Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 76 - 81
Received 20 January 2021; Accepted 08 February 2021.

Oral Finding Patterns in Patients with Celiac Disease: An Original Research

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Abstract

Aim

Purpose of this research was to assess the incidence of oral signs and symptoms and will oral examination could be used as a first diagnostic screening tool for asymptomatic forms.

Methodology

15 CD patients, between 2 and 18 years (mean age 10.3) and 15 healthy subjects, age and gender-matched, were examined for hard and soft tissue lesions such as dental enamel defects (DED), dental caries, aphthous-like ulcers (ALU), atrophic glossitis, geographic tongue, median rhomboid glossitis.

Results

Statistically significant differences between the two groups were observed for the prevalence of DED (in 64,4% CD and 24,46% control patients, p=0.001), as well as for the prevalence of ALU (in 40% CD as opposed to 4,44% control patients, p=0.001).

Conclusion

CD patients who are asymptomatic had DED, ALU which could serve as a diagnostic sign for alerting the clinicians for development as progression of this disease.

Keywords celiac disease, dental enamel defects, aphthous-like ulcers.

INTRODUCTION

Celiac disease (CD) is a familial, autoimmune disease caused by sensitivity to dietary wheat gliadins as well as related prolamins in rye and barley.[1, 2] It is one of the most significant causes of chronic malabsorption in children, with symptoms including diarrhoea, abdominal pain and growth failure. Symptoms in adulthood include anaemia, fatigue, weight loss, diarrhoea, constipation, infertility and neurologic symptoms, although occult disease is frequently present with minimal symptoms. [3]The earliest evidence that genetic factors are of

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significance in celiac disease consisted of isolated reports of multiple cases occurring within families.[4] In addition, most reported monozygotic twin pairs were concordant for the disorder, emphasizing the importance of genetic factors.[5] Despite these observations, the mode of inheritance remained unclear.Families with numerous cases of CD are very commonly found, with largest estimations amid 10 and 12%.[6-9] CD has a robust genetic link with the human leukocyte antigen (HLA) class II genes DQA1 and DQB1, with approximately 90% of celiacs carrying the DQ2 genotype and 5% carrying the DQ8 genotype.[10] However, the HLA association alone is insufficient to explain the hereditary nature of the disease, and is estimated to explain less than half the sibling risk, indicating the presence of one or more additional susceptibility loci.[11-14]The patients suffering from CD are also prone to have associated autoimmune disorders such as type I diabetes and Sjogren syndrome (SS). [15] Extraintestinal symptoms like dermatitis herpetiformis and osteoporosis are seen frequently in CD.[16, 17] Oral manifestations of enamel defects in 50-80% of adult patients and mucosal inflammatory changes including recurrent aphthous ulcers and angular cheilitis.[18-20] As oral manifestations occur frequently in individuals suffering from CD or SS, subjects having concomitantly both disorders might even be at higher risk, and require thus additional preventive measures and thorough treatment. [21]The CD-related oral manifestations, most frequently mentioned include dental enamel defects (DED), lower dental caries incidents compared to healthy individuals, recurrent aphthous stomatitis (RAS), oral manifestations of dermatitis herpetiformis, angular cheilitis, atrophic glossitis, oral lichen planus and geographic tongue.[22-27] An immensely wide variation has been reported for the prevalence of systemic DED in patients with mixed/permanent dentition that ranges from 9.52% to 95.94%, whereas in the primary teeth the prevalence is 5.88% to 13.33%8. RAS is one of the most common mucosal diseases8. Scully suggested that the term aphthous-like ulcers (ALU) should be used for ulcers in patients with systemic and intestinal disorders, while RAS is appropriate for patients with no systemic diseases.[28] For the overall prevalence of CD-related ALU a great variation has again been reported ranging from 9.66% to 40.98%10 or even to a high 61%.[22]

AIM OF THE STUDY

The present study aims, firstly, to compare the prevalence of the various oral manifestations in the hard and soft oral tissues in CD patients, in comparison to age and gender matched group of healthy individuals, and to explore whether oral examination is a useful screening tool for possible identification of atypical and asymptomatic CD forms.

METHODOLOGY

The present study is a comparative, cross sectional study between a CD and a healthy control group. The CD group consisted of 15 children with celiac disease. The patients were with age (mean± SD) 10.3±4.1 and median 9.96 years. All patients were categorized in three CD categories (classical, atypical, asymptomatic form). The control group consisted of 15 healthy children, matched for age (mean age: 10.3±4.05) and gender to those of the CD group.A thorough oral examination of hard and soft tissues in the dental chair was performed under identical conditions for both groups. This was done in both locations by the same investigator after drying the teeth with an air/water syringe, as necessary. He had previously been trained by an experienced pediatric dentist both in the clinic and by viewing an extensive set of photographs for recognizing expected lesions in oral hard and soft tissues. Photographs were always taken in addition to recording the oral findings. An informed consent was obtained and an expanded questionnaire was filled by the legal guardian, which included a complete medicaland dental history (diseases, parent diseases, medications, dental trauma etc).Both systemic DED (symmetrical defects in homologue teeth of right and left arch side) and non-

systemic DED (asymmetrical defects, affecting a single tooth in only one side) were recorded. Decayed, missing and filled teeth and surfaces (DMFT/dmft, DMFS/dmfs) were recorded according to World Health Organization's criteria.Soft tissue pathologies like - ALU, non-specific atrophic glossitis, geographic tongue and median rhomboid glossitis was also recorded. The frequency of ALU both before and after the CD diagnosis and/or GFD introduction was also queried to the subjects' legal guardian.The statistical analysis of the collected data was carried out using the SPSS 25.0. The differences of numerical variables between study and control groups were tested using T-test, For qualitative variables, the Chi-Square test was used to compare differences. A $p \leq 0.05$ wasconsidered as significant.

