Endoscopic and histopathologic characteristics of Helicobacter pylori infection in a Canadian Arctic hamlet

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CANHelp (Canadian North Helicobacter pylori) Working Group
Research Context

- Aboriginal communities in Yukon and Northwest Territories express concern about health risks from *H. pylori* infection and seek research to find solutions.
- Northern Canadian health authorities seek information:
  - to improve clinical management of *H. pylori* infection given perception of frequent treatment failure.
  - to inform public health policy related to *H. pylori* infection.
- Northern communities are remote with respect to advanced medical services.
Project Goals

- Address community concerns
- Describe the *H. pylori*-associated disease burden
- Reduce health risks from *H. pylori* infection
Research Questions

To achieve project goals, the following information is needed for targeted communities:

- How widespread is the infection?
- What environmental factors are associated with it?
- What health problems result from it?
- Who requires medical care related to it?
- What are the best ways to treat it?
- How can it be assessed in remote communities?
- How can communities be protected from it?
- How can communities understand the obstacles to finding and implementing effective solutions?
- How can communities recognize benefits from research on community health problems that may be difficult to solve?
CANHelp (Canadian North *Helicobacter pylori*) Working Group

**Community Organizations**
- Aklavik Health Committee
- Billie Archie, Arctic Health Research Network, Aklavik Chapter
- Crystal Lennie, Inuvialuit Regional Corporation

**NWT Agencies**
- Rachel Munday, Nurse in Charge, Aklavik Health Center
- Leah Seaman, Public Health Physician, Beaufort-Delta Regional Health Authority
- Andre Corriveau, Former Chief Medical Officer, NWT Health and Social Services
- John Morse, Former Medical Director, Stanton Territorial Health Authority
- Susan Chatwood, Director, NWT Arctic Health Research Network

**Alberta Health Services**
- Robert Bailey, Director, Northern Health Services Network

**University of Alberta**
- Principal Investigator, Epidemiology: Karen Goodman
- Gastroenterology: Sander van Zanten, Justin Cheung, Amy Morse, Richard Fedorak
- Microbiology: Monika Keelan, Joanne-Simala Grant
- Pathology: Safwat Girgis
- Anthropology: Christopher Fletcher
- Health Policy: Carl Phillips
Investigate *H. pylori* infection in Aklavik

- Screen residents for *H. pylori* infection, family history, symptoms
- Collect epidemiologic data on risk factors for *H. pylori* infection
- Offer upper endoscopy to:
  - Estimate the prevalence of endoscopically significant abnormalities
  - Obtain biopsies to:
    - Estimate the prevalence of bacterial resistance to antibiotics and bacterial virulence factors
    - Characterize histopathology in relation to *H. pylori* infection
- Evaluate the effectiveness of anti-*H. pylori* therapies
- Follow those treated long-term to identify factors associated with treatment failure and reinfection
Study Community: Aklavik, NWT

- 2004 population: 631
  - 90% Inuvialuit (Inuit) or Gwich’in Dene (First Nation)
- Access
  - Reached only by air or by winter ice-road from Inuvik
Aklavik Health Centre
Overview:
Aklavik *H. pylori* Project
Aklavik H. pylori Project
Endoscopy
Aklavik H. pylori Project

Endoscopy

• Enrollment

  • A Study Planning Committee based in Aklavik guided researchers
  • Decided everyone in the community who was age-eligible should have the opportunity to be scoped
  • Age minimum, 10, was determined by the planning committee and NWT health authorities
  • Aklavik residents >=15 were targeted and younger children were allowed to enrol at parents’ request
  • Separate informed consents were completed for this component of the project, as well as child assents to accompany parental consents for children <17 years
Aklavik *H. pylori* Project

**Endoscopy**

- **Endoscopies**
  - Performed in February 2008 by visiting gastroenterologists
  - Equipment transported temporarily to the Aklavik Health Center
  - Transnasal ultrathin gastrosopes used for the procedure, majority done without sedation
  - 5 gastric biopsies obtained from each participant (2 antrum, 2 corpus & 1 incisura) for histopathology
• Biopsies

• 4-6 per patient, 93% had >=5
• Size ranged from 2mm-4.5mm, mean 2.9mm
• Pathologist judged nearly all of optimal quality (each participant had multiple biopsies of optimal quality)
• Processed with H&E and Giemsa stains
• Evaluated microscopically by a single pathologist using the updated Sydney system
Biopsies were obtained from 194 individuals (42% male)

Participants were primarily Inuvialuit (Inuit) or Gwich’in Dene (Athabascan First Nations)

