

# The Rising Incidence of Clostridium Difficile in Toxic Megacolon Patients

**SreyRam Kuy, MHS, MD**

Grand Rounds August 20, 2014  
Overton Brooks Veterans Affairs Medical Center  
Louisiana State University - Shreveport





# Background

SreyRam Kuy, MD, MHS

# Clostridium Difficile

- Gram positive spore forming bacteria
- Can be a minor part of normal colonic flora
- Causes disease when competing normal flora in the gut eradicated by antibiotic treatment (clindamycin, ampicillin, third generation cephalosporins, fluoroquinolones are high risk drugs)

# Clostridium difficile

- In hospitalized patients, *C. difficile* infection is associated with longer lengths of stay and increased healthcare costs (\$7,179 for inpatient care)<sup>1</sup>
- Transmission in the hospital
  - Hands of healthcare personnel
  - Contaminated environment (light switches, door knobs)
- Treatment:
  - PO or IV Metronidazole, PO or enema Vancomycin
  - Fulminant colitis and Toxic megacolon necessitate surgical intervention
- Can present on a spectrum: diarrhea, infectious colitis, pseudomembranous colitis, toxic megacolon

# Toxic Megacolon

- First described in 1950<sup>1</sup>
- Acute toxic colitis with a nonobstructive colonic dilation<sup>2</sup>
  - Colon > 6 cm
  - 3 of the following signs of systemic toxicity (Fever, Tachycardia, Leukocytosis, Anemia)
  - 1 of the following (Dehydration, Altered mental status, Electrolyte abnormality, Hypotension)
- Can be a complication of Inflammatory Bowel Disease (usually UC, rarely Crohn's), Clostridium difficile, and other infectious causes (Entamoeba histolytica, Shigella)
- Other types of megacolon: Hirschsprung's disease

# The Study Question

- Has the incidence of Clostridium difficile associated Toxic Megacolon in the hospitalized population changed over a decade?
- How has mortality of patients with Clostridium difficile associated Toxic megacolon changed over a decade?

# Methods

- Design: Retrospective cross-sectional study
- Source: Nationwide Inpatient Sample, 2000-2010
- Population: Patients hospitalized with Clostridium Difficile, Toxic Megacolon and Inflammatory Bowel disease
- Statistical analysis:
  - Bivariate analysis (  $X^2$ , ANOVA)

# Results

- The incidence of Clostridium Difficile more than doubled among hospitalized patients.
- The incidence of Toxic Megacolon remained stable among hospitalized patients.

Patients in the US (2000-

Number of Patients    Incidence (%)  
with Toxic  
Megacolon

2004	8,004,571	50,747		1,636	0.02%
2005	7,995,048	61,369	0.77%	1,588	0.02%
2006	8,074,825	64,668	0.80%	1,673	0.02%
2007	8,043,415	65,351	0.81%	1,538	0.02%
2008	8,158,381	71,026	0.87%	1,554	0.02%
2009	7,810,762	66,122	0.85%	1,525	0.02%
2010	7,800,441	68,645	0.88%	1,418	0.02%
				1,451	0.02%
				1,725	0.02%
				1,416	0.02%
				1,598	0.02%

# Results

Table: The Changing Incidence of Clostridium Difficile and IBD in Hospitalized Patients with Toxic Megacolon in the US (2000-2010)

Year	All Patients with Toxic Megacolon	Clostridium Difficile Infection Among Patients with Toxic Megacolon		IBD Among Patients with Toxic Megacolon		P value
	Number	Number	Percentage	Number	Percentage	
2000	1,636	59	3.61%	40	2.44%	NS
2001	1,636	59	3.61%	37	2.33%	
2002	1,636	59	3.61%	34	2.03%	
2003	1,636	59	3.61%	36	2.34%	
2004	1,636	59	3.61%	38	2.49%	
2005	1,636	59	3.61%	38	2.33%	
2006	1,636	59	3.61%	33	3.31%	
2007	1,636	59	3.61%	48	2.84%	
2008	1,636	59	3.61%	49	3.60%	
2009	1,636	59	3.61%	61	3.60%	
2010	1,636	59	3.61%	63	3.94%	

➤ The rate of Toxic Megacolon cases due to Clostridium difficile has more than doubled

vs.

