Major dental clinical pathological manifestation of celiac disease

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Corresponding Author:
Dr. Andrea Quaranta,
dentist, Dipartimento di Scienze Odontostomatologiche e Maxillo Facciali, Universita' degli Studi di Roma - Italy

Submitting Author:
Dr. Francesca Muggiano,
Dentist, Dipartimento di Scienze Odontostomatologiche e Maxillo Facciali, Universita' degli Studi di Roma - Italy

Other Authors:
Dr. Ivana Giannantoni,
dentist, Dipartimento di Scienze Odontostomatologiche e Maxillo Facciali, Universita' degli Studi di Roma - Italy

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Author(s): Muggiano F, Quaranta A, Giannantoni I

Abstract

Celiac disease or sprue is an autoimmune disorder that leads the blunting and loss of villi of the small intestine due to the gluten assumption which is a proteic complex found in various cereal product. Celiac symptoms are mostly various: diarrhoea, failure to gain weight (in young children), reduction of adipose tissue, irritability are the most common symptoms, though other signs and symptoms be clinically suggestive of celiac disease. Among the most characteristic symptoms there are migraine, iron deficiency anaemia, hypertransaminasemia, hepatosteatosis, meteorism. Other clinical symptoms related to the oral cavity but not properly pathognomonic of, can be observed in all clinical forms of celiac disease and suggest clinicians to require more specific diagnostic analysis and exams.

Introduction

Celiac disease is a chronic enteropathy autoimmune disorder that affects genetically predisposed individuals of both gender at any age, but has a female prevalence of the sex ratio. It is an inflammatory disease that concerns tenuous intestine mucosa, leading to a progressive intestine villi flattening and their eventually complete atrophy causing nutritive substances malabsorption.

Matherials and methods

Etiopathogenesis

Celiac disorder affects genetically predisposed to gliadin intolerance individuals. Glydin is a gluten proteic fraction that causes an intestine inflammatory reaction and the afterwards villous atrophy. In physiological conditions intestine epithelium, thanks to intercellular tight junctions, forms a barrier to the passage of several macromolecules as gluten. In celiac disorders such barrier is altered. Therefore glydin overcome the low bowel mucosal barrier and gets in contact with the lamina propria mucosa where it interacts with and is structurally modified by the enzyme transglutaminase. Subsequently glydin binds to HLA DQ2 and DQ8 portion of antigen presenting cells and activates cd4+ lymphocytes found in the lamina propria intestine mucosa.

Tissutal damages are hence caused by immune system cross-reaction that produces anti-gliadin antibodies and antibodies direct to tissue transglutaminase and iTG-gliadin proteic complex. B cell lymphocytes are also involved in the pathogenesis producing anti-giadin, anti-endomysium Ig A and anti transglutaminase antibodies. In celiac disease the oral cavity is also subjected to tissue alterations that indicate diagnostic suspect. Therefore an accurate clinical exam of the oral cavity allows to reveal soft and hard tissue lesions associated to celiac disorders.

Clinical expressions associated to celiac disorders located in the oral cavity are:

Recurrent Aphthous Stomatitis

Recurrent Aphthous Stomatitis (RAS) results to be the most frequent pathological expression that concerns the oral cavity. There are three different clinical forms of RAS: minor aphthous ulcer, major aphthous ulcer and herpetiform aphthous ulcers.

The common features are the ulcerative lesions of oral mucosa that arise with a burning sensation and progressively the affected sites become erythematosus and evolves in erosive lesions:

Minor aphthous ulcers: (diameter inferior to 1 cm) clinically appear as roundish ulcer with well defined border and a yellowish fibrous bottom, surrounded by an erythematous halo. They are elective for non keratin mucosa sites, specifically for the buccal mucosa of the lower lip.

Major aphthous ulcers (diameter superior to 1 cm) have a longer clinical progress compared to minor aphthous ulcer. They appear with an irregular crateriform shape and well-defined, infiltrated prominent border surrounded by a peripheral edema; the lesion bottom is rich of fibrous greyish tissue. Often they are associated to halitosis, hypersalivation, dysphagia, dysphonia, fever, feeling of general discomfort, localized lymphadenopathy and the most frequent affected sites are the labial mucosa, palatine arches and soft palate.
Herpetiform aphthous ulcers appears as numerous groups of punctiform ulcerations (ranging from 10 to 100 elements and with dimensions inferior to 3mm). This latter group prevails in the female sex and in adults, often it is associated dysphonia, dysphagia and hypersalivation.

The possible connection with the celiac disease is supported by the complete remission of the oral aphthous ulcers in patient receiving a gluten free diet and by the recurrence of aphthous lesions after the introduction of gluten in ordinary diet.

Clinically celiac patients show most frequently minor aphthous ulcers.

Atrophic glossitis

Glossitis is an inflammation of the lingual mucosa; in celiac disorders, the tongue initially appear swollen, flushed and de-epithelialized and it is associated to a sensation of dryness, burning and pain during swallowing. Later on the tongue become lucid, smooth and pale due to the papillae atrophy. The B12 vitamin deficiency due to celiac nutritional malabsorption is the origin of this pathological expression.

Oral Lichen Planus

Oral Lichen Planus is a mucocutaneous disease, that affect both skin and mucosal sites as oral cavity, vagina penis esophagus. Lichen Planus affects skin (in particularly at the flexor surface of limbs) as small purple polygonal pruritic papulae; Lichen Planus can affect also scalp and hair follicles. It can also involves all the surfaces of the oral cavity specifically the cheek mucosa, bilaterally, tongue and gums. Possibly celiac disorders and Lichen Planus have the same autoimmune etiopathogenetic mechanisms.