Participants were aged 10-80

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
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<tbody>
<tr>
<td>Gwich'in</td>
<td>53</td>
</tr>
<tr>
<td>Inuvialuit</td>
<td>114</td>
</tr>
<tr>
<td>Other Aboriginal</td>
<td>8</td>
</tr>
<tr>
<td>Non-Aboriginal</td>
<td>18</td>
</tr>
<tr>
<td>Missing</td>
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<table>
<thead>
<tr>
<th>Age (years)</th>
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<tbody>
<tr>
<td>10-17</td>
<td>19</td>
</tr>
<tr>
<td>18-29</td>
<td>42</td>
</tr>
<tr>
<td>30-49</td>
<td>75</td>
</tr>
<tr>
<td>50-69</td>
<td>47</td>
</tr>
<tr>
<td>70-80</td>
<td>11</td>
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</table>
Aklavik *H. pylori* Project

**Endoscopic Abnormalities**

- Of 194 scoped persons, percent with:
  - Apparent inflammation
    - Gastritis 13.8%
    - Duodenitis 6.7%
  - Erosions
    - Gastric 6.2%
    - Duodenal 0.5%
  - Ulcers
    - Gastric 3.1%
    - Duodenal 0
  - Cancers 0
  - *Esophagitis* 10.4%
  - *Barrett’s Esophagus* 2.6%
Aklavik *H. pylori* Project
Histopathology
**Prevalence of *H. pylori***

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>H.pylori+ % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inuvialuit</td>
<td>114</td>
<td>70 (61-78)</td>
</tr>
<tr>
<td>Gwich’in</td>
<td>53</td>
<td>70 (56-82)</td>
</tr>
<tr>
<td>Non-aboriginal</td>
<td>18</td>
<td>22 (6-48)</td>
</tr>
<tr>
<td>All participants</td>
<td>194</td>
<td>67 (59-73)</td>
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</tbody>
</table>
Aklavik H. pylori Project
Histopathology

- Prevalence of selected histopathology classifications

<table>
<thead>
<tr>
<th></th>
<th>All H. pylori+</th>
<th>All participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>129</td>
</tr>
<tr>
<td><strong>Inflammation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild (%)</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Moderate (%)</td>
<td>47</td>
<td>31</td>
</tr>
<tr>
<td>Severe (%)</td>
<td>43</td>
<td>29</td>
</tr>
<tr>
<td>Atrophy (%)</td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td>Intestinal Metaplasia (%)</td>
<td>11</td>
<td>8</td>
</tr>
</tbody>
</table>
Aklavik *H. pylori* Project

**Histopathology**

- Prevalence of selected histopathology classifications grouped by ethnicity

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Severe Inflammation % (95% CI)</th>
<th>Atrophy % (95% CI)</th>
<th>Intestinal Metaplasia % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aboriginal total</td>
<td>176</td>
<td>31 (24-38)</td>
<td>14 (9-20)</td>
<td>9 (5-14)</td>
</tr>
<tr>
<td>H. pylori +</td>
<td>125</td>
<td>43 (34-52)</td>
<td>20 (13-28)</td>
<td>10 (6-17)</td>
</tr>
<tr>
<td>Non-aboriginal total</td>
<td>18</td>
<td>11 (1-35)</td>
<td>11 (1-35)</td>
<td>6 (0-27)</td>
</tr>
</tbody>
</table>
Aboriginal residents of Aklavik, NWT have a high prevalence of *H. pylori* infection with elevated frequencies of:

- Erosions and ulcers of the gastric corpus relative to the duodenum
- Severe gastric inflammation
- Gastric atrophy
- Intestinal metaplasia
Aklavik *H. pylori* Project

Conclusions

- Endoscopic and histopathologic evaluation of Aboriginal residents of Aklavik, NWT shows a pattern consistent with an elevated risk of gastric cancer
- This assessment suggests that community worries over cancer risks from *H. pylori* infection are well-placed
- The Aklavik *H. pylori* Project will develop knowledge exchange strategies that help community members understand *H. pylori* health risks as well as currently available solutions and unsolved challenges for reducing these health risks
- This research will expand to other northern Canadian Aboriginal communities to obtain representative data for informing regional health policy aimed at reducing health risks from *H. pylori* infection
Aklavik Project Funding Agencies

- Alberta Heritage Foundation for Medical Research
- Canadian Association for Gastroenterology with Canadian Institutes for Health Research / AstraZeneca
- Social Sciences and Humanities Research Council of Canada
- Public Health Agency of Canada
- Indian and Northern Affairs Canada
- Canadian Circumpolar Institute
Aklavik Project Supporters

Canadian North

Northwest Territories

University of Alberta

Inuvialuit Regional Corporation