Leveraging Clinical Research Networks to Identify Patients with Primary Hyperoxaluria for Clinical Trials

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Background

- Challenges to performing clinical trials include identifying and recruiting eligible participants
  - These challenges increase for rare diseases
- Primary hyperoxaluria (PH) is a genetic disorder of liver oxalate overproduction that affects up to 1 in 40,000 persons.

Study objective: To leverage data from a clinical research network (CRN) to identify one of the largest cohorts of children with PH for future clinical trials

Methods

- PEDSnet is a pediatric CRN focused on improving health outcomes in children
  - Comprised of 8 U.S. health systems
  - Engages clinicians, researchers, and other stakeholders to conduct research
  - Enabled assembly of longitudinal database for >6 million children across 23 states
  - Harmonization of participating institutions’ EHR systems
  - Transforming source institutional EHR data into the Observational Medical Outcomes Partnership and PCORnet common data model (CDM)
  - Organizes data into a standard structure, which facilitates centralized queries
  - Provides a path back to the full patient record, enabling contact for prospective studies

- Developed and executed an algorithm to identify children <18 years presumed to have PH (Jan 2009 - Jan 2021)
  - From 7 PEDSnet institutions
  - Used diagnostic codes for either:
    1) PH (regardless of type)
    2) Hyperoxaluria
    3) Oxalate nephropathy
    4) Oxalosis
    5) ≥2 codes for a disorder of carbohydrate metabolism AND ≥1 code for kidney stones

- Characterized the cohort to determine feasibility of clinical trial recruitment

Results

- 341 patients identified with likely PH
  311 patients
  5) ≥2 codes for a disorder of carbohydrate metabolism AND ≥1 code for kidney stones

30 patients

1) PH (Type 1, 2, 3)
2) Hyperoxaluria
3) Oxalate nephropathy
4) Oxalosis

Demographic

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>IQR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs) at first PH-related diagnostic code</td>
<td>9.0</td>
<td>5.0</td>
<td>9.4</td>
<td>5.0-13.0</td>
</tr>
<tr>
<td>Follow-up (yrs) from first PH-related diagnostic code to most recent PEDSnet encounter</td>
<td>3.8</td>
<td>3.3</td>
<td>2.8</td>
<td>1.0-5.9</td>
</tr>
<tr>
<td>Days since most recent encounter</td>
<td>669</td>
<td>905</td>
<td>212</td>
<td>40-972</td>
</tr>
</tbody>
</table>

- 176 patients had been seen in the last year by a PEDSnet provider with clinical information
  - 68% had kidney stone diagnosis
  - 26% had surgery for kidney stone (PCNL, URS, or SWL)

Conclusions

- We demonstrate the utility of PEDSnet to establish a large PH cohort for meaningful research and discovery
  - Over half of patients had recent encounters in 6 health systems
    - Could indicate their accessibility for recruitment
  - This model could improve the efficiency, effectiveness, and cost of conducting clinical trials for rare urologic diseases

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