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Clinicoradiologic aspects of periodontal diseases in patients with gluten-related disorders

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Abstract

Introduction. The frequency of celiac disease (CD) and non celiac gluten sensivity (NCGS) varies in different geographical area and has gradually increased. CD and has high clinical inhomogeneity. Although it has been suggested that the patient with gluten-related disorders present different oral manifestations. The association between oral manifestation and CD, NCGS is controversial. Often in patients with gluten related disorders in the oral cavity can be found: aphthous stomatitis, desquamative glossitis, angular cheilitis, gingivitis, enamel hypoplasia, xerostomia etc. However in literature there are only few investigation of the association between gluten related disorders and periodontal diseases. **Material and method.** The study included 50 patients with existing periodontal pathology in patients with CD or NCGS aged 18 to 50 years. According to inclusion criteria patient were divided into two main groups (depending on the type of gluten related disorder): I (n=25) patients with CD, II (n=25) with NCGS. Periodontitis was defined according to the standardized procedure. Modified papillary bleeding index (MPBI), Fedorov-Volodkina hygiene index, PMA (papillary-marginal-alveolar index), periodontal probing depth (PD), bone mineral density (BMD) were obtained. **Results and discussions.** Participants of the I study group had a mean age ± SD 41.03 ± 8.3 years, II - 40.38 ±8.1. During the study it was found that in the structure of periodontal diseases general periodontitis were diagnosed predominantly. The mean value of MPBI in the patients with CD was 0.21±0.25 and in patients with NCGS 0,24±0.34. The Fedorov-Volodkina hygiene index in patients with celiac disease was 1.48±0.3 and with NCGS - 1.51±0.2. Depth of periodontal pockets in patients of I group was 3.25±1.71 mm., II - 2.88±1.64 mm. The mean PMA index in patients of I group was 28.9%±15.0, II – 24.88%±14.1. The mean value of BMD in patients with CD range from 1200 to 1300 HU. In patients with NCGS 1100 - 1250 HU. **Conclusions.** The results of this study demonstrate a set of clinicoradiological features of periodontal disease in patient with CD and NCGS. The statistical analysis of the received clinical and radiological data did not reveal statistical differences between the studied groups (p≥0.05).

Key words: *gluten-related disorders, celiac disease, non celiac gluten sensitivity, periodontal disease,*

Introduction

Periodontal disease is a highly prevalent chronic inflammatory disease affecting of 98% adult population worldwide (1,2). However, according to recent epidemiological studies periodontal diseases affect about 15.2% people aged 20-30 years, rapidly increasing to more than 75% in the group of patients aged 30-40 years (3,4). According to the latest epidemiological findings tendency to increasing the frequency of periodontal lesions among young people has been observed. The problem of diagnosis, treatment and prevention of periodontal diseases in the young individuals remains an important topical issue of modern dentistry and public health system. Progressive periodontal tissue destruction, deepened pocket depths with alveolar bone loss has been observed in patients with generalized periodontitis (5). Accordind it periodontal desease can lead to early tooth loss in young patient (6).

It is well documented how periodontal diseases are associated with systemic diseases (7,8,9,10). Recent research describe different pathogenic mechanisms of co-relation of chronic periodontal disease and systemic diseases. The main of them describe exposure of dental plaque which entered bloodflow (11,12). Another one describe indirect influence of inflammatory mediators which induced periodontal disease (13,14). Well known is relationship between periodontal disease and diabetes mellitus, cardiovascular, respiratory and gastrointestinal diseases etc (15,16,17,18). Today increasing interest has been directed toward the association of gastrointestinal disease and its manifestations in the oral cavity. Numerous publications underlined that gastrointestinal tract and oral cavity have a close

neurohumoral relationship, because they are different parts of a single morphological system. So 80-87% of patients with gastrointestinal diseases have oral manifestations (19). In recent years decrease attention to oral manifestations of gluten related disorders, especially: celiac disease (CD) and non celiac gluten sensitivity (NCGS) (20,21). According to some studies, specific oral signs and symptoms can be classified as extra-intestinal manifestation of CD or NCGS.

Non celiac gluten sensitivity is not well defined. NCGS is a syndrome of gastrointestinal and extraintestinal manifestations responding to gluten ingestion. Currently, there are no reliable laboratory markers or histological abnormalities. So this diagnosis is more of a diagnosis of exclusion (22,23). Some authors propose another names for NCGS such as: gluten sensitivity, non-celiac gluten intolerance etc (24). However**,** CD is one the most common T-cell-mediated chronic systemic autoimmune disorders that predominantly affects the small intestinal mucosa in genetically predisposed children and adultsm as a response to gluten (25,26). The diagnosis is established by a gastroenterologist in accordance with guidelines, based on the finding of serological markers and typical small intestinal villous atrophy (27,28). According to World gastrointestinal organization (WGO) the prevalence of celiac disease significantly increased over the last years is about 1% population worldwide with variety in different countries (29). However, prevalence of NCGS is 5-10% of the total population (30). Despite the level of medical progress, the diagnosis of CD and NCGS is difficult due to the manifestation of the disease, its atypical signs and prevalence of its extraintestinal clinical manifestations. Often in such cases, the diagnostic of this pathology requires a comprehensive and multidisciplinary approach. According to Tortora R. celiac disease is increasingly diagnosed at the age more than 30 years (31). Often in patients with gluten related disorders in the oral cavity can be found: aphthous stomatitis, desquamative glossitis, angular cheilitis, gingivitis, enamel hypoplasia, xerostomia etc. (32,33). However in literature there are only few investigation of the association between gluten related disorders and periodontal diseases. Although, there is a hypothesis that chronic inflammatory process in the jejunum can cause a more severe periodontal disease (34).

