Introduction

• C. difficile infections (CDI) disproportionately affect the elderly due to their underlying comorbidities, immune senescence, and microbiome changes.
• Elderly patients are also more likely to be infected by the NAP1/027 C. difficile strain, possibly due to frequent exposure to antibiotics and healthcare.

Objectives

• Describe the trends in CDI incidence among the elderly in Monroe County, NY.
• Illustrate the change in NAP1/027 strain type and how this may be affecting incidence.

Methods

• Since 2010, population and laboratory-based surveillance for CDI has been conducted in Monroe County, NY among residents aged ≥ 1 year as part of the Centers for Disease Control and Prevention (CDC), Emerging Infections Program.
• We are reporting on the CDI incidence in the elderly since 2011; after all the surveillance labs implemented nucleic acid amplification test for C. difficile stool diagnosis.
• An incident CDI case is a case with a positive C. difficile stool specimen greater than 8 weeks after a previous positive test.
• Cases were divided into 4 epidemiologic classifications:
  1. Community-associated (CA): stool collected in outpatient setting or within 3 days of hospitalization and no overnight stay in healthcare facility in the prior 12 weeks.
  2. Community-onset healthcare-associated (CO-HCFA): stool collected in outpatient setting and overnight stay in healthcare facility in the prior 12 weeks.
  3. Hospital onset (HO): stool collected after 3rd day of hospitalization.
  4. Nursing home onset (NHO): stool collected in nursing home or within 3 days of hospitalization.
• Isolation molecular testing was performed by the CDC lab on a random sample of stool specimens. In 2011, C. difficile strain types were identified by pulsed field gel electrophoresis (PFGE) and in 2012-2013 by capillary-based polymerase chain reaction ribotyping. Additional testing included toxinotyping and mutation analysis. Data from 2010 is included for comparison, data from 2014 is pending.
• We conducted a Poisson regression predicting overall incidence with year and age. To further describe the changes across year, four additional Poisson regressions were computed, one for each epidemiologic classification, predicting incidence using age category and year. All regression models employed Generalized Estimating Equations to ensure robust error terms and appropriate confidence intervals.

Discussion

• The incidence of CDI has decreased significantly.
  • The decrease is most notable in the nursing homes and in cases above the age of 85 years.
  • The reduction of incidence could be related to the CDI prevention efforts at the local hospitals, but this does not fully explain the significant reduction in CDI in the nursing homes. A change in the prevalence in the NAP1/027 strains could be responsible for some of this reduction, similar to observations from other countries.
• Additional data (not described above) shows that the reduction in incidence is associated with a 43% reduction in the rate of first CDI recurrence and a 33% reduction in the 30 days mortality.

Acknowledgements

Kathleen Holt, PhD and Christina Felsen, MPH

References


Table 1. Six most common CDI strain types by year and epidemiologic classification

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<tr>
<th>Strain type</th>
<th>CA 100</th>
<th>CA HCA*</th>
<th>CO-HCFA 100</th>
<th>CO-HCFA HCA*</th>
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<td>Total number of isolates</td>
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<td>103</td>
<td>68</td>
<td>58</td>
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</table>

Results

• Results show that CDI incidence is higher in the 85 and older group (p=0.05) and significantly lower in each subsequent year using 2011 as reference (fig 1).
• Regression done for each epidemiologic classification shows similar results: incidence higher in the 85 and older group, and significant decreases in 2014 compared to 2011 (fig 1): odds ratio (OR): 0.570, 95% confidence interval (CI): 0.569-0.570.
• The strongest of these models was in the NHO group (fig 2): OR=0.434, CI: 0.434-0.434 when comparing 2014 to 2011.

Figure 1. Incidence of CDI in cases aged ≥ 65 years

Figure 2. Incidence of CDI by age and epidemiologic classification