Prevalence of celiac disease in a cohort of adult patients with type 1 diabetes

Prevalencia de enfermedad celíaca en una cohorte de pacientes adultos con diabetes tipo 1

Type 1 diabetes accounts for 5–10% of all diabetes cases and its incidence and prevalence are constantly on the rise, with the global annual incidence increasing by 2%–5% per year.[1,2] Patients with type 1 diabetes have a higher risk of other associated autoimmune diseases, the most prevalent of which include thyroid disease, celiac disease (CoD) and pernicious anaemia, which share genetic factors and immunological processes that are key in the development of type 1 diabetes.[3,4]

CoD is a chronic, multiorgan, autoimmune disease mainly affecting the small intestine due to the ingestion of gluten. Classic symptoms include chronic diarrhoea, weight loss, and failure to thrive in children, as well as constipation, abdominal pain and bloating, iron deficiency anaemia, fatigue, headaches, and osteoporosis in both children and adults. However, especially in adults, CoD can have few symptoms or even be asymptomatic.[4] It is diagnosed through serological tests along with duodenal biopsies during gastroscopy. The diagnosis of CoD in adults is confirmed by histopathology samples from the duodenum showing increased intraepithelial lymphocytes, crypt hyperplasia and villous atrophy with positive celiac serology.[5]

Clinical practice guidelines recommend CoD screening in all paediatric patients with type 1 diabetes as soon as possible after diagnosis, and again two and five years after diabetes diagnosis if the first screening was negative.[6] However, in the adult population there are no clear recommendations on CoD screening in the absence of obvious clinical suspicion.[3]

Diagnosis of CoD in patients with type 1 diabetes has a significant impact, forcing them to substantially modify their diet, in addition to the dietary control necessary for diabetes itself. Several studies have also shown that, compared to patients with isolated type 1 diabetes, people with type 1 diabetes and CoD have a higher prevalence of diabetic retinopathy.[7,8]

The prevalence of CoD among patients with type 1 diabetes varies greatly in different studies,[9,10] depending on age, origin and/or the implementation of screening in asymptomatic people. There is also a lack of clear recommendations on the need to carry out CoD screening in adults with type 1 diabetes. As such, we developed a working hypothesis and a proposal to start the study detailed below.

The stated objective was to find out the prevalence of diagnosed CoD and the percentage of people screened for CoD in a cohort of adults with type 1 diabetes. To this end, we conducted a retrospective study, approved by the Clinical Research Committee of our centre, in which we included 639 adults with type 1 diabetes under follow-up at three hospitals in the province of Albacete by 10 different Endocrinology and Nutrition specialists, in order to obtain sufficient statistical power, and a representative sample of the population with type 1 diabetes.

Our cohort had similar characteristics in terms of age (46.6 years; SD 15.6), time since onset of diabetes (21.1 years; SD 13.6) and gender distribution (52% women) to those found in other larger cohorts, thereby providing appropriate external validity.

The overall prevalence of CoD in our study was 2.97% (95% CI: 1.80–4.60) in patients with type 1 diabetes.

A total of 60% of the people included in the study had been screened for CoD in the previous five years,

Table 1 Relationship between age at diagnosis of type 1 diabetes, age at diagnosis of celiac disease and current age.

Patient	Age at diagnosis of type 1 diabetes (years)	Age at diagnosis of CoD (years)	Current age (years)
1	1	12	37
2	3	7	21
3	3	9	23
4	3	3	22
5	4	25[a]	33
6	6	8	20
7	7	22[a]	24
8	8	8	20
9	9	31[a]	42
10	11	39[a]	40
11	11	25[a]	36
12	12	13	25
13	12	12	28
14	13	21[a]	24
15	16	16[a]	33
16	18	18[a]	22
17	32	34[a]	41
18	35	39[a]	40
19	47	50[a]	50

[a] Patients over the age of 14 when diagnosed with celiac disease.

with the prevalence in this subgroup being 4.70% (95% CI: 2.81–7.33).

