Norovirus: a modern day scourge

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Outline

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- Montreal outbreak
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- Challenges for the Public Health Department
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  - Mrs Josiane Létourneau, nosocomial team coordinator, Public Health Department;
  - Drs Renée Paré et Pierre Pilon, co-authors of the provincial guidelines on epidemic gastroenteritis management in health care settings;
  - Surveillance unit staff;
- CSSS Infection prevention nurses

Objectives

- Review the microbiological and epidemiological characteristics of Norovirus that affect public health practice in the health care setting;
- Qualitative assessment of the impacts of a Norovirus epidemic in health care settings;
- Share and discuss local public health strategies for surveillance and intervention of epidemic gastro-enteritis.
Norovirus

- Also known as *Norwalk virus disease* or *Winter vomiting disease*;
- Very small (27-32 nm), ssRNA, calicivirus family;
- Most common cause of nonbacterial gastroenteritis outbreaks;
- Occurs most often in outbreaks, some sporadic cases;
- Human reservoir;
- Transmission: fecal-oral, contact. Droplet suggested;
- Infecting dose small, large quantity in stool and vomitus;
- Outbreak settings: shellfish consumption, cruise ships, child care, hospitals, military, restaurants.
- Water or food borne with secondary transmission is common presentation.

Norovirus

- Incubation 12-72 hours (mean 24 h);
- Predominant symptoms: nausea, vomiting, diarrhea, cramps, fever and headaches.
- Usually self limited but can be severe in vulnerable populations;
- Communicability: few hours before onset of symptoms to 48h after symptoms have subsided;
- General susceptibility compounded by short-term immunity (14 weeks); levels of antibody do not correlate with susceptibility to the disease;
- Unenveloped, therefore particularly stable in the environment and more resistant to disinfectants;
Epidemiology of the 2006-2007 Norovirus Outbreak in Montreal

- Definition of viral gastroenteritis:
  - Two sudden vomiting episodes within 24 hours
  - Sudden diarrhea over 24 hours
  - And
    - 2 stools above normal frequency over 24 hours;
    - Absence of other possible causes for the vomiting and diarrhea (ex: laxatives, undelying disease);
    - Fever or nausea or abdominal cramps or HA.
Definition of an Outbreak

- Suspected when there are two or more cases of gastro-enteritis with a possible epidemiological link (time, person and/or place).

Surveillance in health care facilities

- Outbreak of gastro-enteritis in a health care facility is notifiable in Quebec;
- Surveillance via passive reporting.
Outbreak data: health facilities

- Long-term care facilities:
  - 55/84 at least 1 outbreak;
  - 25/55 confirmed positive with Noro or calicivirus;
  - Total of 84 outbreaks.

- Acute care facilities and rehabilitation centres:
  - 28/33 at least 1 outbreak;
  - 24/28 confirmed positive with Noro or calicivirus;
  - 7/28 only one episode of outbreak;
  - Includes 3 psychiatric facilities, 3 rehabilitation, 1 paediatric, 1 geriatric institute.
Outbreak declarations from Public Health Departments

Données provisoires du 2007-04-03

n = 1232

Source: Laboratoire de Santé Publique du Québec

- Typical seasonal incidence;
- Biannual epidemic curves;
Norovirus in the community

- Health information telephone system;
- Passive reporting of outbreaks in schools, daycare, etc.
- Reporting of possible foodborne events;
- ER consultations and ambulance use (« Multi-risk surveillance »)

Health information telephone system

[Raisons d'appels sélectionnés à Infosanté par semaine
Région de Montréal
du 18 décembre 2006 au 26 mai 2007]
Other Outbreaks

Éclissions gastro-entérite région Montréal, période octobre 2006 à mai 2007

Multi risk surveillance

Nombre d'inscriptions à l'urgence région Montréal, octobre 2006 à mai 2007
Source de données : Siturg+
Conclusion:
We are facing a gastro enteritis epidemic

New strain?
- Calicivirus: Norovirus-like and Sapporo;
- GI - GVI
- GI: classical Norwalk virus cluster
- GII: More diverse (Gwynend, Snow Mountain, Hawaii, White River, Toronto, Lordsdale virus clusters)
- In Quebec: GII 4 most common, especially Lordsdale
- Diagnostic testing by LSPQ: EM, PCR, RT-PCR

Source: Laboratoire de Santé Publique du Québec
- Lorsdale GII – 4 is predominant from 2000 to 2007;
- Other GI and GII have also been detected;
- Different cluster of GII - 4 in 2006-2007;
- Rapid dispersion of new clusters across Quebec;
- Sudden appearance and disappearance of new clusters;
- 2006-2007 clusters similar to international clusters identified (Japan and Holland);

