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Timely blood glucose management for the outbreak of 2019 novel coronavirus disease (COVID-19) is urgently needed

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Since December 2019, a novel coronavirus disease (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was emerged in Wuhan, China. Due to sustained human-to-human transmission, the rapid spread of SARS-CoV-2 results in a formidable outbreak in many cities in China and expanding internationally, including Japan, South Korea and the United States. As of 24 February 2020, this new emerging virus had caused a total of 79,331 confirmed cases with 2618 deaths globally. The population is generally susceptible to this coronavirus, and the elderly and those with certain underlying diseases are more vulnerable to SARS-CoV-2, including hypertension and diabetes [1,2]. It was reported that the overall proportion of diabetes in COVID-19 was from 5.3% to 20% [1–6]. Due to compromised innate immune response, diabetic patients exist increased susceptibility and enhanced disease severity following SARS-CoV-2 infection. In addition, COVID-19 with diabetes has much more potential to progress rapidly with acute respiratory distress syndrome and septic shock, which may be eventually followed by multiple organ failure. Comorbid diabetes was associated with much more intensive care unit (ICU) admission. Compared with patients who did not receive ICU care, ICU patients with virus infection were more likely to have underlying diabetes (22.2% vs 5.9%) [1]. Clinical data shown that the mortality of COVID-19 patients was from 2.3% to 15% [1–3,6]. Remarkably, presence of diabetes is associated with increased mortality. At this stage, the largest epidemiological investigation in China indicated that the mortality of COVID-19 with diabetes up to 7.3% (80/1102), which is dramatically higher than that of the patients without

any comorbidities (0.9%, 133/15,536) [6]. Infection of SARS-CoV-2 with diabetes might trigger stress condition and increased secretion of hyperglycemic hormones, such as glucocorticoid and catecholamines, which results in elevated blood glucose, abnormal glucose variability and diabetic complications. Moreover, in order to raise admission capacity of local hospitals, huge amount of Chinese medical personnels went to Wuhan, the epicenter of the outbreak, to battle against this epidemic. However, compared with professional endocrinologists, most of front-line respirologists and critical care specialists in Wuhan may be lack of the concern of blood glucose and insufficient of clinical experience of diabetes therapy, which may lead to blood glucose fluctuation for patients with diabetes. Therefore, timely and standardized blood glucose management for diabetic patients with COVID-19 is urgently needed.

For the COVID-19 patients with diabetes, tailored therapeutic strategy and optimal goal of glucose control should be formulated based on clinical classification, coexisting comorbidities, age and other risk factors. Blood glucose should be controlled for all patients during hospitalization to monitor the progress of illness and avoid aggravation. For critical cases, early identification and timely reduction adverse drug reaction (for instance, glucocorticoid-induced hyperglycemia) could prevent worse symptoms. During the 4-week follow-up period after discharge, blood glucose homeostasis should be maintained continuously and patients need to avoid infectious diseases due to a lower immune response. Long-term follow-up is still essential for diabetic patients to reduce diabetes-related complications and mortality.

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With the aim of preventing person-to-person transmission, a variety of online services of glucose management have been implemented widely for diabetic patients and general population during the outbreak of COVID-19 in China. The popularization of Internet and smartphones, as well as emerging fifth generation networks, have ensured endocrinologists to provide remote medical consultation for the patients who are not advised to go to the hospital during the COVID-19 outbreak. Furthermore, free educational videos and e-books on diabetes self-management and COVID-19 prevention have been provided for the public via WeChat mobile app. To date, these online services and resources have played remarkable roles in the nationwide COVID-19 control in China.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.diabres.2020.108118>.

REFERENCES

- [1] Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA* 2019;2020. <https://doi.org/10.1001/jama.2020.1585>.
- [2] Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet* 2020;395:507–13. [https://doi.org/10.1016/s0140-6736\(20\)30211-7](https://doi.org/10.1016/s0140-6736(20)30211-7).
- [3] Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395:497–506. [https://doi.org/10.1016/s0140-6736\(20\)30183-5](https://doi.org/10.1016/s0140-6736(20)30183-5).
- [4] Zhang JDX, Cao YY, Yuan YD, Yang YB, Yan YQ, Akdis CA, et al. Clinical characteristics of 140 patients infected by SARS-CoV-2 in Wuhan, China. *Allergy* 2020. <https://doi.org/10.1111/all.14238>.
- [5] Song F, Shi N, Shan F, Zhang Z, Shen J, Lu H, et al. Emerging coronavirus 2019-nCoV pneumonia. *Radiology* 2020. 200274. <https://doi.org/10.1148/radiol.2020200274>.
- [6] The novel coronavirus pneumonia emergency response epidemiology team. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) — China, 2020. *China CDC Weekly*. 2020;2:113–22.