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Diabetes patients with COVID-19 need better blood glucose management in Wuhan, China

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1. Main text

Coronavirus Disease 2019 (COVID-19) has aroused worldwide public health concerns in recent days [1]. Diabetes has been reported as one of the most common comorbidities and correlated with higher mortality [2,3].

In order to investigate current blood glucose (BG) management of the patients with both diabetes and COVID-19, we retrospectively analyzed 29 inpatients diagnosed with type-2 diabetes and laboratory-confirmed COVID-19 and admitted to a designated isolation medical center in Wuhan from February 13th to March 1st. These patients had a median (range) age of 69 (54–81) years old and diagnosed with diabetes for 6 (1.5–14) years. All patients had at least one BG test. The clinical management varies according to their BG levels and physicians' advice. We utilized the BG targets suggested for inpatients by the American Association of Clinical Endocrinologists and American Diabetes Association, 7.8 mmol/L for preprandial BG and 10.0 mmol/L for postprandial BG, as the cutoff values [4].

A total of 881 capillary BG tests were performed for these patients. Among them, 56.6% (499/881) of the tests showed abnormal BG levels, including 29.4% (58/197) of the preprandial BG tests and 64.5% (441/684) of the postprandial tests. 69.0% (20/29) patients were considered with non-ideal BG levels. And 10.3% (3/29) of the patients suffered at least one episode of hypoglycemia (<3.9 mmol/L).

These results suggested a failure of current BG management strategies for patients suffering both diabetes and COVID-19, especially that of postprandial BG. As diabetes and hyperglycemia may lead to higher secondary infection risk and mortality [5–7], we suggest that the BG management of these patients should be better valued and optimized.

Given the current situation of Wuhan's healthcare system, we infer the potential reasons are as follows: 1) There is a relative shortage of available professional endocrinologists in designated isolation medical centers, leading to delay or absence of professional advice. 2) Diet for COVID-19 patients is uniformly provided. A diabetic diet or personalized diet is unavailable. 3) Quarantined inpatients are unable to exercise due to limited indoor space and poor pulmonary function. 4) The anxiety led by COVID-19 induces hyperglycemia [8]. 5) Pancreatic tissue is a potential target of viral infection, leading to glucose metabolism disorders [9,10].

We hereby suggest 1) Establish an electronic blood glucose record and remote consultation system to flexibly utilize the resources of local endocrinologists or professionals nationwide. 2) Coordinate with nutritionists and hospital canteens to offer diabetic diet. 3) Provide indoor exercise instructions. 4) The anxiety levels of inpatients should be evaluated. Psychological intervention should be carried out for patients in need. 5) Further pathophysiological studies are needed.

Clinical practice and related social resources allocation in today's Wuhan city may differ from that of other places with adequate medical resources. However, this Wuhan experience may help other cities learn how to better respond to the COVID-19 outbreak. In this letter, we demonstrate that BG management strategies for diabetes patients with COVID-19 should be optimized. Further clinical and pathophysiological studies are needed to establish more details.

Declaration of competing interest

The authors receive no funding and declare no conflict of interest.

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References

- [1] Lai C, Shih T, Ko W, Tang H, Hsueh P. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirusdisease-2019 (COVID-19): the epidemic and the challenges. *Int J Antimicrob Agents* 2020;105924.
- [2] Yang X, Yu Y, Xu J, Shu H, Xia J, Liu H, et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Respir Med* 2020. [https://doi.org/10.1016/S2213-2600\(20\)30079-5](https://doi.org/10.1016/S2213-2600(20)30079-5).
- [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 (London, England)* 2020;395(10223):497–506.
- [4] Moghissi ES, Korytkowski MT, DiNardo M, Einhorn D, Hellman R, Hirsch IB, et al. American Association of Clinical Endocrinologists and American Diabetes Association consensus statement on inpatient glycemic control. *Diabetes Care* 2009;32(6):1119–31.
- [5] Tseng C. Mortality and causes of death in a national sample of diabetic patients in Taiwan. *Diabetes Care* 2004;27(7):1605–9.

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- [6] Yang JK, Feng Y, Yuan MY, Yuan SY, Fu HJ, Wu BY, et al. Plasma glucose levels and diabetes are independent predictors for mortality and morbidity in patients with SARS. In 2006:623–8.
- [7] Kechagias S, Nasr P, Blomdahl J, Ekstedt M. Established and emerging factors affecting the progression of nonalcoholic fatty liver disease. *Metab Clin Exp* 2020;154183.
- [8] Miazgowski T, Bikowska M, Ogonowski J, Taszarek A. The impact of health locus of control and anxiety on self-monitored blood glucose concentration in women with gestational diabetes mellitus. In 2018:209–15.
- [9] Yang J, Lin S, Ji X, Guo L. Binding of SARS coronavirus to its receptor damages islets and causes acute diabetes. *Acta Diabetol* 2010;47(3):193–9.
- [10] Hamming I, Cooper ME, Haagmans BL, Hooper NM, Korstanje R, Osterhaus ADME, et al. The emerging role of ACE2 in physiology and disease. *J Pathol* 2007;212(1):1–11.