Risk Factors for Community-Associated Clostridium difficile Infection in Children

Mark Weng, Centers for Disease Control and Prevention
Susan H. Adkins, Centers for Disease Control and Prevention
Monica Farley, Emory University
Catherine C. Espinosa, Atlanta Veterans Affairs Medical Center
Claire Reisenauer, Colorado Department of Public Health and Environment
Tory Whitten, Minnesota Department of Health
Emily B. Hancock, University of New Mexico
Ghinwa Dumyati, University of Rochester
Corinne M. Davis, Tennessee Department of Health
Lucy Wilson, Maryland Department of Health and Mental Hygiene

Only first 10 authors above; see publication for full author list.

Journal Title: Open Forum Infectious Diseases
Volume: Volume 4, Number suppl_1
Publisher: Oxford University Press (OUP) | 2017-10-04, Pages S677-S678
Type of Work: Article | Final Publisher PDF
Publisher DOI: 10.1093/ofid/ofx163.1812
Permanent URL: https://pid.emory.edu/ark:/25593/s6gd9

Final published version: http://dx.doi.org/10.1093/ofid/ofx163.1812

Copyright information:
© The Author 2017. Published by Oxford University Press on behalf of Infectious Diseases Society of America. This is an Open Access work distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Accessed July 16, 2018 7:38 AM EDT
2282. Clinical and Radiologic Manifestations of Cat-Scratch Osteomyelitis in Children
Guzl Erdem, MD1; Loujain Shorbati, PharmD2; Joshua Watson, MD3; W. Garrett Hunt, MD, DTIM&H4; Cody Young, MD5; Milap Nahata, PharmD2; Cristina Tomatis Soubrieri, MD6 and Katalin Koranyi, MD5.

Departments of Pediatrics, Nationwide Children's Hospital and the Ohio State University School of Medicine, Columbus, Ohio, 1Pharmacy, OSU, Columbus, Ohio, 2Department of Pediatrics, Nationwide Children's Hospital and the Ohio State University School of Medicine, Columbus, Ohio, 3Pediatric Infectious Diseases, Nationwide Children's Hospital, Columbus, Ohio, 4OSU, Columbus, Ohio, 5Infectious Diseases, Nationwide Children's Hospital, Columbus, Ohio

Results. Nine patients with positive cat scratch serology and/or tissue PCR were identified.

Discussion.

2283. Epidemiological Profile of Children Infected with Bordetella pertussis at Varela Santiago Children's Hospital: a Retrospective Study
Igor Thaigo Queiroz, MD, PhD1; Manuela Gomés, ms2; Glyssson Rosa, RN, MD3; Filipe A. Desiree Labeaud, MD, MS, Marcelo Igors Queiroz, MD, PhD1; Manuela Gomes, ms1; Gleysson Rosa, RN, MD3; Stephan Kohlhoff, MD4; David Arnonoff, MD, FIDSA5; Jared Aronoff, MD, FIDSA5; Jessica Thais Da Silva Maia, MS5; Izuim Watanabe, MS6; Shushin Clement, HL5; Margaret Hammerschlag, MD4 and David Aronoff, MD, FIDSA5.

Departments of Pediatrics, State University of New York Downstate Medical Center, Brooklyn, New York, 1Pediatrics, State University of New York Downstate Medical Center, Brooklyn, New York, 2Pediatrics, Coney Island Hospital, Brooklyn, New York, 3Pediatrics, Brooklyn Children's Medical Center, Brooklyn, New York, 4Pediatrics, Coney Island Hospital, Brooklyn, New York, 5Pediatrics, Coney Island Hospital, Brooklyn, New York

Results. A total of 33 cases of pertussis hospitalizations were found, where 75.7% (25/33) of the patients were 6 months of age or younger (6 patients were 30 days old or younger while 19 ranged in age from 31 days to 6 months). Of these, 54.5% (14/25) were in exclusive breastfed children. Only 18.2% (6/33) of the patients had the appropriate administration of DT vaccine doses according to their age. Signs and symptoms were: cough (100%), cyanosis (63.6%), fever (48.5%) and inspiratory whoop (33.3%), Azithromycin was used as monotherapy in 90% (30/33) of the cases and the mean time of hospitalization was 9.48 days ranging from 6 to 30 days. No patient died.

Disclosures. All authors: No reported disclosures.

