



Characteristics of Glycemic Control and Long-Term Complications in Patients with Young-Onset Type 2 Diabetes (*Endocrinol Metab* 2022;37:641-51, Han-sang Baek et al.)

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We read with interest the article by Baek et al. [1], which showed that patients with young-onset diabetes mellitus (DM) (≤ 40 years) had higher blood sugar levels at diagnosis and overall poorer control on follow-up, despite initial improvement at 3 months. They were also at a higher risk of developing complications than the middle-age-onset (41 to 59 years) and the late-onset (≥ 60 years) groups [1]. However, conclusions of that study were based on fasting glucose levels recorded over three time points within the first year of diagnosis and trends correlated with the future development of complications. This assumes that DM control is static.

We recently studied the trend in hemoglobin A1c (HbA1c) (measured approximately at 3- to 6-month intervals, with a mean of 9.1 readings per patient) of 100 consecutive patients with type 2 DM. We categorized patients into three groups: good/satisfactory control (HbA1c $\leq 8.0\%$), suboptimal control (8.1% to 9.0%), and uncontrolled ($\geq 9.0\%$). Based on their latest HbA1c, 44% were categorized as having good/satisfactory control, 6% as having suboptimal control, and 50% as having uncontrolled DM. We then looked at their past HbA1c levels to

ascertain trends, and found that 43% of patients recorded fluctuations in control between slight to marked improvement (25%) or deterioration (18%). This shows that control is dynamic and is influenced by many factors, including patients' awareness, knowledge, compliance with management, and concomitant diseases. Interestingly, the uncontrolled group was also significantly younger, on more DM medications, had more hospitalizations for DM indications, and had a lower estimated glomerular filtration rate (all P values < 0.05). We also recently reported our experience with DM and retinopathy, and when we re-analyzed the data ($n=341$) following the same breakdown of age groups as Baek et al. [1], we found that despite a shorter duration of DM among the young (11.3% of all patients) and middle-age groups, they had poorer DM control and a higher prevalence of diabetic retinopathy than the older group [2]. The results of this study are summarized in the Table 1. In our analysis, the age groups were based on patients' age at the time of the study and not at the diagnosis of DM.

The control of DM is influenced by a complex interplay of several factors, including genetic factors, especially maturity-

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Table 1. Comparisons between the Three Age Groups

	Young (<40 years)	Moderate (40 to <65 years)	Old (65 and older years)	P value
HbA1c, mL/min/1.73 m ²	8.7±2.1	8.4±1.9	7.7±1.5	0.005 ^a
Proportion of DM control, %				0.018 for trend
Good	41.0	40.1	58.2	
Suboptimal/poor	59.0	59.9	41.8	
Duration of DM, yr	4.5±4.1	8.9±6.9	13.2±8.3	<0.001 ^b
Presence of diabetic retinopathy, %	25.6	25.6%	11.4%	0.029 for trend

Values are expressed as mean ± standard deviation.

HbA1c, hemoglobin A1c; DM, diabetes mellitus.

^aAnalysis of variance (ANOVA): $P=0.033$ between young and old, and $P=0.007$ between moderate and old; ^bANOVA: $P=0.001$ between young and moderate, $P<0.001$ between young and old, and moderate and old.

onset diabetes of the young, patient-related factors; such as awareness, knowledge, perceptions, and compliance [3,4], and healthcare provider-related factors [5]. Of these, patient-related factors are perhaps the most important. Younger patients are likely to have genetic or epigenetic predispositions, while patient attitudes may also make a major contribution. The fact that hyperglycemia is mostly asymptomatic may lead to a false sense of well-being or a mistaken belief of invulnerability to the effects of chronic hyperglycemia. This can lead to noncompliance with treatment, lifestyle modifications, and clinic attendance.

The findings of Baek et al. [1] are important, especially as they provide evidence that can be used to educate and reinforce the importance of good early control. However, DM control is a dynamic process, and it is important for patients to be aware that fluctuations can occur, and control can deteriorate or improve regardless of the previous levels of control. Nonetheless, further studies are required to confirm if the findings of Baek et al. [1] regarding good early control translate to a reduced risk of future complications and can be extrapolated to other patient populations with different social and cultural norms.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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