

An Outbreak of *Burkholderia cepacia* complex Infections in Pediatric, Non-Cystic Fibrosis Patients

Lucila Marquez, MD, MPH¹, Katie Jones, MPH, CIC², Tjin Koy, MPH, MT, CIC², Elaine Whaley, MSN, CIC, RN², James Dunn, PhD, D(ABMM)³, John LiPuma, MD⁴, Judith Campbell, MD¹

¹Pediatrics, Baylor College of Medicine/Texas Children's Hospital, Houston, TX; ²Infection Prevention and Control and ³Pathology, Texas Children's Hospital, Houston, TX; ⁴University of Michigan, Ann Arbor, MI

Abstract

Background: *Burkholderia cepacia* complex species are best known as opportunistic pathogens in patients with cystic fibrosis (CF) but have been implicated in healthcare-associated outbreaks due to contaminated products and devices.

Methods: We investigated an outbreak of *B. cepacia* complex in patients without cystic fibrosis from February through July, 2016 at a tertiary care pediatric hospital in Houston, Texas. Isolates were evaluated for molecular relatedness with repetitive extragenic palindromic polymerase chain reaction (rep-PCR); specific species identification and genotyping were performed at an independent laboratory. The investigation included detailed review of all cases, direct observation of clinical practices, and respiratory surveillance cultures. Environmental and product cultures were performed at an accredited reference environmental microbiology laboratory.

Results: There were 18 respiratory tract, 5 bloodstream, 4 urinary tract, and 3 stool infections in 24 patients. The median age of the patients was 22.5 months (range, 2-148 months) and the majority of patients had underlying chronic cardiopulmonary conditions. Rep-PCR typing showed that 21 of 24 cases represented the same strain, which was identified as a novel species within the *B. cepacia* complex. Product cultures of liquid docusate were positive with an identical strain of *B. cepacia* complex. Local and state health departments, as well as the CDC and FDA, were notified, prompting a multi-state investigation.

Conclusions: Our investigation revealed an outbreak with a unique strain of *B. cepacia* complex isolated from clinical specimens from non-CF pediatric patients and from liquid docusate. This resulted in a national alert and voluntary recall by the manufacturer.

Background

The *Burkholderia cepacia* complex includes several related, yet distinct, species of gram-negative bacteria that are opportunistic pathogens in patients with cystic fibrosis (CF) and individuals with chronic granulomatous disease. *B. cepacia* has also been implicated in healthcare-associated outbreaks that have resulted in recalls of contaminated products and devices.

Methods

- Cases were defined as any patient currently or recently hospitalized in the PICU and CVICU with a culture positive for *B. cepacia* complex between February, 2016 and July, 2016.
- Isolates were evaluated for molecular relatedness with repetitive extragenic palindromic polymerase chain reaction (rep-PCR); specific species identification and genotyping were performed at an independent laboratory.
- The investigation included detailed review of all cases, direct observation of clinical practices, and respiratory surveillance cultures. Environmental and product cultures were performed at an accredited reference environmental microbiology laboratory.

