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Renal Threshold for Glucose Re-Absorption in Patients with Latent Autoimmune Diabetes of Adults is Similar to That of Patients with Type 1 Diabetes Mellitus but Lower than That of Patients with Type 2 Diabetes Mellitus

We have reported that the renal threshold in patients with type 1 diabetes mellitus (T1DM) was near the normal range and significantly lower than that in patients with type 2 diabetes mellitus (T2DM) [1]. This time, we have assessed the renal threshold in patients with latent autoimmune diabetes of adults (LADA).

LADA is defined based on the classification criteria provided by the Immunology in Diabetes Society which include: age > 30 years, serology positive for at least 1 anti-islet cell antibody and a delay in the requirement of insulin therapy of > 6 months from the initial diagnosis of diabetes. In this study, we used anti-GAD65 antibody (glutamic acid decarboxylase 65-kilodalton isoform) for LADA diagnosis. The study included 75, 50 and 25 patients with T2DM, T1DM and LADA, respectively. However, patients who had been prescribed SGLT2 inhibitor (SGLT2i) were excluded from this clinical study because SGLT2i affects the estimation of the renal threshold. As previously reported, the renal threshold was defined as the minimum plasma glucose concentration that resulted in the presence of measurable urine in recent 12 measurements [1, 2].

The mean age of the subjects in the T2DM, T1DM, and LADA groups was 65.7 ± 11.3, 42.3 ± 14.8, and 53.2 ± 18.7 years, respectively. The mean HbA1c of the subjects was 7.2% ± 0.5% in the T2DM group, 7.8% ± 0.8 % in the T1DM group, and 7.0% ± 0.4% in the LADA group. Accordingly, the mean systolic blood pressure was 130.1 ± 13.4, 124.5 ± 14.5, and 125.6 ± 12.8 mm Hg; the mean diastolic blood pressure was 74.5 ± 10.8, 68.0 ± 7.0, and 82.6 ± 24.5 mm Hg; and the mean body weight was 70.4 ± 13.7, 56.8 ± 6.5, and 59.4 ± 11.4 kg in patients in the T2DM, T1DM, and LADA groups. The mean duration of T2DM, T1DM, and LADA was 17.7 ± 8.5, 16.8 ± 11.5, and 23.5 ± 14.0 years, respectively, and mean estimated glomerular filtration rate (eGFR) in T2DM, T1DM, and LADA patients was 70.1 ± 13.6, 76.7 ± 22.1, and 79.4 ± 20.5 mL/min/1.73 m^2. The mean anti-GAD65 antibody level in LADA was 175.7 ± 88.4 U/mL (normal range;

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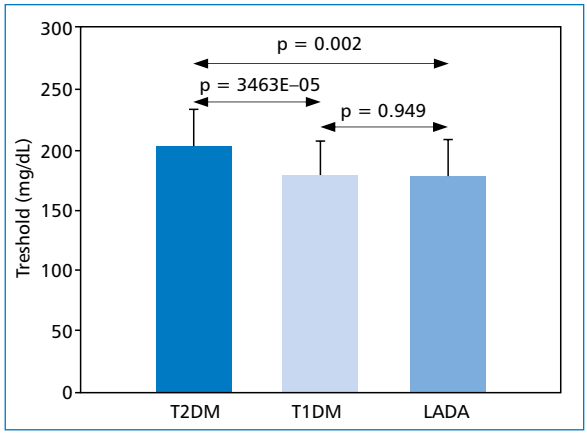

Figure 1. Comparison of the Renal Threshold for Glucose Re-absorption between Patients with T2DM, LADA, and T1DM
The Y-axis represents the renal threshold for glucose re-absorption (mg/dL). Patients with LADA show a significantly lower renal threshold for glucose re-absorption than patients with T2DM (177.8 ± 31.3 vs. 202.4 ± 33.2, p = 0.002). Patients with T1DM show a significantly lower renal threshold for glucose re-absorption than patients with T2DM (178.3 ± 28.8 vs. 202.4 ± 33.2, p = 3.463E-05). Patients with LADA show not similar grade of renal threshold for glucose re-absorption compared with those in patients with T1DM (177.8 ± 31.3 vs. 178.3 ± 28.8, p = 0.949). Closed column, open column, and vertical stripped column represent the threshold in patients with T2DM, T1DM, and LADA, respectively.
LADA — latent autoimmune diabetes of adults; T1DM — type 1 diabetes mellitus; T2DM — type 2 diabetes mellitus

< 5.0). As shown in Figure 1, the renal threshold was 177.8 ± 31.3, 178.3 ± 28.8, and 202.4 ± 33.2 mg/dL in patients with LADA, T1DM, and LADA. Thus, the renal thresholds in patients with LADA and T1DM were near the normal range and significantly lower than that in patients with T2DM (p = 0.002).

Recent study reported that in patients with LADA on three months of dual therapy with metformin, DPP-4 inhibitors were able to decrease the HbA1c by 1.05% compared to SGLT2i and sulfonylureas which were able to decrease the HbA1c by 0.84% and 0.73%, respectively [3]. SGLT2i therapy in patients with LADA may not show the same efficacy as in patients with T2DM.

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The study protocol was reviewed and approved by the review board of Hidaka Hospital in accordance with the principles of the Declaration of Helsinki.

Written informed consent was obtained to analyze and report the patients' clinical laboratory data.

Conflict of interest

None declared.

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