Clinical characteristics, hospitalisation and mortality rates of COVID-19 among patients with coeliac disease in the USA: a multicentre network study

We read with interest the work by Belli et al regarding outcomes of COVID-19 in liver transplant candidates. The authors concluded that liver transplant candidates were at risk of early death, especially those with uncompensated cirrhosis and model for end-stage liver disease score ≥15.

Similarly, patients with coeliac disease (CD) are a population of interest in regards to clinical outcomes after a diagnosis of COVID-19. Although the evidence of an impact of other chronic disorders on the outcome of COVID-19 is emerging, the consequences of COVID-19 infection in individuals with CD remain uncertain. We sought to define the rates of hospitalisation, mortality, thrombosis or intensive care unit (ICU) requirement in individuals with CD and COVID-19.

We used a large healthcare research network (TriNetX) to compile the electronic medical records of adult patients (age ≥18 years) with CD and confirmed COVID-19 infection (CD cohort) from 51 healthcare organisations in the USA, between 1 January 2020 and 7 July 2021. Within this same time period, we also identified COVID-19 positive patients with no history of CD (non-CD cohort). The definition of CD required an International Classification of Disease, 10th Revision (ICD-10) diagnostic code and additional codes related to CD diagnosis such as villous atrophy present on biopsy of small intestine and positive autoantibody screening for CD. For both cohorts, we studied the risk of hospitalisation (defined as a composite outcome of inpatient or critical care services), mortality, thrombosis (defined as a composite outcome of deep vein thrombosis, acute pulmonary embolism, stroke or myocardial infarction) and ICU requirement (requiring mechanical ventilation or extracorporeal membrane oxygenation) within 90 days of COVID-19 diagnosis. We performed 1:1 propensity score matching (PSM) using a greedy nearest-neighbour matching algorithm to account for potential confounding variables (online supplemental file 1).

For each outcome, we estimated ORs and 95% CI to compare the risk of hospitalisation, mortality, thrombosis and ICU requirement between the CD cohort and the non-CD cohort. We identified a total of 810,972 non-CD patients with COVID-19 and 599 CD patients with COVID-19. The CD and non-CD cohorts were relatively balanced after PSM (n=598 each group). Overall, there were no significant differences among any of the measured outcomes between CD and non-CD patients with COVID-19 after PSM (table 1). Before PSM, 18.20% of patients in the CD cohort were hospitalised compared with 11.34% in the non-CD cohort (OR 1.74; 95% CI 1.41 to 2.14; p<0.0001). However, after PSM, this association became insignificant (OR 0.96; 95% CI 0.71 to 1.11; p=0.0906). Similarly, 5.34% of patients in the CD cohort developed thrombosis compared with 2.06% in the non-CD cohort before matching (OR 2.69; 95% CI 1.88 to 3.83; p<0.0001). However, after PSM, this difference became insignificant (OR 0.938; 95% CI 0.57 to 1.54; p=0.800).

This is the largest study characterising CD patients with COVID-19 to date to systematically investigate outcomes of CD patients with COVID-19. Our findings are consistent with a recent population-based study from Sweden, similarly demonstrating no significant increase in risk of hospitalisation, severe COVID-19 or increase in mortality between CD and non-CD patients afflicted with COVID-19. One limitation of our study is that the diagnosis of CD is based on a diagnostic ICD-10 code but likely mitigated by the requirement of additional codes related to CD. In conclusion, we found that CD patients infected with COVID-19 do not carry a significantly higher risk of hospitalisation, mortality, thrombosis or ICU care requirement compared with COVID-19 patients without CD following propensity score matching. Although reassuring, this study is all about outcomes in individuals with diagnosed CD and the potential impact of COVID-19 in patients with undiagnosed CD remains unknown.

Emad Mansoor,1 Muhammed Mustafa Ali Khan,2* Jaime Abraham Perez,2 Kayla Schlick,2 Mohannad Abou Saleh,4 Alberto Rubio-Tapia4

1Department of Medicine; Digestive Health Institute, University Hospitals of Cleveland, Cleveland, Ohio, USA
2Department of Medicine, University Hospitals of Cleveland, Cleveland, Ohio, USA
3Center for Clinical Research, Case Western Reserve University, Cleveland, Ohio, USA
4Department of Medicine; Division of Gastroenterology, Hepatology, and Nutrition, Cleveland Clinic, Cleveland, Ohio, USA

Correspondence to Dr Alberto Rubio-Tapia, Cleveland Clinic, Cleveland, Ohio, USA; rubiosal@yahoo.com

Twitter Muhammed Mustafa Ali Khan @MMAlihanMD


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Table 1 Differences in outcomes between non-coeliac disease (non-CD) patients with COVID-19 and coeliac disease (CD) patients with COVID-19 after having performed analysis with stricter criteria for CD case

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Before matching</th>
<th>After matching</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CD (n=599), n (%)</td>
<td>Non-CD (n=101972), n (%)</td>
</tr>
<tr>
<td>Mortality</td>
<td>13 (2.17)</td>
<td>16 (0.99)</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>109 (18.19)</td>
<td>91 (18.19)</td>
</tr>
<tr>
<td>Thrombosis</td>
<td>32 (5.44)</td>
<td>16 (0.69)</td>
</tr>
<tr>
<td>Intensive care unit requirement</td>
<td>15 (2.50)</td>
<td>10 (0.83)</td>
</tr>
</tbody>
</table>

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ORCID iD
Muhammed Mustafa Alikhan http://orcid.org/0000-0002-1570-6474

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