Oral Health Status in Inflammatory Bowel Diseases Patients

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Inflammatory bowel diseases (IBD) are chronic disorders that affect the gastrointestinal tract, including the oral cavity. Both Crohn's disease (CD) and ulcerative colitis (UC) patients have an increased odds of periodontitis coincidence compared to the controls. Moreover, in most studies, patients with IBD are characterized by higher values of caries indices. In conclusion, the risk of oral diseases in IBD patients cannot be clearly established due to the possible association of other factors, e.g., sociodemographic or environmental factors.

inflammatory bowel disease | oral health | oral hygiene | dental caries

1. Introduction

Inflammatory bowel diseases (IBD) are chronic disorders that affect the gastrointestinal tract, including the oral cavity. Potential etiopathogenetic factors include genetic predisposition, immunological dysfunctions and environmental conditions [1]. Crohn's disease (CD) and ulcerative colitis (UC) differ not so much in their clinical symptoms as in the extent of the inflammatory processes and their reflection in biochemical parameters of body fluids, e.g., saliva [2]. The course of the disease is associated with disturbances in the immune system, resulting in changes in proinflammatory cytokines and oxidative status markers [3]. Patients with IBD may have specific manifestations in the oral mucosa, such as cobblestoning, mucosal tags or deep linear ulcerations (in CD) and *pyostomatitis vegetans* (in UC) [4].

The most common dental problems include caries and periodontal disease. Carious lesions are formed due to changes occurring in the biofilm and thus disturbances in the neutral environment of the oral cavity, causing the demineralization of enamel [5]. Apart from the patient's hygiene and dietary habits, other factors, such as medication and systemic diseases, that may affect saliva secretion are also important in the development of caries [6]. Additionally, periodontal diseases with alveolar bone destruction appear as a result of dysbiosis, often in patients with an impaired host response [7]. In the literature, factors increasing the risk of periodontal disease suggest, among others, systemic conditions such as diabetes, immunodeficiency, stress or obesity [8][9]. On the other hand, smoking can mask signs of bleeding on probing due to the contraction of the microvessels [10].

Both in the progression of IBD and periodontal disease, the key role is played by immunoinflammatory processes involving cytokines responsible for tissue destruction [11][12]. In addition, periopathogens may alter the composition of the intestinal microflora and exacerbate inflammatory processes, disrupting host defence [13][14]. In contrast,

there is also a controversial thesis that poor oral hygiene may be associated with a reduced risk of developing IBD [15].

2. Oral Health Status in Inflammatory Bowel Diseases Patients

In the study by Brito et al. [16], a higher prevalence of periodontal disease and caries was observed in patients with IBD, considering smoking as an important modifier of oral health. In the group of smokers, patients with UC manifested periodontal disease significantly more frequently and thus higher PPD values, and patients with CD had higher DMF-t values relative to healthy subjects. For nonsmokers, these relationships were reversed, with CD patients having significantly deeper periodontal pockets and UC patients having higher caries incidence. Similarly, the results of the study by Koutsochristou et al. [17] presented an increased incidence of caries and periodontal disease in children and adolescents with IBD, despite oral hygiene indicators comparable to the control group.

Moreover, Rodrigues et al. [18] observed the significantly increased prevalence of dental caries in UC patients. However, it was not influenced by their eating habits, such as the frequency of soft drinks, cakes, sweets and sugars between meals. Patients with the active form of the disease and a longer duration demonstrated higher levels of *Streptococcus mutans*, which seemed to be a manifestation of UC dysbiosis. These detected bacteria are mainly responsible for the caries development. Also, the study by Szymanska et al. [19] presents that CD patients after resective surgery had higher DMF-s scores and elevated counts of *Lactobacilli* and *Streptococcus mutans* in comparison to the control group. In contrast, Schütz et al. [20] noticed that in CD patients, caries prevalence was increased by a longer disease duration but depended on insufficient oral hygiene and intensified sugar consumption. Tan et al. [21] observed a significant increase in the DMF-t index only in the CD group but not in the UC group, while the periodontal status did not differ between IBD patients and healthy subjects.

Zhang et al. [22] compared the prevalence and severity of dental caries and periodontal disease in IBD and healthy subjects. Patients with CD and UC had significantly increased risks of caries and periodontitis compared to the control group. Habashneh et al. [23] also inferred a higher prevalence of periodontal disease of greater severity and extent in patients with IBD. In addition, deep oral mucosal ulcerations were significantly more common in the UC group. Furthermore, Vavricka et al. [24] suggested that predisposing factors for periodontal disease include an active form of CD with associated perianal lesions. Interestingly, Grošelj et al. [25] indicated that the selected parameters of oral health status could be used for predicting the clinical response in CD patients with infliximab administration. However, the prediction quality began to decrease after 2 months of anti-TNF therapy.

Menegat et al. [26] determined that the expression of selected cytokines was significantly increased in gingival tissue compared to the intestinal mucosa in IBD patients with periodontal disease. In the study by Schmidt et al. [27], IBD patients demonstrated more severe periodontitis with higher CAL compared to healthy subjects. Elevated aMMP−8 concentrations were correlated with periodontitis severity in only CD patients. Although the authors speculated changes in host immune response, the role of periodontal bacteria in the relation between periodontal diseases and IBD remained still unclear. In contrast, Stein et al. [28] suggested that CD patients had an increased

prevalence of periodontal diseases. The colonization of *Campylobacter rectus* seems to be a causal pathogen for the periodontal manifestation in CD.

Surprisingly, Grössner-Schreiber et al. [29] observed no significant differences in caries incidence and periodontal status indices between IBD patients and healthy subjects, despite the determination of higher values of plaque indices in the study group. Similarly, in the study by Piras et al. [30], patients with IBD, especially those taking immunomodulators, demonstrated a higher prevalence of periapical lesions of larger sizes, despite the lack of differences in the caries indices in relation to the controls.

3. Conclusions

There is a higher prevalence of dental caries and an increased risk of periodontal disease in IBD patients, especially those with ulcerative colitis. Therefore, the relationship between oral health status and inflammatory bowel diseases cannot be clearly defined due to confounders such as sociodemographic or environmental factors.

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