2284. Risk Factors for Community-Associated Clostridium difficile Infection in Adolescents
Mark Weng, MD, MSc, FAAFP1; Susan H. Adkins, MD1; Monica Farley, MD, MDSAS2; Catherine C. Espinosa, MPH1;3; Claire Reisenauer, DVM, MPH1; Tory Whitten, MPH1; Emily B. Hancock, MS5; Ghinwa Dumyati, MD, FSHAE4; Corinne M. Davis, MPH, MS1;2; Lacy Wilson, MD, ScM1;2; Zintars G. Beldavs, MD1;2; 1Department of Pediatrics, Royal Children's Hospital, Melbourne, Victoria, Australia, 2Department of pediatrics, Boston Children's Hospital, Boston, MA, 3Division of Infectious Diseases, University of Cincinnati College of Medicine, Cincinnati, OH, 4Pediatric Infectious Diseases, University of British Columbia, Vancouver, BC, Canada, 5Pediatric Infectious Diseases, University of Miami Miller School of Medicine, Miami, FL

Results. No reported disclosures.

Session: 250. Pediatric Bacterial Infections: From A to Z
Saturday, October 7, 2017: 12:30 PM

Background. Pertussis, also called whooping cough, is an acute infectious disease of high transmissibility transmitted through aerosol particles released during the catarrhal phase and paroxysmal cough. Since the 1990s its incidence has increased and atypical clinical forms have been identified, mainly in newborns and adults. We hypothesized that there is a relationship between the high incidence of pertussis infection in children up to 6 months of age and genetic changes in the circulating strains of B. pertussis (1.5% on day of birth, 7.2% at 1 month age, 18.2% at 3 months, and 21.4% at 6 months). The low rate of vaccination is unexpected, given that there has been greater access to vaccination and higher percentage of breastfeeding of the studied population. The low rate of vaccination is unexpected, given that there has been greater access to vaccination and higher percentage of breastfeeding of the studied population. The low rate of vaccination is unexpected, given that there has been greater access to vaccination and higher percentage of breastfeeding of the studied population. The low rate of vaccination is unexpected, given that there has been greater access to vaccination and higher percentage of breastfeeding of the studied population. The low rate of vaccination is unexpected, given that there has been greater access to vaccination and higher percentage of breastfeeding of the studied population.

Conclusion. We identified a high prevalence (75.7%) of B. pertussis infection in children up to 6 months of age. This is likely explained by the low vaccination rate (18.2%) and the low percentage of exclusive breastfeeding of the studied population. The low rate of vaccination is unexpected, given that there has been greater access to vaccination in recent decades in Brazil. In addition, the cases evolved with an atypical clinical presentation, since the classical signs and symptoms of pertussis were absent or had a short duration such that typical signs and symptoms were not present at the time of hospitalization. Our study does not exclude the possibility that genetic changes are occurring in the circulating strains of B. pertussis and that DT vaccine seems to less efficacy on these new strains, but future studies will be needed to specifically test this hypothesis.

Disclosures. All authors: No reported disclosures.

Natalie Bannettis, MD1; Kimberly Wisecup, DO2; Leah Byland, BA2; Izuim Watanabe, MS5; Shushin Clement, HL5; Margaret Hammerschlag, MD4 and David Aronoff, MD, FIDSA5.

Departments of Pediatrics, State University of New York Downstate Medical Center, Brooklyn, New York, 1Pediatrics, State University of New York Downstate Medical Center, Brooklyn, New York, 2Pediatrics, Coney Island Hospital, Brooklyn, New York, 3Pediatrics, Coney Island Hospital, Brooklyn, New York

Results. 297 serum samples were identified (age range 1–20 years). 18.5% (19/105) of subjects ≤10 years of age in Group 1 tested positive for anti-CT IgG, while none tested positive in Group 2. CT screening was first recommended by the CDC in 1993.

Methods. Anonymized banked sera (–80°C) and prospectively collected sera from children and adolescents in Brooklyn, NY, were tested for anti-CT IgG via a validated enzyme immunoassay. Serum samples were divided by collection years: Group 1 (1991–1995) prescreening and Group 2 (2012–2015, post-screening). Infants <1 year of age were excluded due to interference of maternal antibody. Maternal screening and CT infection rates during pregnancy were determined via a retrospective review of 200 random charts (2016–2017). Statistical analysis by Fisher’s exact test.

Conclusion. CT remains the most prevalent STI in developed and developing countries. Prenatal screening and treatment of pregnant women has resulted in a dramatic decrease of perinatal CT infection. There have been limited seroepidemiologic studies in unselected children and adolescents following the implementation of routine CT screening as first recommended by the CDC in 1993.

Disclosures. All authors: No reported disclosures.

