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COMMENTARY

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A new diagnostic strategy for gestational diabetes during the COVID-19 pandemic for the Japanese population

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Gestational diabetes (GDM) is one of the most common perinatal complications. As pregnant women have to consume 75 g of glucose during an oral glucose tolerance test (OGTT) in order to diagnose GDM, they have to stay longer in hospitals. Since its outbreak, COVID-19 has spread all over the world. To prevent the COVID-19 infection, patients must minimize hospital visits, avoid spending long periods of time at the hospital, and limit face-to-face contact with healthcare practitioners. As a result, the Japanese Society of Diabetes and Pregnancy published the Japanese GDM diagnostic strategy in the evolving COVID-19 pandemic, on the 10th of April 2020. This strategy is a modification of the United Kingdom and Australian guidelines.^{1,2} With this background, we investigated whether the strategy was suitable for the Japanese GDM population.

We retrospectively investigated the records of a cohort of 264 women diagnosed with GDM in their second trimester, using the International Association of Diabetes in Pregnancy Study Group (IADPSG) criteria, who received perinatal care at our hospital between January 2013 and December 2019. We re-classified them retrospectively using the Japanese GDM diagnostic strategy in the evolving COVID-19 pandemic. This strategy in the second trimester was defined as follows: the COVID-19-GDM group, HbA1c \geq 38 mmol/mol (5.7%), random glucose level (RPG) \geq 9.0 mmoL/L (162 mg/dL), or fasting plasma glucose (FPG) \geq 5.1 mmoL/L (92 mg/dL); no further testing (COVID-19-NFT)-group, HbA1c < 38 mmol/mol (5.7%), random glucose level (RPG) \geq 5.1 mmoL/L (92 mg/dL); no further testing (COVID-19-NFT)-group, HbA1c < 38 mmol/mol (5.7%), random glucose level (RPG) \leq 5.1 mmoL/L (162 mg/dL), or fasting plasma glucose (FPG) \leq 5.1 mmoL/L (92 mg/dL). This study was approved by the ethical committee of Keio University School of Medicine (No. 20150103).

Of the 264 patients, 104 were diagnosed with COVID-19-GDM and 160 GDM patients diagnosed using the IADPSG criteria were reclassified as COVID-19-NFT. In the COVID-19-GDM group, no patients were diagnosed with RPG \geq 9.0 mmoL/L (162 mg/dL). A comparison of

maternal characteristics between the COVID-19-GDM and COVID-19-NFT groups has been shown in the Table 1 below. The incidence of 1 hour- and 2 hours-glucose level positives in the COVID-19-NFT group were significantly higher than those in the COVID-19-GDM group (P < .01). There was no difference in the incidence of insulin requirement during pregnancy between the two groups (P = .08).

As the Japanese population has lower ability of insulin secretion compared with other ethnicities such as the Caucasians, the Japanese women with GDM has been shown to associate with impaired insulin secretion or beta cell dysfunction in our previous report.³ In the Japanese GDM diagnostic strategy in the evolving COVID-19 pandemic, which is a modification of criteria from other countries, FPG and HbA1c are listed as important for diagnosing GDM. However, FPG is associated with insulin resistance. Since FPG in Japanese people is lower than that in Caucasians, the 160 patients who were diagnosed using the IADPSG criteria were re-classified as COVID-19-NFT (61%). As 65 patients (41%) in the COVID-19-NFT group required insulin during pregnancy, many patients with GDM who should be treated as such, might not be diagnosed when the Japanese GDM diagnostic strategy in the evolving COVID-19 pandemic is used. Furthermore, according to our results, to diagnose COVID-19-GDM, the cutoff value of RPG might be unsuitable for Japanese GDM because there were no patients who were diagnosed with RPG ≥9.0 mmoL/L (162 mg/dL) in this study. Therefore, further research may be needed based on bigger data sets, to define the cutoff value of RPG to detect Japanese GDM. While the 50-g glucose challenge test (GCT) is not a definitive diagnosis of GDM, the sensitivity of GCT (74%) in the previous report was higher than that in the Japanese GDM diagnostic strategy in the evolving COVID-19 pandemic for diagnosing GDM.⁴ While pregnant women have to spend longer periods at the hospital for GCT than those for RPG, if we can create a new strategy such that the pregnant women consume 50 g of glucose for GCT before

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TABLE 1Comparison of maternal characteristics between GDM and no further testing group diagnosed by Japanese diagnostic strategy in
the evolving COVID-19 pandemic

		COVID-19-GDM	COVID-19-NFT	
		(n = 104)	(n = 160)	P-value
Maternal age at delivery	(years)	37 (23-51)	37 (25-59)	.24
Nulliparity		65 (63)	114 (71)	.14
Pre-pregnancy BMI	(kg/m ²)	21.4 (16.4-36.3)	20.4 (16.4-35.4)	<.01
Underweight (BMI < 18.5 kg/m ²)		9 (9)	24 (23)	.18
HbA1c ≥ 38 mmol/mol		35 (34)	0 (0)	-
Random glucose level ≥ 9.0 mmoL/L		0 (0)	0 (0)	-
Antepartum 75-g OGTT				
Fasting glucose level	(mmol/l)	5.2 (4.2-7.7)	4.6 (3.0-5.1)	<.01
1-hour glucose level	(mmol/l)	9.7 (6.0-14.1)	11.4 (5.1-13.5)	.07
2-hours glucose level	(mmol/l)	8.4 (4.5-16.2)	8.9 (6.1-12.8)	<.01
Fasting glucose level positive		89 (86)	0 (0)	-
1-hour glucose level positive		40 (38)	95 (59)	<.01
2-hour glucose level positive		51 (49)	120 (75)	<.01

Note: Continuous data were compared between groups using the Mann-Whitney U test. Categorical variables were analysed using the chi-squared test or the Fisher's exact test. Data are expressed as n (%) or median (range).

Abbreviations: BMI, body mass index; GDM, gestational diabetes; NFT, no further testing group; OGTT, oral glucose tolerance test.

visiting hospitals, and blood samples are collected 1 hour after consumption, it may shorten the amount of time required for them to be in a hospital. Since pregnant women with false-positive GCT (ie, positive GCT, but negative OGTT) were at a higher risk of large for gestational age in a previous Japanese report,⁵ it might be possible to manage glycemic conditions to false-positive GCT mothers in the evolving COVID-19 pandemic.

In conclusion, this report is the first to reveal the usefulness of the GDM diagnostic strategy in the evolving COVID-19 pandemic. The Japanese GDM diagnostic strategy in the evolving COVID-19 pandemic should be re-considered for diagnosing GDM in the Japanese population.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

AUTHOR CONTRIBUTION

Y. K. collected data, performed statistical analyses, wrote the manuscript, contributed to the discussion, and reviewed/edited manuscript. Y.S., S. I., D. O., and M. T. contributed to the discussion and reviewed and edited the manuscript.

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