The aim of the study. To evaluate the prevalence of periodontal disease in patients with CD and NCGS, clinicoradiologic peculiarities of manifestations of periodontal disease in patients with celiac disease and non celiac gluten sensitivity,

Materials and methods. The study included 50 patients with existing periodontal pathology in patients with CD or NCGS aged 18 to 50 years. The criteria for inclusion in the study were: the presence of celiac disease or non celiac gluten sensitivity diagnosed by gastroenterologist, the presence of periodontal pathology, adult patients, the patient's consent to participate in the study. Exclusion criteria were: the presence of cancer, the presence of other comorbide pathologies, the absence of patient-doctor compliance, refusal to participate in the study. According to inclusion criteria patient were divided into two main groups (depending on the type of gluten related disorder): I (n=25) patients with celiac disease, II (n=25) with non celiac gluten sensitivity. Clinical examination of patients was performed according to the standard method and included the study of patient complaints, anamnesis morbi and evaluation of periodontal status. Modified papillary bleeding index, Fedorov-Volodkina hygiene index, PMA (papillary-marginal-alveolar index), periodontal probing depth (PD) were obtained. For evaluating bone mineral density, bone loss patients underwent orthopantomogram (Planmeca) and CT (Planmeca). To determine the bone density of the mandible region of interest (ROI) was detected. ROI was constructed at the intersection of three tomographic slices. According to the literature, it is optimal to determine the bone mineral density of the in the area of the second molars of the mandible and chin. The bone density was determined in Hunsfield units (HU).

Periodontal status, periodontal and oral hygiene index, assessment of bone condition were entered into the developed examination card and medical card of the patient. Statistical processing of the obtained indicators was performed using the Mann-Whitney U test, Fisher test using the software «IBM SPSS Statistics 20». $P < 0.05$ was considered statistically significant.

Results and discussions. Participants of the I study group had a mean age ± SD 41.03 ± 8.3 years, II - 40.38 ±8.1. During the study it was found that in the structure of periodontal diseases among patients with celiac disease inflammatory periodontal diseases were diagnosed in 20 % of patients, *dystrophic inflammatory periodontal* diseases in 80%. Dystrophic-inflammatory periodontal diseases were prevalent in patients with NCGS, which was

detected in 72% of patients. During clinical examination of patients with celiac disease, the initial severity of generalized periodontitis was detected in 16 %, the first stage was diagnosed in 27.7% of patients, second - in 50% of patients, and third - in 5.5% of patients. Among patients with celiac disease, 15% of patients had an initial severity of generalized periodontitis, 1 - 20%, 2 - 55% and 10% of patients had 3 stage of generalized periodontal disease. In both study groups, despite the prevalence of the process, a catarrhal form of gingivitis was prevalent, which was diagnosed in 75% of patients.

During the initial examination according to the data obtained in the majority of cases patients in both study groups complained of: gums bleeding, feeling of discomfort, periodic gum swelling. Objective examination of periodontal tissues in patients most often revealed cyanotic (rarely hyperemia) gums and marginal gums, changes in the relief of the gums, gums retraction. The results of determining the presence of traumatic occlusion in patients in groups showed that the prevalence of traumatic occlusion in patients of I and II groups ranged from 70-80%. Depth of periodontal pockets in patients of I group was 3.25±1.71 mm., II - 2.88±1.64 mm. No significant difference was found between two study groups (Mann Whitney test value U=159, p=0.5). In both study groups, isolated cases with I-II grade tooth mobility were detected. The mean PMA index in patients of I group was 28.9%±15.0, II – 24.88%±14.1. No significant difference was found between two study groups (U = 354, p=0.2). The Fedorov-Volodkina hygiene index in patients with celiac disease was 1.48±0.3 and with NCGS - 1.51±0.2. All patients presented good oral hygiene levels. The mean value of modified papillary bleeding index (MPBI) in the patients with celiac disease was 0.21±0.25 and in patients with NCGS 0,24±0.34. No statistically significant difference was found between the groups (U = 225, p = 0.08).

The radiographs of the two study groups in 90% of cases showed resorption of the interalveolar septum not exceeding 1/2 root length.The mean value of Fuchs index on the mandible in patients with CD was 0.8±0.2. In patients with NCGS the mean value of Fuchs index was 0.9±0.19. No significant difference was found between the study groups (U index=166, p=0.6). In determining bone mineral density of the mandible in patients with celiac disease, the mean value range from 1200 to 1300 HU. In patients with non celiac gluten sensitivity the mean value of bone mineral density ranged from 1100 to 1250 HU.

Conclusions. The results of this study demonstrate a set of clinicoradiological features of periodontal disease in patient with CD and NCGS. During examination of the oral cavity patients with celiac disease and non celiac gluten sensitivity become aware of prevalence generalized periodontitis. During the evaluation of the hygiene of the oral cavity, attention is drawn to the fact that the unsatisfactory state of oral hygiene in any of the study groups was not detected. The statistical analysis of the received clinical and radiological data did not reveal statistical differences between the studied groups ($p \geq 0.05$). The data obtained that patients with gluten-related disorders have some factors in the oral cavity that influence the progression of periodontal disease. The abovementioned needs further investigation.

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