



Management of Clostridium Difficile: Total Colectomy versus Colon Sparing Surgery

Rahul Narang, MD
Colon and Rectal Surgery
Assistant Professor of Surgery



Montefiore
THE UNIVERSITY HOSPITAL

 **EINSTEIN**
Albert Einstein College of Medicine
OF YESHIVA UNIVERSITY

No Disclosure



Clostridium Difficile Colitis: Treatments, Guidelines, and Challenges

- **Up to 3 million cases per year in US**
- **Estimated \$3.2 billion/year in expenditures**
 - **Mortality estimated to be ~4-8%**

Pathophysiology

- *C. difficile* colonizes the colon after the normal gut microflora is disrupted by antibiotics or other host factors.
- Kyne et al demonstrated that 31% of patients who received antibiotics in the hospital were colonized with *C. difficile* and 56% of these developed symptomatic disease.

Issues

- **Who to operate on?**
- **What are the indications for operative management?**
- **When to operate?**
- **What operation?**
- **What can we improve upon?**

Prevention!

- **Infection Control**
- **Barrier precautions**
- **Isolation precautions**
- **Cleaning with bleach**
- **Handwashing**
- **Antibiotic stewardship**

Severity Scoring and Treatment

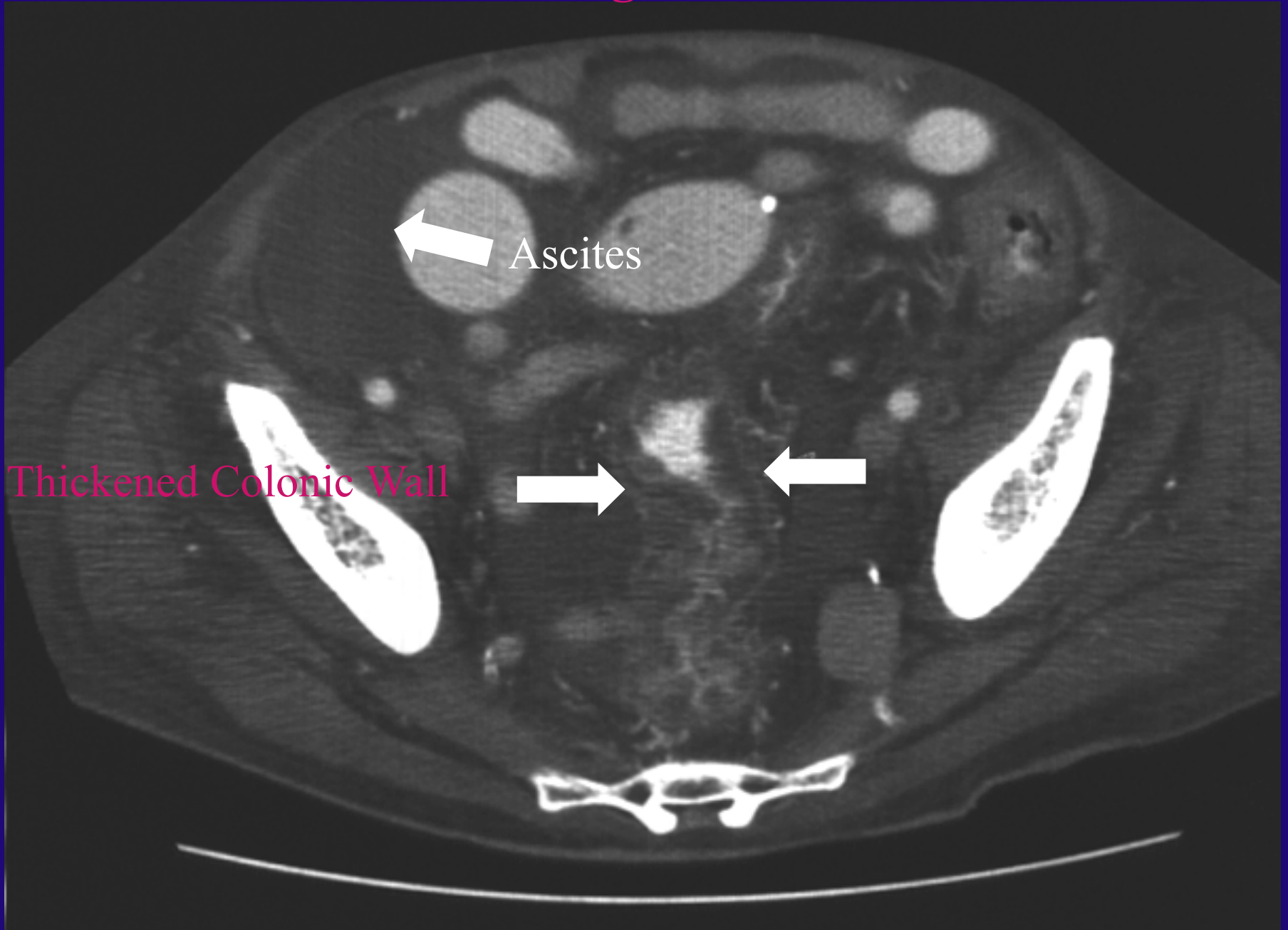
Severity	Criteria
Mild or Moderate:	WBC of 15K or lower & Serum creatinine
Severe:	WBC of 15K or higher or Serum creatinine >1.5 times the premorbid level
Severe, Complicated:	Hypotension or shock, ileus, megacolon

