Epidemiology and clinical features of calicivirus gastroenteritis in Catalonia in pediatric and adult population

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Subdirectorate of Surveillance and Response to Emergencies in Public Health.
Agency of Public Health of Catalonia
The Caliciviridae family (RNA viruses): Norovirus and Sapovirus both cause acute gastroenteritis (AG) in humans.

<table>
<thead>
<tr>
<th>Calicivirus</th>
<th>Incidence</th>
<th>Transmission</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norovirus</td>
<td>1st AG outbreaks</td>
<td>person-to-person</td>
<td>mild - moderate (50% vomiting) 12-60 h More severe in elderly</td>
</tr>
<tr>
<td></td>
<td>1st sporadic AGE in adults</td>
<td>Food and water fomites</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd in children</td>
<td>aerosol</td>
<td></td>
</tr>
<tr>
<td>Sapovirus</td>
<td>AG in children</td>
<td>person-to-person</td>
<td>mild - moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>food and water fomites</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>aerosol</td>
<td></td>
</tr>
</tbody>
</table>
Objective

*FIS Project PS09/02516 – AGAUR 2009/SGR42*

Calicivirus acute gastroenteritis outbreaks in Catalonia

• To analyze clinical differences by
  • age group
  • agent involved

• to provide useful evidence for the detection and investigation of AG outbreaks.
Methods

• Outbreaks reported to the Catalonia Public Health Agency.

• 2010-2011, Catalonia, 7 500 000 p.

• Outbreak: ≥2 cases of AG epidemiologically linked by time and place.

• Number of cases, the relationship, the transmission route.

• Faecal samples:

  PCR for Norovirus and Sapovirus
  other virus, bacterial and parasites
Cases

• **Confirmed cases:**
  \[ \geq 2 \text{ loose stools and/or } \geq 2 \text{ episodes of vomiting within 24 h} \]
  PCR +

• **Confirmed and probable cases:**
  Sociodemographic data
  Type and duration of symptoms
  Healthcare assistance

• **Standardized questionnaire, staff of epidemiologist units**
Results

101 outbreaks:

- 2 Sapovirus (29 cases)
- 99 Norovirus (2727 cases)

No other virus detected
2 Sapovirus outbreaks

2 in child care centre

Person-to-person and/or fomites

Genogroup I
99 Norovirus outbreaks

50 food-borne (45.6% catering)
5 water-borne
44 person-to-person and/or fomites

12 cases were hospitalized, 8 >65y
371 cases (13.5%) nosocomial
2 deaths

Genogroup II 77%, GI 5%, GII+GI 4%
2365 cases

- 2727 cases
- Clinical information for 86%: 2365 cases included
- 60% females

**Distribution of cases by age**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>N. Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5y</td>
<td></td>
</tr>
<tr>
<td>5-14y</td>
<td></td>
</tr>
<tr>
<td>15-64y</td>
<td>900</td>
</tr>
<tr>
<td>65-74y</td>
<td>300</td>
</tr>
<tr>
<td>≥75y</td>
<td>200</td>
</tr>
</tbody>
</table>
Distribution (%) of symptoms

- Diarrhea: 63%
- Vomiting: 50%
- Fever: 19%
- Abdominal pain: 45%
- Nausea: 36%
- Headache: 11%
- Myalgia: 8%
- Chills: 4%
Distribution (\%) of cases by symptoms and age

<table>
<thead>
<tr>
<th></th>
<th>&lt;5y</th>
<th>5-14y</th>
<th>15-64y</th>
<th>≥ 65y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhea</td>
<td>73,6</td>
<td>47,2</td>
<td>71,0</td>
<td>58,1</td>
</tr>
<tr>
<td>Vomiting</td>
<td>62,7</td>
<td>76,6</td>
<td>57,1</td>
<td>34,7</td>
</tr>
<tr>
<td>Fever</td>
<td>40,0</td>
<td>79,4</td>
<td>64,8</td>
<td>18,6</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>30,9</td>
<td>22,0</td>
<td>27,0</td>
<td>9,7</td>
</tr>
</tbody>
</table>
Distribution (%) of cases by symptoms and age

- <5y: Only diarrhea
- 5-14y: Only diarrhea
- 15-64y: Only diarrhea
- 65-74y: Only diarrhea
- ≥ 75y: Only diarrhea

- <5y: Only vomiting
- 5-14y: Only vomiting
- 15-64y: Only vomiting
- 65-74y: Only vomiting
- ≥ 75y: Only vomiting
Clinical differences between cases aged <15 and ≥15 years old

