COVID-19 and diabetes: Knowledge in progress -Akhtar Hussain -Faculty of Health Sciences, Nord University, Norway

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Abstract

We aimed to briefly review the general characteristics of the novel coronavirus(SARS-CoV-2) and provide a better understanding of the coronavirus disease (COVID-19)in people with diabetes, and its management.Methods:We searched for articles in PubMed and Google Scholar databases till 02 April2020, with the following keywords: ''SARS-CoV-2'', ''COVID-19'', ''infection'', ''pathogenesis'',''incubation period'', ''transmission'', ''clinical features'', ''diagnosis'', ''treatment'',''diabetes'', with interposition of the Boolean operator ''AND''.Results:The clinical spectrum of COVID-19 is heterogeneous, ranging from mild flu-likesymptoms to acute respiratory distress syndrome, multiple organ failure and death. Olderage, diabetes and other comorbidities are reported as significant predictors of morbidityand mortality. Chronic inflammation, increased coagulation activity, immune responseimpairment, and potential direct pancreatic damage by SARS-CoV-2 might be among theunderlying mechanisms of the association between diabetes and COVID-19. No conclusiveevidence exists to support the discontinuation of angiotensin-converting enzyme inhibi-tors (ACEI), angiotensin receptor blockers or thiazolidinediones because of COVID-19 inpeople with diabetes. Caution should be taken to potential hypoglycemic events with theuse of chloroquine in these subjects. Patient tailored therapeutic strategies, rigorous glu-cose monitoring and careful consideration of drug interactions might reduce adverse out-comes. We conducted a scoping review to provide a brief summaryof the general characteristics of COVID-19, as well as a moredetailed description and critical assessment of the associa-tion between this new infectious disease and diabetes. Wehope this review can provide meaningful information forfurture research and ultimately contribute to better clinicalmanagement of patients with COVID-19 and diabetes.

Most initial COVID-19 patients had a direct contact historywith a local Chinese seafood and wildlife market, suggestinga common-source zoonotic exposure as the main mode oftransmission[10]. Findings from virus genome sequencinganalysis have pointed out that SARS-CoV-2 and bat coron-avirus (bat CoV) might share the same ancestor, although batsare not for sale in this seafood market[11]. Later cases werereported among health care workers and others withoutexposure history of wildlife or visiting Wuhan, which indi-cated human-to-human transmission[10]. Currently, it isconsidered that the virus can be mainly transmitted throughdroplets, direct contact and aerosols. Droplets transmissionmay occur when respiratory droplets, produced when aninfected person coughs or sneezes, are ingested or inhaledby individuals nearby (within about 6 feet). A subject can alsoget infected by touching a surface or object contaminatedwith the virus and subsequently touching his/her mouth,nose, or eyes[12]. Additionally, it has been shown experimen-tally that the virus can remain viable in aerosols for at least3h[13], and can be

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transmitted in closed environments ifinhaled into the lungs[12]. Therefore, airborne transmissionis a possibility during aerosol generating procedures, e.g.,endotracheal intubation, bronchoscopy, non-invasivepositive-pressure ventilation, tracheostomy, cardiopul-monary resuscitation, etc[14]. Although viable virus has beenidentified in fecal swabs, the fecal-oral route does not appearto be a driver of COVID-19 transmission. The diagnosis of COVID-19 cannot be made without microbi-ologic analysis. Patients who meet the criteria discussedbelow should undergo testing for SARS-CoV-2, in addition totesting for other respiratory pathogens (e.g., influenza, respi-ratory syncytial virus, etc). Since testing for COVID-19 in sus-pected cases is limited owing to inadequate capacity, localhealth authorities may introduce specific criteria for prioritycases[23]. Although many laboratory tests have been devel-oped, real-time fluorescence (RT-PCR) has been the currentstandard diagnostic method for diagnosis of COVID-19, bydetecting the positive nucleic acid of SARS-CoV-2 in sputum,throat swabs, and secretions of the lower respiratory tractsamples

Although the pathophysiological mechanisms are still notunderstood, it has been observed that most severe and fatalcases with COVID-19 have occurred in the elderly or inpatients with underlying comorbidities, particularly CVDs,diabetes mellitus, chronic lung and renal disease, hyperten-sion, and cancer[7,20,26,27].One Chinese meta-analysis including 1527 patientsshowed that the most prevalent cardiovascular metaboliccomorbidities with COVID-19 were hypertension (17.1%, 95%CI 9.9–24.4%) and cardio-cerebrovascular disease (16.4%, 95%CI 6.6–26.1%), followed by diabetes (9.7%, 95% CI 6.9–12.5%).In this report, patients with diabetes or hypertension had a2-fold increase in risk of severe disease or requiring intensivecare unit (ICU) admission, while those with cardio-cerebrovascular disease had a 3-fold increase[28]. In a sub-set of 355 patients with COVID-19 in Italy who died, the meannumber of pre-existing underlying conditions was 2.7, andonly 3 subjects did not have any comorbidity

Conclusions:Suggestions are made on the possible pathophysiological mechanisms of therelationship between diabetes and COVID-19, and its management. No definite conclusionscan be made based on current limited evidence. Further research regarding this relation-ship and its clinical management is warranted.

COVID-19 has rapidly spread since its initial identification inWuhan and has shown a broad spectrum of severity. Earlyisolation, early diagnosis, and early management might col-lectively contribute to a better control of the disease and out-come. Diabetes and other comorbidities are significantpredictors of morbidity and mortality in patients withCOVID-19. Future research is urgently needed to provide abetter understanding regarding potential differences ingenetic predispositions across populations, underlying patho-physiological mechanisms of the association between COVID-19 and diabetes, and its clinical management.

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