The SARS-CoV-2 Pandemic Is Associated With Increased Severity Of Presentation Of Childhood Onset Type 1 Diabetes Mellitus: A Multicentre Study Of The First COVID-19 Wave

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INTRODUCTION

Children are usually mildly affected by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2, COVID-19). However, the pandemic has caused collateral damage to those with non-COVID-19 diseases. Reports show an unusually high proportion of children and young people presenting in diabetic ketoacidosis (DKA) during the pandemic.1,4

AIM

We aimed to determine the impact of the COVID-19 pandemic on the presentation of newly diagnosed childhood onset type 1 diabetes.

METHODS

• Cross-sectional study over a one-year period.
• We compared the severity of presentation of new-onset type 1 diabetes in children under the age of 18 presenting to the multi-centre North Central London diabetes network before (1st July 2019 to 30th June 2020) and during the first wave of the COVID-19 pandemic in the United Kingdom.
• We compared demographic data and the severity of DKA as measured by:
  - The degree of acidosis (pH)
  - DKA admissions requiring paediatric intensive care unit admission
  - Electrolyte imbalance
  - Presenting glycaated haemoglobin (HbA1c)
• Statistical analyses: Fisher’s exact tests (two-sided); independent sample t-tests; SPSS v27.0.1

RESULTS

A total of 30 children presented with new-onset type 1 diabetes during the pre-pandemic period and 17 presented during the first COVID-19 wave.

• Presenting mean pH was lower and first HbA1c measurement was higher in those presenting during the first COVID-19 wave (Table 1).
• There was no significant increase in paediatric intensive care unit admissions for DKA during the first COVID-19 wave compared to pre-pandemic (Table 1).

CONCLUSIONS

The COVID-19 pandemic is associated with increased severity of presentation of childhood onset type 1 diabetes.

• This was evidenced by a lower pH at diagnosis, a higher presenting HbA1c, and a greater risk of developing DKA and severe DKA.
• This may be indirectly due to delayed presentation or directly due to the emerging complex relationship between SARS-CoV-2 infection and glucose metabolism or diabetes pathogenesis.3,5
• Whatever the context, young people with suspected new-onset type 1 diabetes should be referred for urgent clinical review.

REFERENCES


ACKNOWLEDGEMENTS

We acknowledge the commitment and participation of the North Central London clinical paediatric diabetes teams for contributing data to this study, particularly: Ms Usha Parkash (Children and Young People’s South East Coast & London Diabetes Network Manager), Ms Sam Abdott (University College London Hospitals), Ms Marina Berlina-Castelli, Dr Yuva Miyo, Ms Megan Beaton (Whittington Hospital), Dr Veronika Dubnik, Ms Sue Hampstead (Royal Free Hospital), Ms Frances Clinch (Barnet and Chase Farm Hospitals).

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Children presented more frequently in DKA and more frequently in severe DKA during the first COVID-19 wave compared with the pre-pandemic period.

• During the first COVID-19 wave, DKA presentations in children with a family history of type 1 diabetes were less frequent compared to those without a family history (33.3% vs 100.0%; p<0.006).
• Pre-pandemic, children presenting in severe DKA had a lower mean age at presentation compared to those not in severe DKA (3.9 years vs 12.2 years; p<0.001). However, during the first COVID-19 wave, this difference was no longer significant (10.1 years vs 11.2 years; p=0.568).
• The likelihood of presenting in DKA was not significantly influenced by weight-for-age nor time from symptom onset to first presentation.
• Serum electrolyte concentrations (potassium, sodium, calcium, phosphate) did not differ significantly between the groups.
• COVID-19 PCR status did not significantly influence mean pH or likelihood of presenting in DKA.

Table 1: Characteristics of all patients with newly diagnosed type 1 diabetes mellitus over a one-month period

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>First COVID-19 wave</th>
<th>Pre-pandemic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>11.4 (range 2.2–14.6)</td>
<td>10.4 (range 5.6–13.0)</td>
<td>0.13</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>21 (70)</td>
<td>15 (50)</td>
<td>0.79</td>
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<tr>
<td>Family history positive</td>
<td>7 (23)</td>
<td>4 (13)</td>
<td>0.57</td>
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<tr>
<td>mild or moderate DKA</td>
<td>28 (90)</td>
<td>26 (87)</td>
<td>0.21</td>
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<tr>
<td>Severe DKA</td>
<td>2 (6.7)</td>
<td>2 (6.7)</td>
<td>1.00</td>
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<tr>
<td>Electrolyte imbalance</td>
<td></td>
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<tr>
<td>Sodium (mmol/L)</td>
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<td>Calcium (mmol/L)</td>
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<td>Phosphate (mmol/L)</td>
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