Poster Abstracts • OFID 2017:4 (Suppl 1) • 677
of inflammatory bowel disease (IBD) were statistically significant risk factors for rCDI.

The overall rate of recurrence in our cohort was 8.5%. Race and having a diagnosis of IBD were associated risk factors. We sought to identify CA-CDI risk factors in younger children.

Methods. We enrolled children from 8 geographically diverse U.S. sites during October 2014–February 2016. Case-patients were defined as children aged 12–60 months with a positive Clostridium difficile stool specimen collected as an outpatient or within 3 days of hospitalization, who had no healthcare facility admission in the prior 12 weeks and no history of CDI. Each case-patient was matched to one randomly selected control child with no prior history of CDI by site and age group. Caretakers were interviewed about participants’ relevant exposures in the 12 weeks prior to case-patient’s illness onset date; univariate analysis was performed using exact conditional logistic regression.

Results. Of 138 children, 43.5% were female; 69.6% were 12–23 months old. A significantly higher proportion of cases than controls had: an underlying chronic medical condition (33.3% vs 11.9%; P = 0.02); a neonatal intensive care unit (NICU) stay at time of birth (26.9% vs 13.2%; P = 0.04); or recent antibiotic exposure (53.6% vs 20.6%; P = 0.0011). More cases than controls had recent higher-risk outpatient healthcare exposures (emergency department, outpatient procedure and surgical centers, hospital-based outpatient settings, or urgent care) (34.9% vs 19.1%; P = 0.06) or a household member with diarrhea (36.2% vs 20.6%; P = 0.05). No difference was found in the proportion of cases and controls who had a feeding tube (2.9% vs 0%; P = 0.50) or a recent exposure to gastric acid suppressants (6.1% vs 2.9%; P = 0.63).

Conclusion. Young children with underlying disease, NICU stay, or recent antibiotic use might be at higher risk for CA-CDI. Improving outpatient antibiotic use, particularly among children with comorbidities, might reduce CA-CDI in this population. Further investigation of other risk factors, including outpatient healthcare and household exposures, is needed.

Disclosures. All authors: No reported disclosures.

2287. Risk Factors for Recurrent Pediatric Community Associated Clostridium difficile Infection

Deepika Parmar, MD1; Rebecca Dang, MD1; Margot Miranda Katz, none1; Amy Alabaster, PhD1 and Tara Greenhow, MD1; Pediatrics, Kaiser Permanente Northern California, Oakland, Oakland, California, 2Colby College, Colby College, Bangor, Maine, 3Kaiser Permanente Division of Research, Oakland, Oakland, California, 4Pediatric Infectious Diseases, University of California, San Francisco, San Francisco, California

Session: 250. Pediatric Bacterial Infections: From A to Z
Saturday, October 7, 2017: 12:30 PM

Background. As rates of pediatric community-associated (CA) Clostridium difficile infection (CDI) increase, additional research is needed to address the paucity of data in this cohort. Studies in pediatrics suggest concurrent antibiotics, CA CDI, malignancy, recent surgery, the number of antibiotic exposures by class and taxoforms as independent risk factors for recurrent CDI (rCDI).

Methods. This study was a retrospective review of the electronic health records of all children 1–17 years with stool specimens sent for C. difficile from January 1, 2012 – December 31, 2016 at Kaiser Permanente Northern California. Children with clinical symptoms consistent with CDI, confirmatory laboratory testing, no other identified causes of diarrhea, and community associated disease were defined as cases.

Results. Of the 961 positive C. difficile cases from 2012 to 2016, 744 were community-associated. There were 558 total cases of CA CDI fitting case definition. Of these 507 were primary, 43 recurrence and 8 recurrence following recurrence. The incident rate of CDI was 17 per 100,000 children.

The overall rate of recurrence in our cohort was 8.5%. Race and having a diagnosis of inflammatory bowel disease (IBD) were statistically significant risk factors for rCDI. Compared with other races, we observed increased rates of CDI in multi-racial and “other/unknown” children. Though not statistically significant, there appeared to be a correlation between the age subset of 2–5 years of age and developing rCDI. (Table)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>N = 507 (%)</th>
<th>N = 43 (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–2</td>
<td>131 (25.8%)</td>
<td>6 (4.6%)</td>
<td>0.09</td>
</tr>
<tr>
<td>2–5</td>
<td>131 (25.8%)</td>
<td>22 (16.8%)</td>
<td></td>
</tr>
<tr>
<td>6–11</td>
<td>87 (17.2%)</td>
<td>6 (9.6%)</td>
<td></td>
</tr>
<tr>
<td>12–17</td>
<td>158 (31.2%)</td>
<td>20 (12.7%)</td>
<td></td>
</tr>
</tbody>
</table>

