JDI Journal of Diabetes Investigation Open access
Official Journal of the Asian Association for the Study of Diabetes
LETTER TO THE EDITOR

Response to "Preserved" glucagon secretion in fulminant type 1 diabetes

We thank Murase-Mishiba *et al.* for their comments[1] on our case report[2]. The Authors reported that glucagon responses to mixed meal test were not impaired in patients with fulminant type 1 diabetes whose diabetes duration was >4 years. We evaluated glucagon responses to arginine stimulation in five patients with fulminant type 1 diabetes, and those in five age- and diabetes duration-matched patients with acute-onset type 1 diabetes who were enrolled in our study[3] (their age and diabetes duration were 54.8 ± 20.9 vs 55.6 ± 18.1 years and 3.0 ± 6.3 vs 3.2 ± 6.9 years, respectively; data were presented as mean ± standard deviation). As shown in Figure 1, the curves of glucagon levels were similar between the two groups. Another 44-year-old woman underwent an arginine stimulation test at the onset of fulminant type 1 diabetes and 11 months later, and her glucagon response did not decrease (her glucagon levels at pre-loading, at peak and the area under the curve of the glucagon were; 139 vs 204 pg/mL, 406 vs 425 pg/mL and 3.7 × 10^4 vs 4.6 × 10^4 pg/mL/min at the onset of diabetes and 11 months later, respectively). On the contrary, another study reported that immunohistochemically stained glucagon-positive cell areas in the pancreas of patients with fulminant type 1 diabetes were significantly lower than those with autoimmune type 1 diabetes for short duration of 2.8 ± 1.9 months after the onset of diabetes[4]. The change in pancreatic α-cell

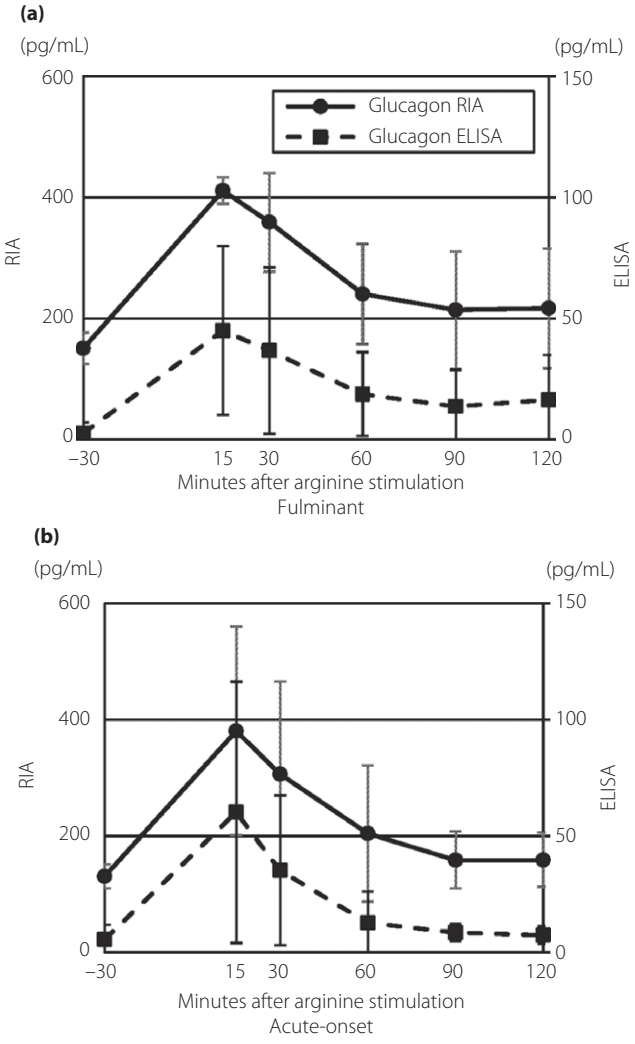

Figure 1 | Glucagon response to arginine stimulation in five patients with (a) fulminant type 1 diabetes, and (b) five age- and diabetes duration-matched patients with acute-onset type 1 diabetes. Solid lines with circles show glucagon levels measured by radioimmunoassay (RIA; Sceti Medical Labo, Tokyo, Japan; the intra- and interassay coefficients of variation were <20 and <15%, respectively). Dashed lines with squares show glucagon levels measured by enzyme-linked immunosorbent assay (ELISA; Mercodia AB, Sweden; the intra- and interassay coefficients of variation were 7.3–9.4% and 7.5–8.5%, respectively). Patients were enrolled in our study[3]. Variables are presented as mean ± standard deviation.

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Received 17 October 2018; accepted 4 November 2018

function might be heterogenous among patients with fulminant type 1 diabetes.

Regarding the methods to measure the glucagon level, Murase-Mishiba *et al.* used conventional radioimmunoassay (RIA). In our case report, we measured the glucagon levels by not only RIA, but also with quantitative sandwich enzyme-linked immunosorbent assays (ELISA), and the curves of the glucagon levels were similar. We also measured the glucagon levels of patients with fulminant and acute-onset type 1 diabetes by ELISA, as shown in Figure 1. Their glucagon levels measured by RIA and ELISA were similar. However, a recent study showed that the trend of glucagon response to a mixed meal test measured by RIA was different from that measured by ELISA and novel liquid chromatography-high resolution mass spectroscopy, which can measure the glucagon levels more specifically[5]. Further prospective, long-term longitudinal studies with large numbers of patients are warranted to gain a complete understanding of the pancreatic α-cell function in fulminant type 1 diabetes.

ACKNOWLEDGMENTS

This work was supported in part by a Junior Scientist Development Grant supported by Novo Nordisk Pharma Ltd. and The Japan Diabetes Society.

DISCLOSURE

The authors declare no conflict of interest.

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Doi: 10.1111/jdi.12972