Society for Healthcare Epidemiology of America (**SHEA**) and the Infectious Diseases Society of America (**IDSA**) Clinical Practice Guidelines 2010

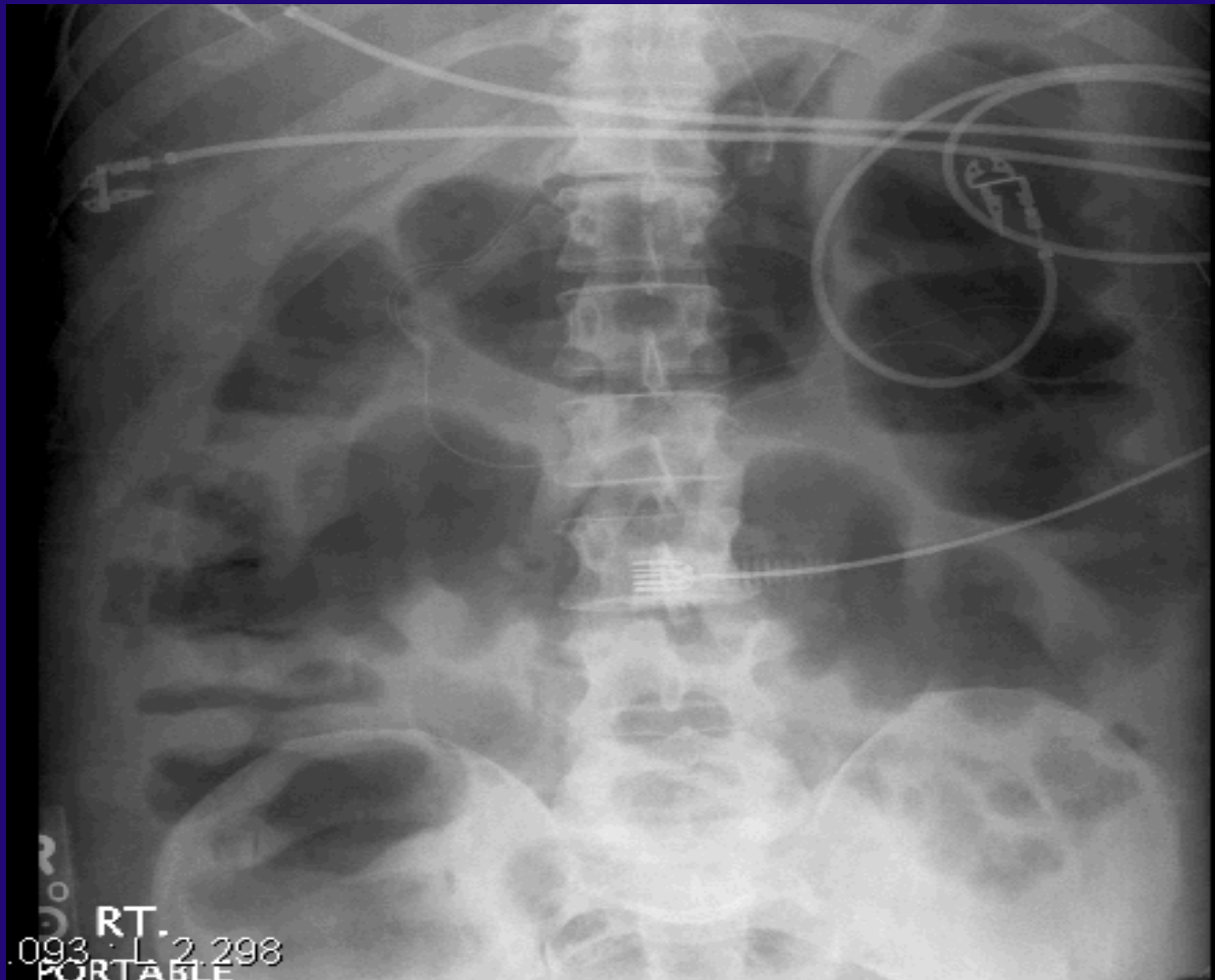
ACG Severity Scoring and Treatment

Severity	Criteria
Mild:	Diarrhea
Moderate:	Diarrhea plus any additional signs or symptoms not meeting severe or complicated criteria
Severe:	Any two of the following: -WBC \geq 15000cells/mm ³ -Serum albumin

Abdominal CT Findings in Fulminant CDI



Dilated Loops of Colon in a Patient with CDI



Normal Colon and Pseudomembranous Colitis (PMC) as seen at Colonoscopy

Normal Colon