Oral Lichen Planus when affects oral mucosa can have variable clinical onset and forms:

Reticular Lichen has the classic clinical aspect of net-like Wickham's striae observed usually at the posterior buccal fornix. Other sites are, decreasing frequency, gums, lingual dorsum and edges, palate and lips. A peculiar feature of oral Lichen Planus which important for the differential diagnosis is the tendency of affecting both sides, bilaterally.

Bullous Lichen shows blisters containing serum that easily get broken leaving and ulcerative lesion area.

Atrophic Lichen is located on the lingual dorsum and causes lingual papillae atrophy associated to white plaques or reticular striae. Almost in all cases acid and hot food arise painful and burning sensations.

Erosive/Ulcerative Lichen is mainly observed on buccal lingual and gingival mucosa and appears as erythematous and ulcerative areas surrounded at the borders by reticular striae. Gingival ulcerative lesions mostly need an histopathological corroborarion since it can simulate other diseases such as pemphigus vulgaris, benign mucous membrane pemphigoid or else evolves in oral carcinoma.

Plaque-like lichen is usually observed all over the oral cavity and clinically appears as irregular and translucent white plaque surrounded by an erythematous halo.

Pigmentotous Lichen is a very rare form characterized by the presence of pigmented papulae derived from in addition to the regular white lesions.

Sjogren disease

Sjogren disease is an autoimmune disease characterized by the progressive destruction of exocrine glands associated to other autoimmune manifestations. There are two clinical variants: a primitive form (where the clinical manifestations are exclusively concerning the exocrine system) and a secondary form (where other systemic tissues are involved in particular the connective tissue). The disease can debut with mucosal dryness or with an aspecific symptomatology. The major clinical expression in the oral cavity of the Sjogren disease is represented by dryness of mouth (xerostomia) due to a reduced secretive function of salivary glands. Patients can have problems swallowing and a burning sensation, they also have a greater predisposition to dental caries and the placement of prosthetic devices are troublesome. Clinical physical exam of the oral mucosa shows dryness, hyperemia and filiform papillae atrophy. Salivary glands appear hard movable, multilobulated and asymmetric. Another useful diagnostic sign is xerophtalmia, which is a defective function of lachrymal excretion that causes photosensitivity, burning sensation and conjunctivitis symptoms. Autoimmune manifestations of Sjogren disease are similar to those that cartherized celiac disease.

Dermatitis Herpetiformis

Dermatitis Herpetiformis or Duhring's disease is a cutaneous pathology autoimmune based, strictly related to celiac disease. It shows erythematous and urticaria cutaneous areas with very pruriginous blisters and vesicles at the periphery. In the oral cavity it express itself with erythematous lesions that later evolve in vesicles whose breakage provoke painful and sometime bleeding erosions.

Dental Enamel Hypoplasia

Enamel Hypoplasia is a qualitative and quantitative
alteration of dental hard mineralized tissues, due to an altered mineralization process of the dental enamel matrix.

The determining factor for the onset of enamel demineralization defects in celiac patients is unknown but the most likely hypothesis is either the hypocalcemia related to calcium malabsorption in the small bowel portion of the intestine during amelogenesis or the autoimmune mediating lymphocyte response versus the enamel organ.

Some authors have suggested that both the etiopathogenetic mechanisms are synergistically involved in dental tissue alterations onset.

Enamel lesions have different pattern ranging from singular discoloration to evident dental shape and color anomalies.

Nowadays enamel lesions found in celiac individuals are classified on the Aine classification system (1986):

**Grade 0:** absence of defects.

**Grade 1:** cromatic alterations: single or multiple yellow or brown opaqueness with well-defined or blurred borders. absence of enamel brightness.

**Grade 2:** mild structural defects: rough surface covered by orizzontal furrows or superficial cavity. Discoloration and opacity can be present. a portion or the whole enamel surface has low brightness.

**Grade 3:** evident structural defects: a portion or the whole enamel surface is rough and has deep orizzontal furrows that have different width or wide cavity. variable opaque ares are present.

**Grade 4:** severe structural defects: dental morphology is subverted, cuspidal margins are sharp whereas incisal margins are rough and thinned. serious substantial discoloration. Other distintive signs of celiac disease are the symmetric and bilateral dental lesions occurring in various tooth of both the arches and the chronological coherence of the lesions arisen during amelogenesis.

**Table I Pathological manifestation with high/low association grade.**

**Conclusions**

During internal and external clinical exam of the oral cavity, clinicians can detect the previously exposed pathological oral manifestations and advance a valid diagnostic suspect for celiac disease in those patients where this lesions are traced out. When those clinical manifestations appears in childhood, they can help to early diagnosed and therapeutically treat such condition ,which generally need a multidisciplinary specialist approach reducing and prevent pathological drawbacks of unthreatened celiac patients on other organs.

**References**

Illustrations

Illustration 1

Fig. 1 Vestibular Major Aphthous Ulcer.

Illustration 2

Fig. 2 Underlip Minor Aphthous Ulcer.
Illustration 3

Fig. 3 Herpetiform Stomatitis.

Illustration 4

Fig. 4 Oral manifestation of Herpetiform Dermatitis.
Illustration 5

Fig. 5 Oral Lichen Planus.

Illustration 6

Fig. 6 Dental Enamel Hypoplasia.
Illustration 7

Table 1. Pathological manifestation with high/low association grade.

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