Type 1 Diabetes and Celiac Disease Risk Over the Lifespan: A Population-Based Cohort Study Using The Health Improvement Network Database

Mary Ellen Vajravelu, Ron Keren, Ritu Verma, Diva De Leon, Michelle Denburg

The Children's Hospital of Philadelphia

OBJECTIVE: Individuals with type 1 diabetes (T1D) are at increased risk for celiac disease (CD). We used survival analysis to investigate risk factors for diagnosis of CD over the lifespan in a large cohort of adults and children with T1D.

RESEARCH DESIGN AND METHODS: Retrospective cohort study using The Health Improvement Network (THIN), a primary care database from the United Kingdom. Subjects were 1-35y at first diabetes Read (diagnostic) code and were included if Read code was T1D-specific or non-type 1 specific but with a history of insulin and no oral hypoglycemic prescription in the first year of diagnosis. Cox proportional hazards regression was used to identify factors associated with diagnosis of CD (defined by CD-specific Read codes) during follow up. Covariates included age at T1D, sex, and timevarying covariates of thyroid disease (hypo- or hyperthyroidism Read codes) and adrenal insufficiency (specific Read code).

RESULTS: Our 11537 (4961 F) subjects had a median follow-up time of 6.8 years (IQR 2.5-14.1). CD was diagnosed in 234, with median time to diagnosis of 2.9 years (IQR 1.2-7.8); 37% were diagnosed more than 5 years after T1D. Median age at T1D was significantly lower in those who were diagnosed with CD than those who were not (10.0 [IQR 6.5-15.2] vs 19.3 [IQR 11.4-27.9], p<0.0001). Incidence (per 10000 person-years) was greater in females than males (26.6 [95% CI 22.2-31.7] vs 16.5 [95% CI 13.5-19.9]). In multivariable Cox regression, each year of age decreased hazard by 12% (HR 0.88, 95% CI 0.80-0.96, p=0.007), female sex increased hazard of CD by 45% compared to male (HR 1.45, 95% CI 1.12-1.88, p=0.005), and thyroid disease increased hazard by 89% (HR 1.89, 95% CI 1.11-3.21, p = 0.018).

CONCLUSIONS: Female sex, younger age at T1D diagnosis, and diagnosis of thyroid disease increase risk for CD diagnosis across the lifespan. A significant proportion of CD cases were diagnosed more than 5 years after T1D diagnosis, the time frame currently recommended for screening.