➤ The rate of Toxic Megacolon cases due to IBD has stayed stable

# Results

Table. Demographics of Patients with Toxic Megacolon in the United States, 2000-2010

Patient characteristics	All Patients with Toxic Megacolon	Toxic Megacolon without Clostridium difficile Infection	Toxic Megacolon with Clostridium difficile Infection	P Value
Age, mean years, (standard deviation)	63.57 yrs (SD 20.86)	63.22 yrs (SD 21.02)	68.90 yrs (SD 18.22)	<.0001
Race/ethnicity				<.0001
White	74.99%	74.56%	81.41%	
Black	13.02%	13.38%	7.75%	
Hispanic	7.63%	7.67%	7.03%	
Asian	1.42%	1.44%	1.07%	
American Indian or Alaska Native			0.24%	
Native Hawaiian or other Pacific Islander			2.50%	
Unknown			1.89%	0.0059
Insurance			6.26%	<.0001
Medicaid			6.54%	
Medicare			0.00%	
Private			25.31%	<.0001
Uninsured			70.23%	
Hospital type			5.82%	
Academic medical center			19.37%	
General hospital			1.53%	
Long-term care facility			3.05%	0.0008
Other			13.13%	
Specialty hospital			23.31%	
Unknown			63.56%	<.0001
Teaching hospital			11.51%	
Yes			88.49%	<.0001
No			46.53%	<.0001
Hospital size			22.84%	
Large			26.26%	<.0001
Medium			34.35%	
Small			16.56%	

**Patients with Clostridium difficile associated Toxic Megacolon, compared with patients without Clostridium difficile were more likely to be:**

- Older
- Urgent admission
- Presented to ED
- Larger Hospitals
- Urban Hospitals
- Teaching Hospitals

# Mortality

Table 2. Trends in Mortality among Patients with Clostridium Associated Toxic Megacolon, 2000-2010 in the United States

Year	Mortality (%)	P value
2000	13.56%	0.0813
2001	14.29%	
2002	14.49%	
2003	22.06%	
2004	26.03%	
2005	31.76%	
2006	23.53%	
2007	30.30%	
2008	27.49%	
2009	27.21%	
2010	24.00%	

**Mortality has more than doubled among patients with Clostridium difficile associated Toxic Megacolon over the decade**

# Mortality

Table 1. Outcomes among Patients with Toxic Megacolon

SreyRam Kuy, MD, MHS

Patients with Toxic Megacolon

Outcome	All Patients with Toxic Megacolon	Patients without Clostridium difficile Infection	Patients with Clostridium difficile Infection	P value
Mortality (%)	7.26%	6.14%	24.45%	<.0001
Discharge Disposition (%)				<.0001
Routine (home)	48.85%	50.45%	24.45%	
Short term hospital	2.65%	2.57%	3.90%	
Skilled nursing facility	28.85%	28.37%	36.16%	
Home with home health care	11.87%	11.95%	10.66%	
Other	0.52%	0.53%	0.39%	
Died in hospital	7.26%	6.14%	24.45%	
Cost (inflation adjusted)	\$20,250 (SD 30,633)	\$18,718 (SD 27,963)	\$41,968 (SD 31,318)	<.0001
LOS, mean days (standard deviation)	9.36 days (SD 10.72)	8.92 days (SD 10.07)	16.13 days (SD 16.33)	<.0001
Colectomy Performed	10.79%	10.30%	18.36%	<.0001

# Conclusions

- Clostridium difficile associated Toxic Megacolon has increased in incidence over the past decade
- Clostridium difficile associated Toxic Megacolon has a high mortality rate, which overall has more than doubled over the past decade, though decreased recently

# Future Directions

- This study draws attention to the tremendous burden of *Clostridium difficile* on patient mortality, health care cost and resource utilization, and the need for aggressive prevention of this iatrogenic disease
- Need to examine variable such as antibiotic regimen, severity of disease, physical exam findings, immunosuppression, presence of end organ failure
- Prior small case series have identified APACHE score, signs of sepsis and leukocytosis as clinical factors associated with mortality

# References

1. Dubberke ER, Reske KA, Olsen MA, McDonald LC, Fraser VJ. Short- and long-term attributable costs of *Clostridium difficile*-associated disease in nonsurgical inpatients. *Clin Infect Dis*. 2008 Feb 15; 46(4):497-504.
2. Marshak RH, Lester LJ. Megacolon a complication of ulcerative colitis. *Gastroenterology*. Dec 1950;16(4):768-72.
3. Jalan KN, Sircus W, Card WI, et al. An experience of ulcerative colitis. I. Toxic dilation in 55 cases. *Gastroenterology*. Jul 1969;57(1):68-82



**Thank You!**

SreyRam Kuy, MD, MHS