

Predictive Value of 1-Hour Glucose Elevations during Oral Glucose Tolerance Testing for Cystic Fibrosis-Related Diabetes

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Background. In cystic fibrosis-related diabetes (CFRD) screening, oral glucose tolerance test (OGTT) thresholds for detecting prediabetes and diabetes are defined by the 2-hour glucose (2 hG). Intermediate OGTT glucoses, between 0 and 2 hours, that are ≥ 200 mg/dL are deemed “indeterminate,” although lower 1-hour glucose (1 hG) thresholds identify those at increased risk of type 2 diabetes in other populations and may also better predict clinical decline in CF. Studies of 1 hG thresholds < 200 mg/dL in people with CF are limited.

Methods. A single center, retrospective chart review was performed of patients with 1 hG available on OGTTs collected between 2010 and 2019. In patients with ≥ 2 OGTTs, Kaplan–Meier analysis estimated likelihood of progression to CFRD based on a high vs. low 1 hG. In patients with ≥ 1 OGTT, mixed-effects models tested whether baseline 1 hG and 2 hG predicted growth and lung function trajectories.

Results. A total of 243 individuals with CF were identified with at least 1 OGTT including a 1 hG, and $n = 177$ had ≥ 2 OGTTs. Baseline age (mean \pm SD) was 12.4 ± 2.6 years with 3.2 ± 1.4 years of follow-up. Twenty-eight developed CFRD. All who developed CFRD had a 1 hG ≥ 155 mg/dL prior to 2 hG > 140 mg/dL. The average 1 hG was 267 mg/dL when 2 hG ≥ 200 mg/dL. In a subset with baseline 2 hG < 140 mg/dL, 1 hG ≥ 140 mg/dL conferred an increased 5-years risk of CFRD ($p = 0.036$). Baseline 2 hG predicted decline in FEV1%predicted, but 1 hG did not.

Conclusions. In youth with CF, 1 hG ≥ 140 mg/dL is an early indicator of CFRD risk. However, 2 hG, rather than 1 hG, predicted lung function decline.