Results

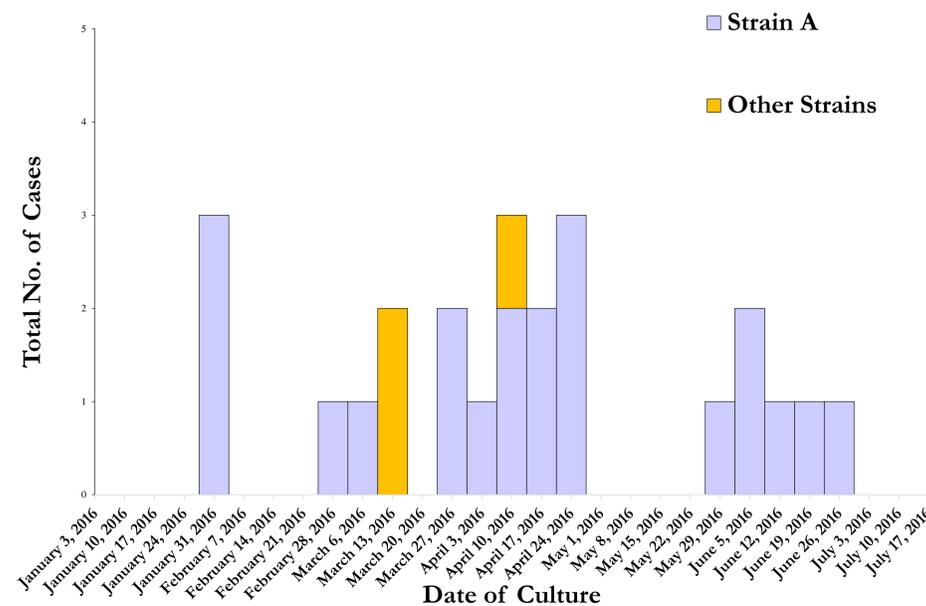


Figure 1. Epidemiologic Curve. *Burkholderia cepacia* complex infections, according to date of diagnosis. Twenty-one cases had infection with Strain A, which matched *B. cepacia* isolated from liquid docusate. Isolates from three cases had a different molecular pattern.

Table. Characteristics of cases

Characteristic	All Cases (N=24)
Demographic and clinical data	
Age- months	
Median	22.5
Range	2-148
Underlying conditions- no. (%)	
Pulmonary	10 (42)
Cardiac	10 (42)
Malignancy	3 (13)
Mechanical ventilation at time of positive culture- no (%)	19 (79)
First positive specimen- no. (%)	
Respiratory	15 (63)
Urine	4 (17)
Stool	3 (13)
Blood	2 (8)
Liquid docusate exposure data	
Exposed- no (%)	24 (100)
Exposure duration- days	
Median	9.5
Range	1-44
Time to positive culture- days	
Median	16.5
Range	1-81

Results (cont'd)

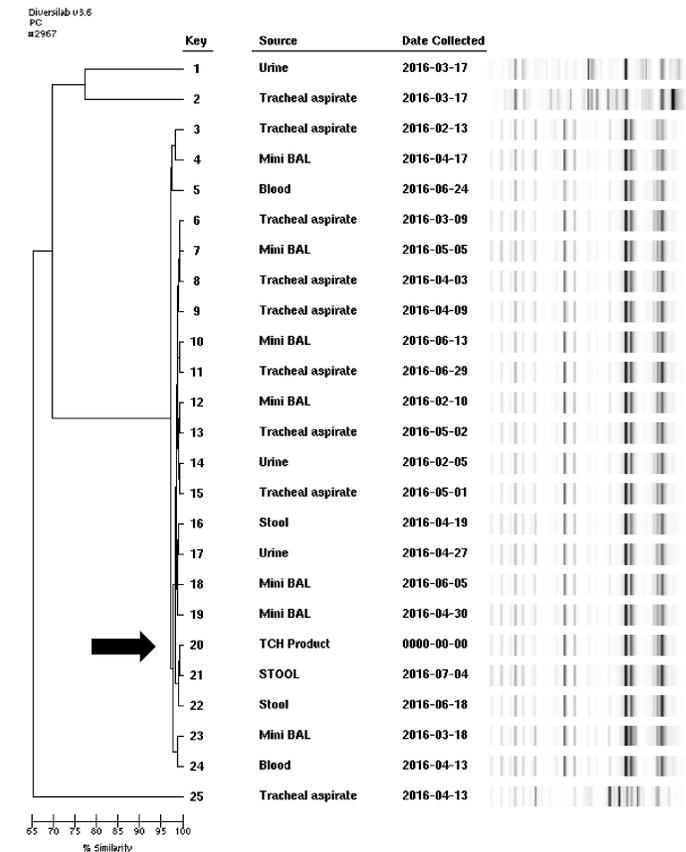


Figure 2. The rep-PCR results illustrate the molecular relatedness of the *Burkholderia cepacia* complex isolates from patients and liquid docusate (TCH product, black arrow).

Recall Key Dates

- 6/24/16:** CDC restricts use of liquid docusate in critically ill and immunocompromised patients
- 7/8/16:** CDC restricts use of liquid docusate in all patients
- 7/15/16:** FDA announces voluntary nationwide recall of liquid docusate manufactured by PharmaTech
- 8/8/16:** PharmaTech announces a voluntary recall of all of its liquid products
- 10/12/16:** FDA confirms *B. cepacia* detected in water system used to manufacture the product

Conclusions

Our investigation revealed an outbreak with a unique strain of *B. cepacia* complex isolated from clinical specimens from non-CF pediatric patients and from liquid docusate. This resulted in a national alert and voluntary recall by the manufacturer.

Acknowledgements: Texas Children's Hospital Administration; Medical and Nursing leadership of the PICU; Respiratory Care; Facilities Operations and the environmental services staff; and the nursing staff of the PICU and CVICU.