Colon with PMC due to
Clostridium difficile Infection



Factors that have been associated with a poor prognosis from CDAD.

- **Non-modifiable patient factors:**

- -Age >65
- Immunosuppression
- Pre-existing renal or pulmonary disease
- High ASA class

- **Physical exam/clinical findings:**

- Fever
- Ileus/distention
- Hypotension/shock requiring vasopressors
- Mental status changes
- Need for intubation/mechanical ventilation

- **Laboratory values:**

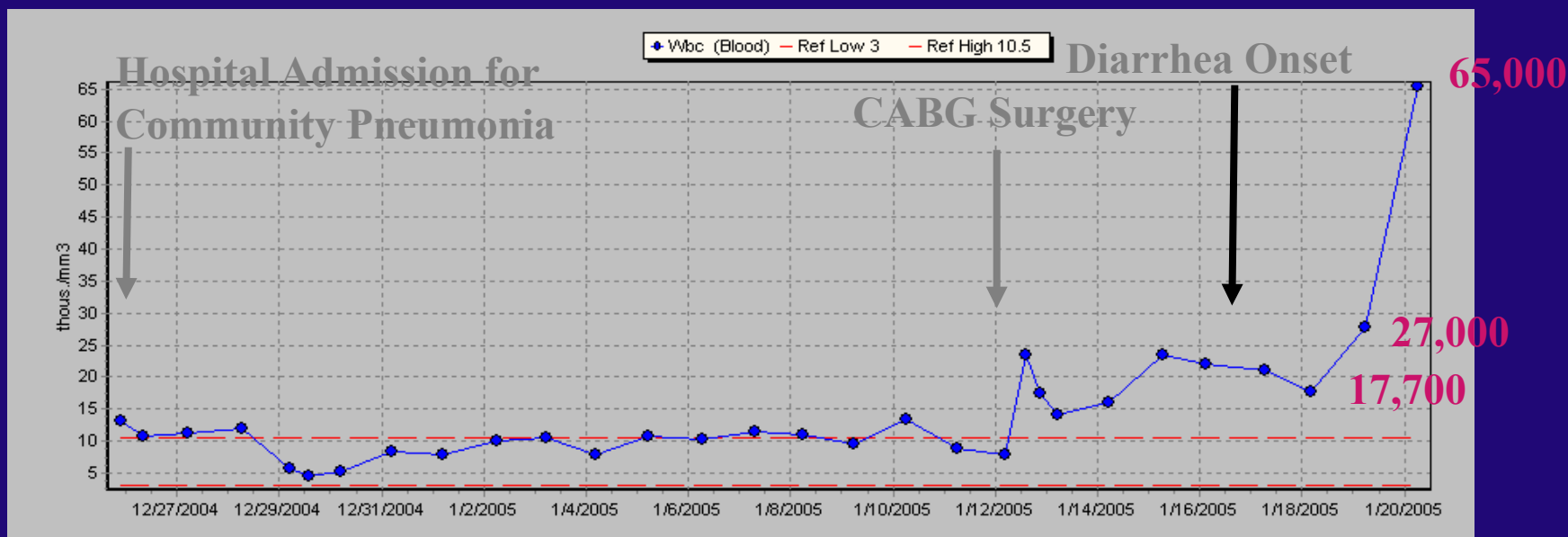
- High White Blood Cell count
- Increasing lactate
- Increased creatinine/renal dysfunction
- Low Albumin