In our cohort, the mean age of patients with type 1 diabetes and CoD was lower (30.47; SD 9.28 years) than that of patients with no clinical diagnosis of CoD (47.15; SD 15.51 years) ($p < 0.05$). These data may indicate a higher prevalence of CoD among young patients. However, our data also confirmed a lower mean age among patients screened for CoD (44.53; SD 15.01 years) compared to patients with no screening (49.83; SD 16.01 years) ($p < 0.05$). The fact that the patients with CoD and type 1 diabetes were younger may therefore have been influenced by the greater amount of screening in this population. Moreover, 44.4% of the patients with CoD had been diagnosed over five years after diagnosis of diabetes and 58% more than 14 years later (Table 1), highlighting how important it is to maintain a high degree of clinical suspicion throughout the patient's life.

Our study lacks sufficient statistical power to be able to find differences between patients with and without CoD in terms of complications, but we can verify that there was a higher prevalence of retinopathy (34.4% vs 28.89% with any degree of diabetic retinopathy) and reduced glomerular filtration rate (7% vs 3.4% of patients with estimated glomerular filtration rate <60 ml/min/1.73 m^2) among patients not screened for CoD. Taking into account previous findings in the literature,[7,8] these data should make us consider the need to increase CoD screening in this subpopulation.

Our results confirm both the high prevalence of CoD among adults with type 1 diabetes, despite the low screening rate over the last five years, and the need to carry out studies with a high level of scientific evidence, to provide clear recommendations on CoD screening in adult patients with type 1 diabetes.

References

1. Maahs DM, West NA, Lawrence JM, Mayer-Davis EJ. Epidemiology of type 1 diabetes. Endocrinol Metab Clin North Am. 2010;39:481–97.
2. DiMeglio LA, Evans-Molina C, Oram RA. Type 1 diabetes. Lancet. 2018;391:2449–62.
3. American Diabetes Association. Comprehensive medical evaluation and assessment of comorbidities: standards of medical care in diabetes-2022. Diabetes Care. 2022;45 Suppl. 1:S46–59.
4. Herranz-Antolín S, Sastre J, Gonzalvo-Díaz C, Del Val-Zaballos F, Moreno-Fernández J, González-López J, et al. Prevalencia de enfermedades autoinmunes en pacientes con diabetes mellitus tipo 1. Estudio DIACAM 1 2010-2020. Med Clin (Barc). 2022;159:522–8, http://dx.doi.org/10.1016/j.medcli.2022.01.027.
5. Lebwohl B, Sanders DS, Green PHR. Coeliac disease. Lancet. 2018;391:70–81.
6. American Diabetes Association. Children and adolescents: standards of medical care in diabetes-2022. Diabetes Care. 2022;45 Suppl. 1:S208–31.
7. Leeds JS, Hopper AD, Hadjivassiliou M, Tesfaye S, Sanders DS. High prevalence of microvascular complications in adults with type 1 diabetes and newly diagnosed celiac disease. Diabetes Care. 2011;34:2158–63.
8. Mollazadegan K, Kugelberg M, Montgomery SM, Sanders DS, Ludvigsson J, Ludvigsson JF. A population-based study of the risk of diabetic retinopathy in patients with type 1 diabetes and celiac disease. Diabetes Care. 2013;36:316–21.
9. Ashtari S, Najafimehr H, Pourhoseingholi MA, Rostami K, Asadzadeh-Aghdaei H, Rostami-Nejad M, et al. Prevalence of celiac disease in low and high risk population in Asia–Pacific region: a systematic review and meta-analysis. Sci Rep. 2021;11:2383, http://dx.doi.org/10.1038/s41598-021-82023-8.
10. Sastre J, Pinés PJ, Del Val F, Moreno-Fernández J, Gonzalez López J, Quiroga I, et al. Metabolic control and treatment regimens in patients with type 1 diabetes in Castilla-La Mancha, 10 years later: the 2020 DIACAM1 study. Endocrinol Diabetes Nutr (Engl Ed). 2022;69:483–92.

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