



Clinical Outcomes Associated with an Emerging *Clostridioides difficile* Ribotype 255 in Texas

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BACKGROUND

- PCR ribotyping of *Clostridioides difficile* strains is commonly used to describe the epidemiology of *C. difficile* infection.
- Certain ribotypes (RT) have been associated with more severe disease and clinical outcomes, such as RT 027,¹ while others are considered less virulent, such as RT 014-020.²
- Texas statewide surveillance identified the emergence of a rarely-described RT 255 beginning in 2015, which now represents the fifth most common ribotype in the state.³
- Here we describe clinical outcomes associated with an emergent RT 255 in Texas.

METHODS

Study design / inclusion

- A retrospective, cohort study was conducted including patients from two tertiary care centers in Houston, Texas.
- A convenience sample of patients infected with *C. difficile* strains of either RT 255, 014-020, or 027 between 2016-18 were included.
- Patients demographics and outcomes were collected by trained abstractors blinded to the RT results. The primary outcome was disease severity as classified by the 2017 IDSA guidelines.

Culture and ribotyping

- C. difficile* stool was plated onto cefoxitin-cycloserine-fructose agar plates and anaerobically incubated for 48–72 hours.
- Fluorescent ribotyping was performed as previously described.²
- This technique does not distinguish between all RTs; therefore, ribotypes 014 and 020 are reported as combined (014-020).

Statistical analysis

- Multivariable logistic regression analysis was done to control for other patient characteristics.
- Results were significant at $P < 0.05$, and all statistical analyses were completed using SPSS, version 25.

RESULTS

	Ribotype				
	255 <i>n</i> = 50	027 <i>n</i> = 50	255 vs. 027 p-value	014-020 <i>n</i> = 50	255 vs. 014-020 p-value
Demographics					
Age, mean years (±SD)	59.3 (±16.8)	69.3 (±13.6)	0.001	61 (±18.3)	0.63
CCI score, median (IQR)	2 (1-3)	3 (2-5)	0.014	2 (1-4)	0.34
Outcomes					
Initial clinical cure, no. (%)	38 (76)	30 (60)	0.09	38 (76)	Not tested
Severe/fulminant disease, no. (%)	19 (38)	40 (80)	< 0.001	20 (40)	0.83
CDI complications [†]	5 (10)	14 (28)	0.02	9 (18)	0.25
30d recurrence, no. (%)	2 (4)	2 (4)	Not tested	3 (6)	0.64
90d recurrence [‡] , no. (%)	5 (10)	10 (20)	0.17	4 (8)	0.70
All-cause 30d mortality, no (%)	5 (6)	8 (16)	0.37	6 (12)	0.75

Table 1. Baseline characteristics and outcomes associated with an emergent ribotype 255 compared to two other endemic ribotypes in Houston, Texas; [†]includes ICU admission, colectomy, ileus, and toxic megacolon; [‡]90-day recurrence includes those with 30-day recurrence. Abbreviations: Charlson Comorbidity Index (CCI)

- A total of 150 patients were included (50 patients infected with each RT).
- Overall, 53% of the patients had severe or fulminant disease most commonly due to RT 027 (80%) followed by RT 014-020 (40%) and RT 255 (38%).
- C. difficile* disease severity of was similar between those infected with RT 255 and RT 014-020 ($p = 0.84$).
- In multivariable analysis, patients infected with ribotype 255 had an 87% relative reduction in the odds of severe disease compared to ribotype 027 after controlling for patient age, CCI score, and serum albumin level (OR, 0.13; 95% CI, 0.037-0.433; $p = 0.001$).
- No differences were seen in the rates of 30-day mortality, or 30- or 90-day recurrence between the three ribotypes.

CONCLUSION

- Ribotype 255 does not appear to be associated with more severe disease when compared to other common ribotypes in Texas.**
- Further studies are warranted to determine contributing factors for its increasing prevalence.

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