- **CT scan findings:**

- Pancolitis/ascites

Fulminant CDI: Severe and Rapidly Fatal Disease

- 51 yo male underwent coronary artery bypass grafting and received cefazolin pre-surgery.
- Rapidly progressive 4-day course from diarrhea to shock and death. WBC elevated throughout course and rose precipitously near the time of death.



Severity Scoring and Treatment

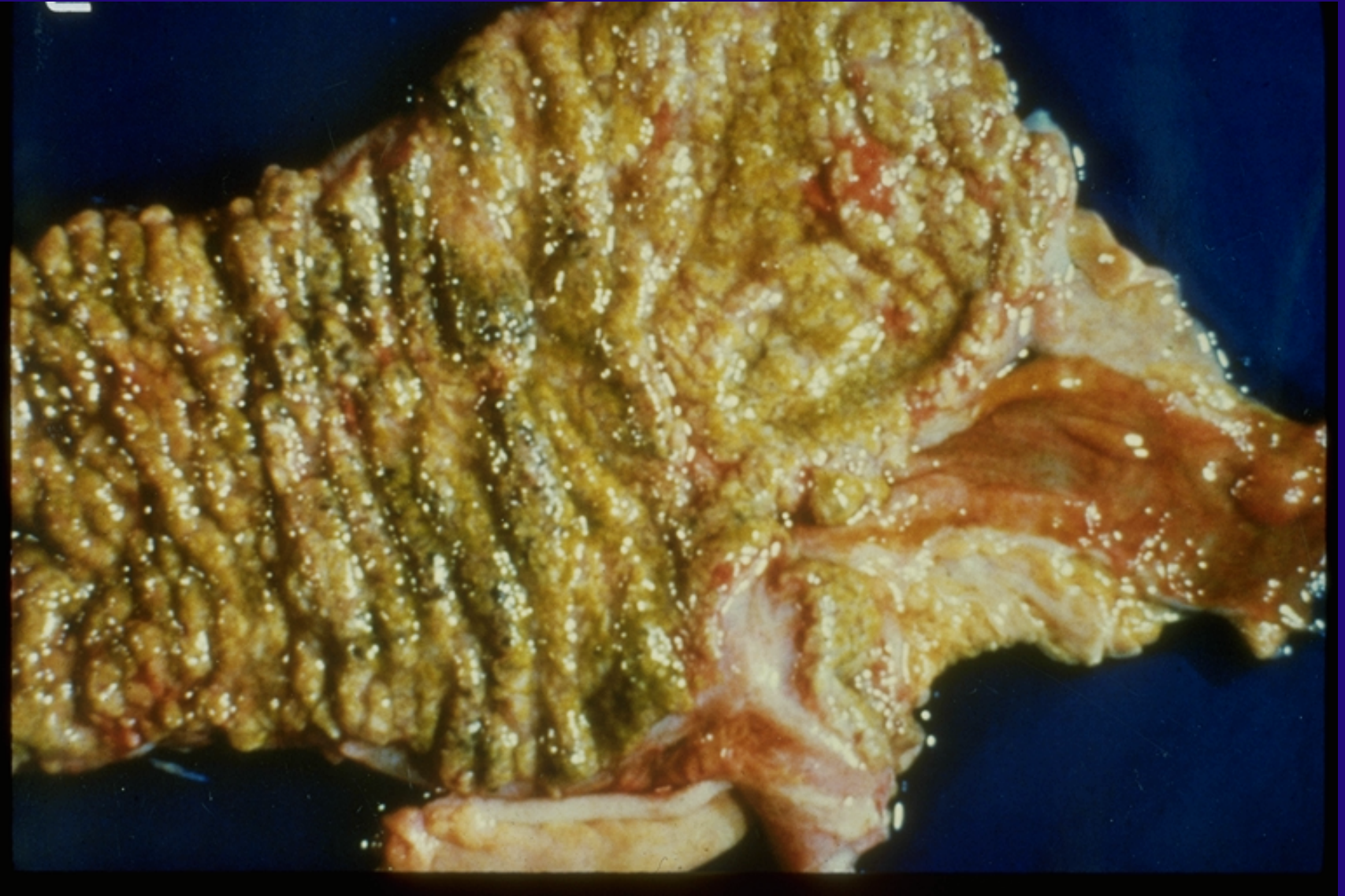
Severity	Criteria	Treatment
Complicated:	<p>Any one of the following:</p> <ul style="list-style-type: none">-Admission to ICU for CDI-Hypotension with or without required use of vasopressors-End organ failure (Mechanical ventilation, Renal failure, etc) - Mental status changes-Fever $\geq 38.5^{\circ}$-Ileus or significant abdominal distention/tender-WBC $\geq 35,000$ cells/mm³-Serum lactate levels greater than 2.2 mmol/Liter	<p>Metronidazole 500 mg IV tid</p> <p>+</p> <p>Vancomycin 125 mg PO qid</p> <p>+</p> <p>Vancomycin 500 mg in 500 mL saline as enema qid (if ileus or distended)</p> <p>+</p> <p>SURGICAL CONSULTATION</p>