Source: Laboratoire de Santé Publique du Québec

Public health organization in Montreal

- Minister of Health
- Provincial Director of Public Health
- 17 other areas
- Regional Director of Public Health
- University Hospitals
- INSPQ
- LSPQ
- MONTREAL Health Agency
- Montreal Public Health Department
- Health Protection Sector
- 12 CSSS
- Long term care facilities
- Hospitals
- CLSC
Internal functioning

- ID Response team: 1 coordinator, 10 nurses, 1 field epi, 1 medical consultant and 1 physician on call;
- For outbreaks in a healthcare facility, on call physician is responsible for initial assessment and counseling the facility;
- Info is forwarded to the Surveillance unit that creates a file for the facility;
- Follow-up done by team coordinator;
- Daily Briefings to discuss the cases;
- During the course of the epidemic, added secretarial help to gather the follow-up info.

Available tools

- Provincial intervention guidelines
  - Before outbreak season: dissemination and clarification of guidelines with health care facilities;
  - 5 stool samples (bacterial and viral testing);
  - In Norovirus « season » after 4-5 positive samples only bacterial testing is recommended;
Other tools

- Communication with partners:
  - Appel à la vigilance;
  - Epidemiological bulletin;
  - Fax sheets;
- On call physician:
  - Local questionnaire based on the provincial guidelines;
  - Includes a follow-up section;
  - Special Gastro enteritis folder with to do list;
  - Intervention aid for prolonged outbreaks (> more than 7-10 days);
- Epidemiology:
  - Epi curves
  - Line listing

Leaving the evening news?

- Or did we?
- Number of interviews:
- Links with the *C. difficile* outbreak of 2004;
- Expectations of the media:
  - Daily report of number of cases and outbreaks;
  - Names of facilities involved;
  - Reporting of closing of facilities or units;
- Expectations of the Provincial Minister of Health
PHD Challenges and opportunities

- Media:
  - Did our communication strategy contribute to the fire?
  - Public information;
- Strategic perspective
  - How far should we go given dealing with a generally self limited disease (cost benefit)?
  - Cost efficacy of interventions when the disease is widely spreading in the community?
  - Regional consequences of closing a unit or a facility of acute care? (Risk vs Benefit)
- Internal management
  - How to ensure a coordinated response when the physician on call changes every week / varying different levels of expertise?
  - Procedure with on call physician is time consuming and inefficient when 20+ outbreaks are reported in a single week

PHD Challenges and opportunities

- Relationship with CSSS and partners:
  - Being aware and informed of the situation;
  - Excellent results with diagnostic testing;
  - Should the PHD or the facility decide to temporarily stop admissions to a facility because of a Norovirus outbreak?
  - Facilities closed to visitors against PH recommendations?
  - Questions that are not in the guidelines? Christmas parties, religious ceremonies…
  - How to support infectious disease prevention nurses in being creative and autonomous about implementing the recommended guidelines?
  - Acting as “negotiator” between short-term and long-term care facilities
Health care and infection control historical context

- **Health care facilities:**
  - Built >20 years ago. Some are >80 years old
- **Infection control nurses**
  - Recent implementation in long-term care facilities
    - Most of the infection control nurses have less than a year of experience.
  - Quebec’s Norovirus intervention protocol was published in 2005
Quebec’s Norovirus intervention protocol

Definitions
- Outbreak and end of an outbreak

Guidelines
- Hand washing
- Cleaning and disinfection
- Workers
- Patients / residents
- Visitors

Hand washing
- October - November 2006
  - Posters and flyers explaining what a good hand wash means;
  - Alternatives to plain soap and water hand wash; alcohol-based soap
Quebec’s Norovirus intervention protocol

Hand washing cont’d
- December 2006
  - Some outbreaks exceeds the expected 7-10 days;
  - PHD is concerned and realize that the alcohol-based soap used in most of the facilities is a 60% alcohol-based, when a 70% should be used.
- January 2007
  - Outbreaks are more frequent and last longer >2 weeks up to 4-5 weeks.
  - Security agents are posted near the entrance of the facilities or even the wards to control hand washing.

