Coronavirus and diabetes: an update

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In December 2019, a cluster of patients with ‘pneumonia of unknown cause’ was linked to a seafood market in Wuhan, China. On 31 December 2019 this was reported to the local World Health Organisation (WHO) Country Office. The Chinese Centre for Disease Control and Prevention (CDC) and local CDCs organised an intensive outbreak investigation programme. The aetiology of this illness was attributed to a novel virus belonging to the coronavirus family, COVID-19, which is the acronym of ‘coronavirus disease 2019’.

COVID-19 is highly contagious and has quickly spread globally. It has an incubation period of five days and common symptoms include a continuous dry cough and fever. The most severe manifestations of infection include Acute Respiratory Distress Syndrome (ARDS) and cytokine storm.1 The WHO estimates globally COVID-19 has a mortality rate of 3.4%. 

COVID-19 reached Britain in late January with the first case being detected in York. The UK government and Public Health England published a COVID-19 response and action plan on 3 March and the latest guidance, which is rapidly changing, can be accessed online.2 On March 11 the WHO declared the COVID-19 outbreak a pandemic. Updated morbidity and mortality data can be accessed online with most fatalities reported in ‘at risk groups’.3 According to the CDC ‘at risk groups’ includes people with diabetes. This editorial will discuss the impact of COVID-19 upon diabetes care.

Diabetes as a risk factor for COVID-19

According to early data reported by the CDC from more than 44,000 confirmed COVID-19 cases in China, death rates among patients with diabetes were 7%, compared with 0.9% for those without an underlying health condition.4 In a separate study of 32 non-survivors, from a group of 52 intensive care unit patients with COVID-19 infection, diabetes was the second most common comorbidity (22%).5 These finding were further corroborated by two additional studies: the first included 1099 patients with confirmed COVID-19, of whom 173 had severe disease with 16.2% having diabetes;6 the other study included 140 patients who were admitted to hospital with COVID-19 infection with 12% having diabetes.7

So why are patients with diabetes considered ‘high risk groups’? Human pathogenic coronaviruses bind to host target cells through angiotensin-converting enzyme 2 (ACE2), which is widely expressed by bronchial mucosal epithelial cells.8 ACE2 expression is increased in diabetic patients prescribed ACE inhibitors and angiotensin II type-1 receptor blockers (ARBs).8 ACE2 expression is also increased by ibuprofen and thiazolidinediones and leading on from this the WHO has recommended that patients suffering COVID-19 symptoms should avoid taking ibuprofen. To date there is no consensus statement or scientific evidence suggesting thiazolidinediones should be discontinued in patients with diabetes with COVID-19 symptoms. These data suggest ACE2 expression is increased in patients with diabetes treated with ACE inhibitors and ARBs, which may facilitate infection with COVID-19. However, on the contrary, there is evidence from animal studies suggesting that ACE inhibitors and ARBs are protective against serious lung damage in COVID-19 infection but this has not been replicated in human subjects.9 Therefore, due to a lack of evidence supporting harmful effects of ACE inhibitors and ARBs in the context of the pandemic COVID-19 outbreak, the Council of Hypertension of the European Society of Cardiology (ESC) released a position statement recommending ACE inhibitors and ARBs should not be discontinued in those infected with COVID-19.10

The International Diabetes Federation (IDF) cites two main reasons for patients with diabetes being ‘high risk’ for COVID-19 infection, namely, the functional immunocompromised state associated with diabetes and the favourable conditions hyperglycaemia confers towards viral replication.

Diabetes UK guidance

Diabetes UK has issued specific advice on COVID-19 for patients with diabetes, which can be accessed online.11 In summary this includes: following government and NHS advice; implementing sick day rules; maintaining adequate hydration and frequent snacking on carbohydrate-enriched foods; increased frequency of capillary blood glucose monitoring every 4 hours, including nocturnally, in patients with type 1 diabetes mellitus; telephone liaison with health care professionals if hyper- or hypoglycaemia is detected; and seeking medical advice if vomiting or unable to keep fluids down. It also provides advice on attending routine appointments, employment and socialising, travel and holidays, and practical tips for carers who support patients with diabetes.

The UK government action plan says that if transmission of the virus becomes established in the UK population, the nature and scale of the response will change. This means that treatment and the requirement for medicines and other clinical countermeasures might start to increase, with the need to draw down on existing stockpiles of the most important medicines, medical devices and clinical consumables.

NHS England has provided a specialty Briefing Guide – see https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/specialty-guide-diabetes-19-march-v2.pdf.

American Diabetes Association position

Similar to Diabetes UK, the American Diabetes Association (ADA) has published practical advice and common tips on COVID-19 infection in patients with diabetes, which can be accessed online.12 The ADA suggests that patients with diabetes are not more likely...
to contract COVID-19 than the general population but those with sub-optimally controlled diabetes are at higher risk of morbidity and mortality from infection. These risks are similar for patients with type 1 or type 2 diabetes. The ADA also confirms that COVID-19 is not impacting upon manufacturing or distribution capabilities for insulin and other supplies but does suggest that if a state of emergency is declared patients should obtain extra refills on prescriptions including having enough insulin for the week ahead.

**Conclusion**

In summary, the evidence on COVID-19 infection in patients with diabetes continues to evolve. It is a public health emergency and as further epidemiological data arise guidelines will change. At the moment three key strategies are being followed: vaccination, which is at least 12–18 months away; estimating that enough people will develop herd immunity through infection; and permanently changing our behaviour and society. It really is a case of watch this space.

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**Declaration of interests**

There are no conflicts of interest declared.

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