Surgery and CDAD

- Colectomy associated with a 35-85% mortality.
- Suggests:
 - **Patients are Sick**
 - **Magnitude of Colectomy too Significant**
 - **We intervene too Late**



Colon Autopsy Specimen of a Patient who Died of Severe CDI: Confluent PMC is Evident



Surgery and CDAD - Dilemma

- Operate early- near total colectomy + ileostomy is a large operation with significant short-term and long-term consequences.
- Operate early- may end up operating on patients that would not need it.
- Operate once patient sick: too late

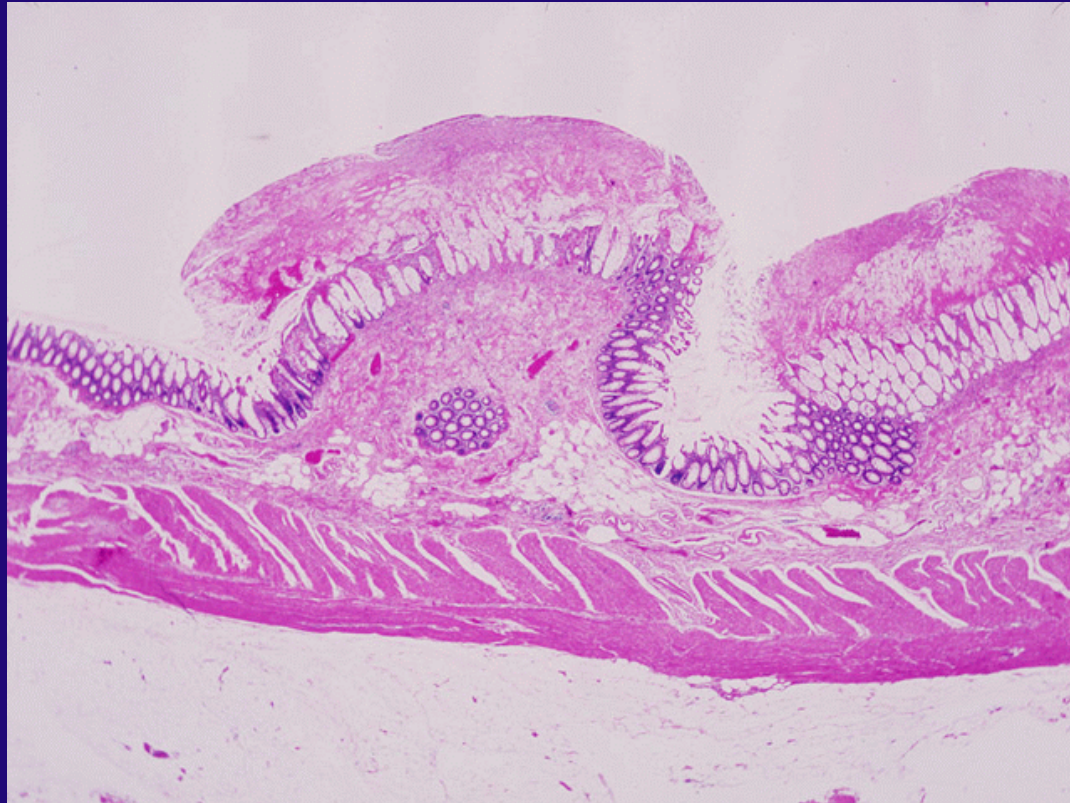