Quebec’s Norovirus intervention protocol

Hand washing vs disposable gloves
- November 2006
  - Outbreaks occurs due to the misuse of disposable gloves.
  - Gloves weren’t always disposed between patients.
Quebec’s Norovirus intervention protocol

Cleaning and disinfection of the environment
- Old facilities
- Particularities of the cleaning / disinfection agents
- Involves a better understanding and collaboration by the:
  - Health care workers
  - House cleaning team
  - Administration
- November-December 2006
  - Poor to fair understanding and collaboration
- January-end of outbreak season
  - Big improvements
    - Regular meetings were held between managers, infection control providers, head nurse’s, house cleaning, human resources.

Quebec’s Norovirus intervention protocol

Workers
- Isolation gowns:
  - Not done systematically by all type of health care workers.
  - Information session, surveillance / control and peer pressure contributed to improve the use of isolation gowns.

- Exclusion of symptomatic worker until 48h after last symptoms
  - Enhance staff shortage;
  - Need to pay while on sick leave to make sure they stay home the whole length of period;
  - Recurrent episodes of gastro-enteritis.
Quebec’s Norovirus intervention protocol

Workers
- Cohort of the personnel
  - Very difficult to implement in some facilities due to;
    - staff shortage
    - facility organization.
- Context of the private nursing agencies;
  - Don’t always pay sick days.
  - Same nurse can work in more than one facility.
  - Private agencies have a role to play in the prevention of nosocomial infections;
    - Arrangements were established between facilities and agencies.
    - Nurses “dedicated” to one facility.

Quebec’s Norovirus intervention protocol

Patients / residents
- Individual isolation until 48 hours after last symptom.
  - I don’t understand. What does it mean?
  - How and where will I eat? And what? And will it still be hot?
- Cohort of ill patients
- Patients with cognitive deficiencies.
- Ward closed to visitors
  - Becomes an important irritant after a few days
Quebec’s Norovirus intervention protocol

Patients / residents cont’d
- Suspension of social activities
  - Christmas and new year’s gathering
  - Sunday’s mass
  - Closed restaurant; every one eats in their rooms
  - Pet therapy
  - Hair dresser
- Suspension of transfers / admission;
  - Impact on the bed management.
  - A lot of questions for PHD.

Quebec’s Norovirus intervention protocol

Visitors
- Hand wash “police”
- Need to wear an isolation gown
  - How?
    - Do I really need to wear one? I’ll only talk, I won’t touch him.
    - Why do I need to wear one when the worker isn’t wearing one?
- Limiting visitors
  - Have I been sick? Why asking?
- Closed ward
  - When will I be able to see my relative?
  - How / who will feed him? Bathe him?
Impacts from the intervention protocol

- Physical / Psychological
  - Workers
    - Stress
    - Exhaustion
    - Verbal aggression from patients / family members / visitors
  - Patients / residents / family members
    - Incomprehension
    - Depression / despair
    - Multiple complaints
    - Mortality

Impacts from the prevention and control protocol

- Financial burden
  - Limited human resources
    - Mandatory overtime
  - Extra-personnel
    - Security agents
    - Private agencies
  - Paid sick leave
  - Protective material / disinfectant products
  - Unused beds
Prolonged or recurrent outbreaks

- Possible causes
  - Patients
  - Workers
  - Administration
  - Facility
  - Visitors

- Impacts
  - Exhaustion
  - Decreased confidence towards guidelines

- Challenges
  - Applying the guidelines adequately
  - Facilities decreeing a quarantine

Facilities decreeing a quarantine

- Closed to all new patients and to visitors
- Not recommended in the Quebec’s Norovirus intervention protocol

- Impacts:
  - PHD is questioned and blamed
  - Media gets involved
  - Great despair among residents and family members

- But, when well managed at all levels, it can rapidly help gaining control and stop the outbreak.
Conclusions

- Norovirus in Montreal was part of an International epidemic of a new cluster of GII – 4;

- The microbiological characteristics of Norovirus affect infection prevention and control;
  - Appears in outbreaks;
  - Frequent and sudden mutations, small infecting dose, fleeting immunity;
  - Stable in environment and resistant to usual disinfection products;
  - Highly communicable and population widely susceptible.

- There were important impacts of the epidemic at the local level:
  - PHD: Internal functioning and resources;
  - PHD: Relationship with partners at the local and provincial levels;
  - Health care settings: Financial, equipment, functioning, workers, patients, residents, families;
  - Media;
  - Population-based impacts difficult to assess.

Conclusions

- Importance of the longitudinal work with CSSS and long term care facilities:
  - Creation of a nosocomial infection prevention and control regional committee;
  - Enhanced training;
  - Enhanced communication;
  - Support the development of the autonomy for the Infection Control Providers;
  - Ensuring collaboration with managers of the facilities