Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Managing diabetes in ageing patients during the COVID-19 pandemic

The pandemic of the novel SARS-2 coronavirus disease (COVID-19) constitutes a public health problem of international concern. Political authorities in collaboration with medical committees and societies try hard to avoid horizontal transmission of the infection. It is estimated that 15 % of the infected patients develop severe disease, 6 % life-threatening pneumonia, acute respiratory failure, or other comorbidities, while the great majority are asymptomatic (17.9–78 %) or present with mild disease [1–3]. A growing body of evidence suggests that patients with COVID-19 have an increased prevalence of comorbidities, including diabetes mellitus (DM) [1]. Data from studies in China showed a pooled DM prevalence of around 10 % in infected complicated patients and a positive correlation with adverse outcomes [1]. A recent case series from three UK hospitals reported that COVID-19 was associated with acute diabetic complications such as long-lasting diabetic ketoacidosis and/or hyperglycemic hyperosmolar state [4].

Evidence from previous coronaviruses and the limited data regarding COVID-19 suggest a direct toxicity of the virus to beta pancreatic cells, possibly through the angiotensin converting enzyme 2 (ACE-2) receptor, and insulin deficiency or an indirect effect through systemic inflammation and/or metabolic changes in other organs such as liver, muscle or adipose tissue, leading to insulin resistance [5]. Age seems to be an important factor related to COVID-19 mortality and this association seems to be largely mediated by the presence of DM [1]. Patients with DM, and especially those not adequately controlled, are prone to critical COVID-19 condition with a bad response to treatment [6,7].

Although there is a lot more to learn about the COVID-19 pandemic, what we have already understood is that patients with DM constitute a group with severe adverse outcomes, emphasizing the need for optimal glycemic control [8]. This task might be particularly challenging for the ageing population, as these patients are not used to virtual consultations provided by telemedicine, while they present other comorbidities that need face-to-face evaluation [9]. HbA1c levels should be evaluated as an indicator of glycemic control, aiming for a general target <7% or a higher individualized goal, depending on the comorbidities, without hypoglycemia. Physicians should remind patients the importance of lifestyle measures, such as a healthy diet, adequate hydration and regular physical activity. They should also be encouraged to measure capillary blood glucose and assess ketones, especially when they feel unwell and follow the sick day rules [8].

Specific attention should be paid in the re-evaluation of the anti-diabetic treatment in the context of the COVID-19 pandemic. Although metformin is the gold standard first choice of treatment in DM, it has to be withheld as soon as suspicious symptoms arise, aiming to minimize the risk of lactic acidosis. Sodium-glucose transport inhibitors (SGLT-2i) precipitate towards a reverse insulin/glucagon ratio, and thus higher rates of ketosis, likely to complicate clinical manifestations of COVID-19 infection [10]; therefore their administration should be kept to a minimum. Treatment with glucagon like peptide 1 receptor agonists (GLP-1RA), a safe and effective anti-diabetic option in general, has been associated with an upregulation of ACE-2 inhibitors, which implies a possible adverse effect on the severity of immune reaction related with the disease [10]. Thiazolidinediones (TZDs) regulate not only glucose levels but also immune system response, through activation of the peroxisome proliferator activated receptor-γ (PPARγ) [11]. However, initiation of TZDs to control the exaggerated catecholamine response during the early stages of suspected COVID-19 infection should be rather avoided; more studies are needed regarding their efficacy in this specific situation. Sulfonylureas are less commonly used nowadays due to the risk of hypoglycemia and their short durability of action. Such a treatment should be readjusted after a confirmed infection, due to the possible viral damage on pancreatic islet cells and possible insulin deficiency observed in patients with COVID-19 [4,5]. Dipeptidyl peptidase 4 inhibitors (DPP-4i) might have a potential positive effect in regulation of the infectious process [10], so the use of these agents appears as a rather efficient and safe choice.

In-person follow-up appointments and re-evaluation of anti-diabetic treatment are especially indicated for older patients who have managed to overcome the respiratory failure linked with the infection and have been discharged with oral steroids, which can aggravate hyperglycemia [12,13]. DM is not only a risk factor for COVID-19, but it can also be complicated by severe and potentially life-threatening emergencies. Health care practitioners should be aware of the relationship of DM with COVID-19 infection and its adverse outcome. It is of high priority to make also patients aware of this association and to educate them to control hyperglycemia effectively and as soon as possible. This is even more necessary in ageing patients with DM and can be achieved by maintaining an ongoing physician-patient interaction, and by willingness to readjust DM regimens based on available data and growing new evidence.

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