Surgery and CDAD

- With the goal of decreasing mortality...
- Lower the threshold for surgical consultation!
- **DO NOT THINK OF SURGICAL CONSULT AND POSSIBLE SURGICAL MANAGEMENT AS SALVAGE THERAPIES!!!**

- **Is colectomy necessary for the treatment of severe, complicated (fulminant) CDAD?**

- **Can we offer a procedure that adequately treats severe, complicated CDAD that is less morbid?**

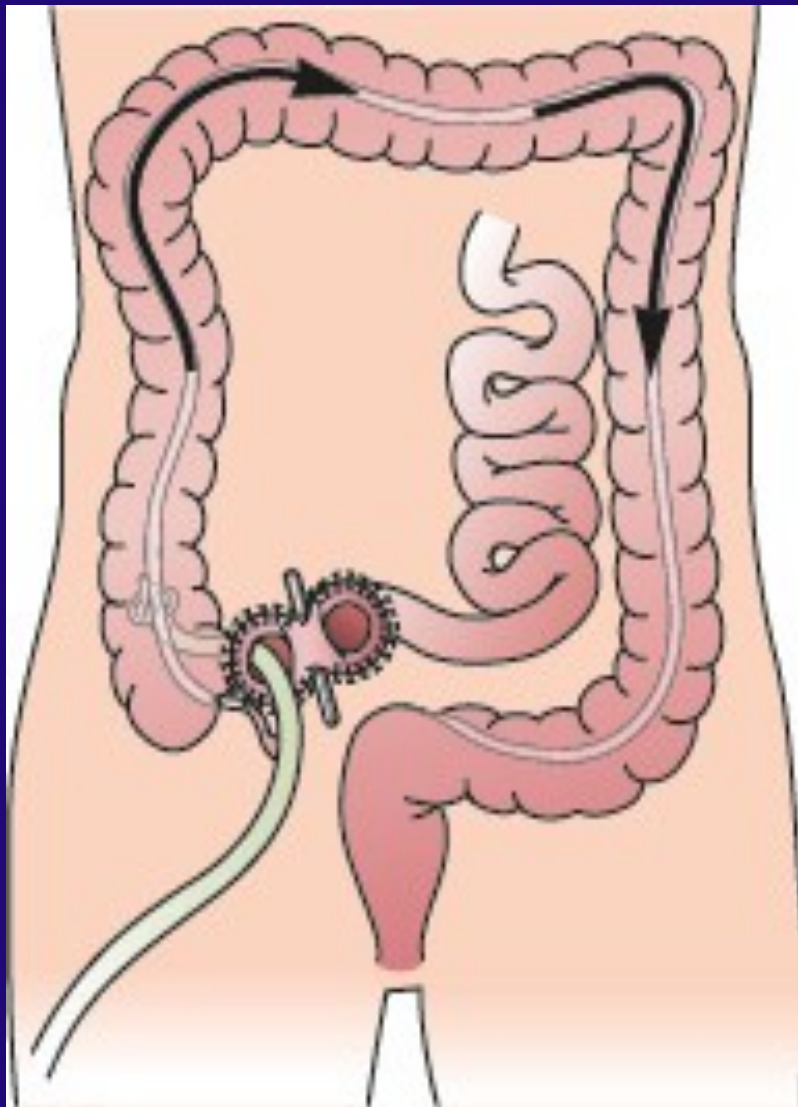
- Pathophysiology -*C. difficile* overgrows and produces exotoxins -Toxins cause mucosal damage and inflammatory cell infiltration.