RESULTS

According to the clinical examination, 10 subjects (64.4%) of the CD group and 5 subjects (24.46%) of the control group were observed with DED (both systemic and non-systemic ones), the difference being statistically significant (p=0.0001).This was owed to the presence of systemic defects rather than the non-systemic ones. Out of the 15 cases of systemic DED in both groups, 6 (53.5%) involved color defects (Aine Grade I), 4 (39.2%) slight structural defects (Aine Grade II), and 1 (7.1%) severe structural defects (Aine Grade IV). These defects were found most frequently in the permanent first molars, central and lateral incisors and first premolars in this order. DED were observed also in the primary teeth with the majority of them being present in the second and first molars in this order. The most frequently affected surface was the buccal /labial (vestibular) and their combination with occlusal or all other surfaces. Significant differences were observed between CD and control patients in the presence of systemic DED by coronal third (incisal: p= 0.0001, middle: p=0.0001, cervical: p=0.007). Both groups displayed a similar pattern with higher prevalence in the incisal and middle third than in the cervical third. Dental caries prevalence by using the DMFT, dmft, DMFS and dmfs indices was handled separately for primary and permanent teeth, both by grouping all patients of each group and by separating patients in age groups. No statistically significant differences were noted between the CD and control group (p=0.788).According to the clinical examination and medical history records, 8 subjects of the CD group were reported to have or had had statistically significantly higher ALU cases in comparison to only 1 of the control group subjects (p=0.001). (Table 2) As for other soft tissue lesions, geographic tongue was found in three CD subjects but the difference with the control group was of no statistical significance (p=0.12). Finally, there was no correlation between the use of GFD and its impact in ALU manifestation. (Table 3)

DISCUSSION

Spinell et al. examined if celiac disease was linked to periodontitis among adult patients. In this large research, the National Health and Nutrition Examination Survey (NHANES) authors between 2009 and 2012 included 6661 subjects with full-mouth periodontal examination and serological testing aimed at antitissue transglutaminase (tTg) and antiendomysial (EMA) antibodies. CD was defined as (i) self-reported physician diagnosis while on a gluten-free diet or (ii) tTg levels greater than 10.0 U/ml. It was found that CD is weakly related to periodontal diseases.[29] Larger studies are necessary to enhance precision and strengthen conclusions.Having xerostomia in case of CD patients was examined by van Gils et al. studying around 1000 participants. The Oral Health Impact Profile 14 (OHIP-14) and Xerostomia Inventory (XI) were screened and recorded. It was noticed that CD patients had more oral health issues. Collaboration between dentists and gastroenterologists is recommended to increase detection of undiagnosed CD.[30]De Angelis et al. reported the way bacteria in oral cavity and intestine digest the food and therefore have an effect over health of human beings with their metabolites, which are many a times are involved in intestinal

diseases also affecting the oral cavity. Having a fibrous diet is beneficial to health as it helps the intestinal bacteria to generate better metabolites. [31]In a different revision paper, another author assessed adult people having GFD diet leading to change in microbiota inside the gut. So it was noted that GFD led changes in microflora were evident in both CD as well as normal adult people as well having GFD diet.[32]Galipeau and Verdu recorded significant findings in their review underlining and effective evidence between intestinal dysbiosis and CD; however, could not establish causality.[33] Therefore, it remains unclear whether general changes in microbial composition leads to CD progression and is the diet involved in the same. Rivera et al in their research studied how CD continues to be an unsolved puzzle and a much-debated topic in the recent literature. It is important to the health issues a CD patient faces as it impacts his/ her quality of life as well. [34] As clinicians, it is very important to be aware of the potential presentations. Evaluation of suspected patients of CD with the help of medical physician will help in being certain about the diagnosis as well as prognosis of such patients.

CONCLUSION

Dental clinicians should consider celiac disease as a multiorgan disorder, in which, frequently, the only oral manifestations are DED and/or ALU. Thus, the rise of awareness among the dentalprofessionals is particularly important so as to make an early referral when suspicion of CD is raised.

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TABLES

Table 1- Prevalence of enamel defects and location of systemic enamel defects per group

Enamel defects	**Celiac disease group**	**Control group**	**P value**
No defects (n, %)	5 (35.6%)	10 (75.6%)	0.001
Non systemic (n, %)	6 (13.3%)	3 (13.3%)	
Systemic (n, %)	5 (51.1%)	1 (11.1%)	

Table 2- ALU incidents before and after introduction of gluten free diet

ALU's incident		**Before GFD**	**After GFD**
	No	6	5
	Once a year	8	2
	More than once a year	1	-
P value	0.310		

Table 3 -Soft tissue findings in two groups

Findings/group	**Celiac disease group**	**Control group**	**P value**
ALU (n, %)	8 (40%)	1 (4.4%)	0.001
Geographic tongue (n, %)	1 (6.6%)	0 (0%)	0.121