Journal club: Overweight and obesity in people with type 1 diabetes

We have taken huge steps forward in the management of both type 1 and type 2 diabetes in the past century. With the 100th anniversary of the first clinical use of insulin just past, it is a time when people are reflecting on what we have achieved. Importantly, however, we also need to look ahead at the challenges that remain. Focusing on type 1 diabetes, the reduction in mortality and improvements in day-to-day quality of life represent the global effort of countless researchers and clinicians. A series of tiny steps together have resulted in the transformation of the lives of people with this condition.

In this gradual evolution, it could be argued there have been three key steps. The first was the recognition that improved glucose control reduced complications associated with diabetes and improved survival. The second was the understanding that training the individual to become an expert in the management of their condition was key. This, combined with the development of modern insulins and technology to manage the condition, has resulted in the current standard of care.

Anyone attending a diabetes professional conference will see the variety of skills and disciplines that are required to improve our understanding of diabetes, from the very specific work of benchtop scientists to the descriptions of real-world practice by doctors and nurses. Furthermore, epidemiology has always been important in showing patterns and trends. Although the answers from epidemiology are often matched by an equal number of further questions, they are important in highlighting the challenges ahead and providing the focus for more specific research. The present paper by Amelia Wallace and colleagues is a good example of this. The key message is that obesity is rising sharply in people with type 1 diabetes and that this is having an impact on the risk of chronic kidney disease. When age differences are corrected for, the burden of chronic kidney disease is greater in people with type 1 diabetes than type 2.

One might be forgiven for thinking that we already knew this, but actually there has been an assumption in the past that people with type 1 diabetes, because of their attention to detail in dietary management, were relatively protected from the epidemic of obesity. Unfortunately, the data in this paper, and others, show that this is not the case.

It is often difficult to study large cohorts of individuals with type 1 diabetes. These data from the US, with some caveats, give us a reasonably robust view of the health of 4000 people with type 1 diabetes over 14 years. The prevalence of obesity is slightly higher than in a matched population of people without diabetes, and it is increasing at a similar rate. The prevalence of obesity in the type 2 diabetes population is considerably higher, although static. The authors point out that obesity is specifically a problem for people with type 1 diabetes because it then increases the risk of chronic kidney disease, which increases the risk of early death.

As is often the way with studies of this kind, we are left with some pressing questions, the most important one perhaps being: what can we do about it? Is it an effect of being on insulin? Is it the result of the specific dietary advice we are giving? Can our current strategies for managing overweight and obesity be directly transposed to the type 1 diabetes community or would that confer its own risk? Can some of the treatments currently developed for type 2 diabetes be safely used in type 1 and will they increase survival? Once again, epidemiology today has asked the questions that we need the wider diabetes research community to provide the answers for tomorrow. ■

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Obesity and chronic kidney disease rates in people with type 1 diabetes

This study used data from a large healthcare system serving 40 counties in Pennsylvania, US, to evaluate the prevalence of obesity and chronic kidney disease (CKD) in people with type 1 and type 2 diabetes. Data were also compared with people from the general US population in the NHANES (National Health and Nutrition Examination Survey).

Data from 4060 people with type 1 diabetes and 135 458 with type 2 diabetes were analysed. People with type 1 diabetes were younger than the general population and much younger than the type 2 cohort (median age, 39 vs 43 vs 62 years). The prevalence of obesity in the type 1 cohort increased between 2004 and 2018 and was level with the general population in 2018, at 36.8%. Obesity was more common in the type 2 cohort, with a prevalence of 61.6% in 2018.

The crude prevalence of reduced eGFR (<60 mL/min/1.73 m²) was higher in the type 1 cohort than in the general population, but lower than in the type 2 cohort (17.5% vs 5.7% vs 26.6%). However, after adjustment for age, sex and race, the prevalence was highest in the type 1 cohort, at around 17% compared with 9% in the type 2 cohort and 1% in the general population. Albuminuria (ACR ≥30 mg/g) followed a similar trend, with the highest crude levels in the type 2 cohort but highest adjusted levels in the type 1 cohort.