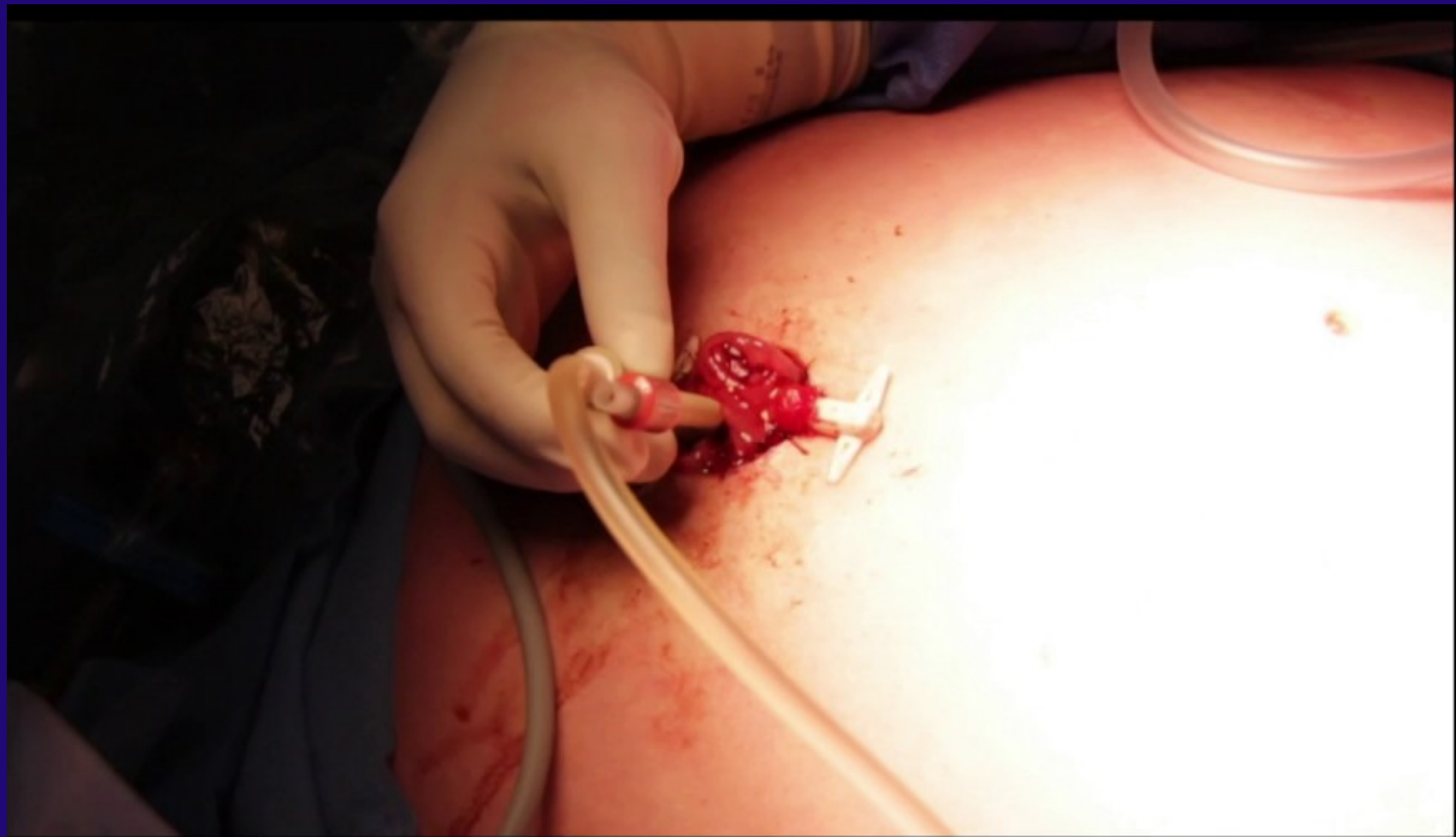
- **Hypothesis: Therapy to decrease bacterial counts and toxin levels throughout the whole colon will adequately treat severe, complicated CDAD.**

Hypothesis

- **Loop ileostomy and colonic lavage followed by postoperative vancomycin flushes is an alternative to colectomy in the treatment of severe, complicated C. Diff.**



1. Creation of diverting loop ileostomy.
2. Intraoperative antegrade colonic lavage with 8 L of warmed PEG3350/electrolyte solution via ileostomy.
3. Postoperative antegrade colonic enemas with vancomycin (500 mg in 500 mL x 10 days) via ileostomy.