Sex

<table>
<thead>
<tr>
<th>Category</th>
<th>N = 240 (%)</th>
<th>N = 22 (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>247 (48.7%)</td>
<td>21 (8.5%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>260 (51.3%)</td>
<td>22 (8.5%)</td>
<td></td>
</tr>
</tbody>
</table>

Race

<table>
<thead>
<tr>
<th>Category</th>
<th>N = 308 (%)</th>
<th>N = 6 (1.9%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>244 (48.1%)</td>
<td>21 (8.5%)</td>
<td>0.02</td>
</tr>
<tr>
<td>Hispanic</td>
<td>133 (26.2%)</td>
<td>8 (6.0%)</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>67 (13.2%)</td>
<td>4 (6.0%)</td>
<td></td>
</tr>
<tr>
<td>African</td>
<td>31 (6.1%)</td>
<td>2 (6.5%)</td>
<td></td>
</tr>
</tbody>
</table>

Disclosures. All authors: No reported disclosures.

2288. Clostridium difficile Molecular Epidemiology in a Prospective Cohort of Canadian Children Compared with Cases of C. difficile Infection

Colin Lloyd, BSc1; Brendan Parsons, PhD1; Tim Du, MSc1; George K. Golding, MD1; Bonita Lee, MD MSc (Epi)1; Linda Chiu, PhD1; Stephen Freedman, MDCM1 and Alberta Provincial Pediatric Enteric Infection Team (APPETITE); 1Laboratory Medicine and Pathology, University of Alberta, Edmonton, AB, Canada, 2National Microbiology Laboratory, Public Health Agency of Canada, Winnipeg, MB, Canada, 3Pediatrics, Stollery Children’s Hospital, Edmonton, AB, Canada, 4University of Calgary, Calgary, AB, Canada

Session: 250. Pediatric Bacterial Infections: From A to Z
Saturday, October 7, 2017: 12:30 PM

Background. Clostridium difficile is a notorious nosocomial pathogen, but little is known regarding the colonization commonly observed in children. It is suspected that C. difficile carriage in infants is a reservoir for toxigenic strains. To test this hypothesis, we sought to determine the genetic relatedness between a prospective cohort of C. difficile toxin gene positive healthy children and those with acute gastroenteritis (AGE) and strains identified in adult and pediatric C. difficile infection (CDI) cases from Alberta, Canada. Additionally, we compared C. difficile toxin production in healthy and AGE children.

Methods. C. difficile was cultured from 97 hospitalized CDI cases (n = 79 adult; n = 18 pediatric) from stool samples tested positive for toxigenic C. difficile by C.DIFF QUIK CHEK COMPLETE® enzyme immunoassay (EIA) in 2015 and samples tested positive for toxins by the Luminex xTAG® Gastrointestinal Pathogen Panel from a prospective cohort of 59 children with AGE seeking care at the emergency department and 17 healthy children attending public health clinics. Isolates were then characterized by PCR-ribotyping, pulsed-field gel electrophoresis (PFGE), PCR of the tcdA, tcdB, tcdC, and cdt genes and C. difficile toxinogenicity by EIA for a subset of 14 healthy and 45 AGE children.

Results. Ribotype 106 was predominant among all pediatric isolates (n = 21, 27.6% AGE and healthy children; n = 5, 27.8% pediatric CDI) and ribotype 027 in adult CDIs (n = 35, 44.3%). Eighteen ribotypes were shared between children and CDI cases (n = 134, 77.5%). Sixteen unique ribotypes and PFGE patterns (n = 84, 48.6%) were identified in two or more cohorts. Similar toxin gene profiles were observed across the three cohorts, but adult CDI isolates had a higher proportion of binary toxin positive isolates (n = 42, 53.2%) compared with children (n = 3, 3.9%) and pediatric CDI (n = 0). C. difficile toxinogenicity was similar (P = 0.23) amongst the subset of healthy (n = 6, 42.9%) and AGE (n = 28, 62.2%) children.

Conclusion. Production of C. difficile toxins in children was not significantly associated with symptoms of AGE. C. difficile strains found in children were similar to those from CDI cases; especially pediatric cases. This suggests that strains might be shared, but the development of CDI may be related to factors other than C. difficile strain type.

Disclosures. All authors: No reported disclosures.