very large data base to support the use of psychological treatments in IBS. This can be explained by the high degree of clinical comorbidity that is generally associated with IBS, as well as the role of the stress response in IBS symptoms Ballou et al. [26]. Gerbarg et al. found that mind-body interventions like BMW (Breath-Body-Mind Workshop), which focuses on Voluntarily Controlled Breathing Practices, can have significant long-term benefits for IBD patients, particularly in terms of symptoms, anxiety, depression, quality of life, and inflammation, though more research is needed [27] Eckert et al. conducted research on the use of exercise treatments in IBD patients that are thought to be safe and beneficial for the patient's general health as well as IBD-specific physical and psychosocial symptoms [28].

But Rozich et al. in their trials of structured exercise and psychological therapy which included mindfulness-based therapies could not

consistently demonstrate benefit in clinical and/or endoscopic disease activity in IBD. But these trials showed improvement in overall quality of life [29] In a randomized controlled trial of patients with IBD, done by Wynne et al. an 8-week ACT therapy course improved stress and other indices of psychological health [30]. Hashash et al., 2016 investigated the result of a volunteer peer specialist network, IBD Connect, which was seen as favorable and showed a marked decrease in stress which was related to the hospitalization. In a similar manner, significant increase was seen in patients who shared their IBD diagnosis and experience with family and friends. Thus in the modern times, the need is seen for patient-centered care, peer volunteers who prove to be important in management of chronic disease and the need to incorporate them in IBD inpatient health care teams is needed [31] Arruda et al. investigated the role of yoga and found it reasonable and acceptable as an adjunct therapy for adolescents suffering from IBD. Participants of yoga therapy showed reduced stress and improvement in ability to identify and manage physical symptoms [32] According to Sehgal et al. when resilience is increased there is improvement in quality of life and surgical procedures in Crohn's disease, which is a form of IBD also reduced [33]

3. PSYCHOLOGICAL FACTORS IN IBD

Initially it was thought that psychological factors played a major role in IBD – both ulcerative colitis and Crohn's disease. They were considered examples of psychosomatic diseases. But, with increasing knowledge of the genetic, environmental, and molecular pathogenesis of IBD, the contribution of stress was overall neglected. But in the recent years more studies have positively shown the contribution of psychological stress in the relapse of IBD. Laboratory researches provide evidence about the different ways in which stress affects both the systemic and gastrointestinal immune and inflammatory responses. These findings suggest the importance of therapeutic psychological interventions based on stress reduction like positive psychology, mindfulness, yoga, ACT, and such other cognitive restructuring techniques. Stress should be dealt with effectively with a positive attitude, which can free patients from unwanted things stored in their minds [34] Though more studies in this direction would shed a positive light on these interventions with greater benefit to the patients. This would give hope to the patients of IBD, who may have a

better control of their lives and that would help in reducing the relapse of IBD symptoms [35-38].

4. CONCLUSION

This paper tries to explore the recent researches in enhancing our understanding of the pathogenic role played by psychological stress in inflammatory bowel disease and focuses our attention on the need for controlled studies on the curative prospective of stress reduction therapies for IBD.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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