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>&lt; 15 y</th>
<th>≥ 15 y</th>
<th>OR (95% IC)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=392</td>
<td>N=1973</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhea</td>
<td>214</td>
<td>1264</td>
<td>0.67 (0.54-0.84)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Vomiting</td>
<td>285</td>
<td>888</td>
<td>3.25 (2.56-4.13)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Fever</td>
<td>96</td>
<td>348</td>
<td>1.51 (1.17-1.96)</td>
<td>0.002</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>268</td>
<td>785</td>
<td>3.27 (2.6-4.12)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Nausea</td>
<td>173</td>
<td>685</td>
<td>1.49 (1.19-1.85)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Headache</td>
<td>45</td>
<td>223</td>
<td>1.02 (0.72-1.43)</td>
<td>0.920</td>
</tr>
<tr>
<td>Myalgia</td>
<td>20</td>
<td>161</td>
<td>0.61 (0.38-0.98)</td>
<td>0.038</td>
</tr>
<tr>
<td>Chills</td>
<td>5</td>
<td>90</td>
<td>0.27 (0.11-0.67)</td>
<td>0.003</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>3</td>
<td>8</td>
<td>1.68 (0.42-6.24)</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>
### Distribution of symptoms (medians) by age

<table>
<thead>
<tr>
<th></th>
<th>&lt; 5y</th>
<th>5-14y</th>
<th>15-64y</th>
<th>65-74y</th>
<th>≥75y</th>
<th>Total</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. diarrheal stools/day</td>
<td>2</td>
<td>2 (^a,b)</td>
<td>4 (^a)</td>
<td>4 (^b)</td>
<td>3</td>
<td>4</td>
<td>0.002</td>
</tr>
<tr>
<td>N. vomiting/day</td>
<td>5 (^c,d)</td>
<td>1</td>
<td>3 (^c)</td>
<td>4</td>
<td>2 (^d)</td>
<td>2</td>
<td>0.001</td>
</tr>
<tr>
<td>Fever (°C)</td>
<td>38 (^e)</td>
<td>38</td>
<td>38 (^f)</td>
<td>37.8</td>
<td>37 (^e,f)</td>
<td>38</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Days of disease duration</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0.052</td>
</tr>
</tbody>
</table>

Krustall Vallis and Dunn test for assess equality of the medians between different groups:

- \(^a\) 5-14y vs 15-64y (p 0.014)
- \(^b\) 5-14y vs 65-74y (p 0.022)
- \(^c\) <5y vs 15-64y (p 0.032)
- \(^d\) <5y vs 75y (p 0.01)
- \(^e\) ≥75y vs <5y (p 0.002)
- \(^f\) ≥75y vs 15-64y (p< 0.001)
Symptoms (%) in cases <15 years by agent

- **Diarrhea**
  - Sapovirus: 100%
  - Norovirus: 50%

- **Vomiting**
  - Sapovirus: 10%
  - Norovirus: 80%

- **Fever**
  - Sapovirus: 10%
  - Norovirus: 20%

- **Abdominal pain**
  - Sapovirus: 60%
  - Norovirus: 60%
Clinical differences between Sapovirus and Norovirus, in cases <15 years

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Sapovirus N=26</th>
<th>Norovirus N=337</th>
<th>OR (IC 95%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhea</td>
<td>26</td>
<td>171</td>
<td>NC</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Vomiting</td>
<td>2</td>
<td>261</td>
<td>41.21 (9.52-178.33)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Fever</td>
<td>1</td>
<td>86</td>
<td>8.57 (1.14-64.17)</td>
<td>0.013</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>16</td>
<td>237</td>
<td>1.48 (0.65-3.38)</td>
<td>0.347</td>
</tr>
</tbody>
</table>
Study limitations

- Outbreaks detected may depend on severity
- After the detection the first step is to control and prevention
- Some outbreaks are easier to detect
- Validity on information
- Period of study
Conclusions

- Diarrhea was the most frequent symptom in Sapovirus outbreaks,
- In children the most frequent symptom in Norovirus was vomiting

- In children vomiting often was the only symptom.
- Children had a higher vomiting per day

- In adult patients diarrhea is most frequent.
- Vomiting, fever, nausea and abdominal pain were less frequent than in children.

- To know clinical symptoms of cases before the laboratory results may be useful for decision-making regarding:
  - therapy
  - investigation of the factors contributing to an outbreak
  - the adoption of preventive measures as rapidly as possible
Acknowledgments:

• Physicians reporting outbreaks
• Epidemiological Surveillance Units of the Public Health Agency of Catalonia
• Members of the Working Group for the Study of Outbreaks of Acute Gastroenteritis in Catalonia

Reference

Cases of acute gastroenteritis due to calicivirus in outbreaks: clinical differences by age and aetiological agent.