The distribution of eGFR in the people with type 1 diabetes was skewed toward lower values, indicating relatively high prevalence of early kidney dysfunction despite the young age of the cohort. In that group, obesity was associated with a 52% increased risk of low eGFR after adjustment for age, sex and race, while albuminuria risk was 35% higher.

The authors conclude that obesity, previously thought to be less common in people with type 1 diabetes, has reached a similar prevalence to the general population in the US. It is also associated with a disproportionately high risk of chronic kidney disease.

Obesity and Chronic Kidney Disease in US Adults With Type 1 and Type 2 Diabetes Mellitus

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Abstract
Objective: Obesity is a global public health challenge and strongly associated with type 2 diabetes (T2D), but its burden and effects are not well understood in people with type 1 diabetes (T1D). Particularly, the link between obesity and chronic kidney disease (CKD) in T1D is poorly characterized.
Research Design and Methods: We included all T1D and, for comparison, T2D in the Geisinger Health System from 2004 to 2018. We evaluated trends in obesity (body mass index ≥ 30 kg/m²), low estimated glomerular filtration rate (eGFR (<60 mL/min/1.73m²), and albuminuria (urine albumin-to-creatinine ratio ≥ 30 mg/g). We used multivariable logistic regression to evaluate the independent association of obesity with CKD in 2018.
Results: People with T1D were younger than T2D (median age 39 vs 62 years). Obesity increased in T1D over time (32.6% in 2004 to 36.8% in 2018), while obesity in T2D was stable at ~60%. The crude prevalence of low eGFR were higher in T2D than in T1D in all years (eg, 30.6% vs 16.1% in 2018), but after adjusting for age differences, prevalence was higher in T1D than T2D in all years (eg, 16.2% vs 9.3% in 2018). Obesity was associated with increased odds of low eGFR in T1D (adjusted odds ratio (AOR) = 1.52, 95% CI 1.12-2.08) and T2D (AOR = 1.29, 95% CI 1.23-1.35).
Conclusions: Obesity is increasing in people with T1D and is associated with increased risk of CKD. After accounting for age, the burden of CKD in T1D exceeded the burden in T2D, suggesting the need for increased vigilance and assessment of kidney-protective medications in T1D.
Key Words: aging, type 1 diabetes, type 2 diabetes, nephropathy, epidemiology, obesity

Significant medical advances in the treatment of type 1 diabetes mellitus (T1D) have resulted in dramatic improvements in survival [1]. Despite this improvement, the life expectancy of individuals with T1D is still 12 years less than the general population, largely attributable to increased risk of chronic disease, especially cardiovascular and kidney disease [2]. In type 2 diabetes (T2D), obesity is thought to be a major contributor to the risk of kidney disease both indirectly through increases in blood pressure and hyperglycemia and directly through increased metabolic demands of higher body weight and the endocrine effects of adipose tissue [3-6]. Despite these increased risks, screening for kidney disease in people with diabetes is suboptimal [6-8].

The prevalence of obesity has reached epidemic proportions in the US population, affecting approximately 42% of US adults in 2017-2018 [9]. People with T1D may be at a higher risk of obesity than the general population because of the anabolic effects of insulin. In the Diabetes Control and Complications Trial (DCCT), intensive insulin treatment reduced mortality and microvascular complications [10] but was also associated with increased weight gain [11]. In recent secondary analyses of the DCCT, participants in the intensive insulin arm of the trial who gained excessive amounts of weight were found to have similar rates of metabolic and cardiovascular disease as participants in the control arm [12,13], suggesting excessive weight gain may negate some of the benefits of tight glucose control. A recent global meta-analysis of over 5 million adults showed that increasing body mass index (BMI) was associated with higher risk for decreased estimated glomerular filtration rate (eGFR) [14], and weight loss has been shown to reduce risk of chronic kidney disease (CKD) in adults with T2D [15]. However, the association between obesity and CKD in T1D is understudied [16].

The objective of this study was to characterize trends in obesity and CKD prevalence and their cross-sectional associations in a cohort of adults with T1D in a large healthcare

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