Diverting loop ileostomy and colonic lavage: an alternative to total abdominal colectomy for the treatment of severe, complicated *Clostridium difficile* associated disease.

- 42 pts, Univ of Pittsburgh
- No significant difference in age, sex, pharmacologic immunosuppression, and Acute Physiology and Chronic Health Evaluation-II scores between our current cohort and historical controls
- Reduced mortality compared to our historical population (19% vs 50%; odds ratio, 0.24; P = 0.006)
- Preservation of the colon was achieved in 39 of 42 patients (93%).

Loop ileostomy/colonic lavage v. total abdominal colectomy (historical controls) for severe, complicated C. Diff.

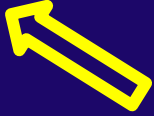

	Ileostomy/washout	colectomy
APACHE-II (mean±S.D.)	31.4±9.0	29.9±8.9
Post-Operative Death	16/81* (20%)	40/81 (49%)
Colectomy	5/81* (6%)	



Loop ileostomy/colonic lavage v. total abdominal colectomy (historical controls) for severe, complicated C. Diff.

	ileostomy/washout	colectomy
APACHE-II (mean±S.D.)	31.4±9.0	29.9±8.9
Time from presentation to surgical consultation	11±9 hours	32±12 hours
Time from surgical consultation to operative intervention	9±6 hours	29±12 hours

Loop ileostomy/colonic lavage v. total abdominal colectomy (historical controls) for severe, complicated C. Diff.

	Ileostomy/washout	colectomy
Alive at 1 year	54/65 (83%)	30/41(73%)
Restoration of GI continuity	46/54 (85%) 	7/30 (23%) 

Loop ileostomy/colonic lavage v. total abdominal colectomy

- **-Is there a patient that is better off with TAC?**
- **-Who is not a candidate for this operation?**
 - **Patients with colonic compromise.**
 - **Abdominal compartment syndrome.**
 - **Patient population that has done the worse**
 - **Patients with acute renal failure (anuric, ongoing fluid resusc, requiring hemodialysis).**

Loop ileostomy versus total colectomy as surgical treatment for Clostridium difficile–associated disease: An Eastern Association for the Surgery of Trauma multicenter trial

- Retrospective multicenter study
- 10 centers of patients who presented with CDAD requiring surgery between July 1, 2010 and July 30, 2014
- 98 patients
- Median age was 64.5 years; 59% were male. Concerning preoperative patient conditions, 54% were on pressors, 47% had renal failure, and 36% had respiratory failure. When comparing TC and LI, there was **no statistical difference regarding these conditions**

Loop ileostomy versus total colectomy as surgical treatment for Clostridium difficile–associated disease: An Eastern Association for the Surgery of Trauma multicenter trial

- Adjusted mortality (controlled for preprocedure confounders) was significantly lower in the LI group (17.2% vs 39.7%; $p = 0.002$)
- Conclusion:
 - **First multicenter study comparing TC with LI for the treatment of CDAD. In this study, LI carried less mortality than TC. In patients without contraindications, LI should be considered for the surgical treatment of CDAD**

**Diverting Loop Ileostomy Sounds
Great in a Tough CDAD Patient!**

- 69 year old man developed fulminant and fatal CDI several days after ileostomy closure in an ileostomy formed for reasons unrelated to CDI – Abe et al., J Med Case Rep, 2012
- 77 yo M who had Ciprofloxacin for prostatitis, Overwhelming Recurrent *Clostridium difficile* Infection after Reversal of Diverting Loop Ileostomy Created for Prior Fulminant *C. difficile* Colitis – POD 3 – hypotensive, on pressors, exlap – subtotal colectomy – pod 5, expired. – Fashandi et al., Am Surg 2017

- CDI after ileostomy closure and one series found a statistically significant association of postoperative CDI with delayed ileostomy closure (>6 months from index procedure, $p=0.003$) – Rubio-Perez, et al. World J Gastrointest Surg 2014
 - 93 patients, who had undergone elective ileostomy closure between 2009 and 2013 was performed
 - Pseudomembranous colitis appeared in 4%

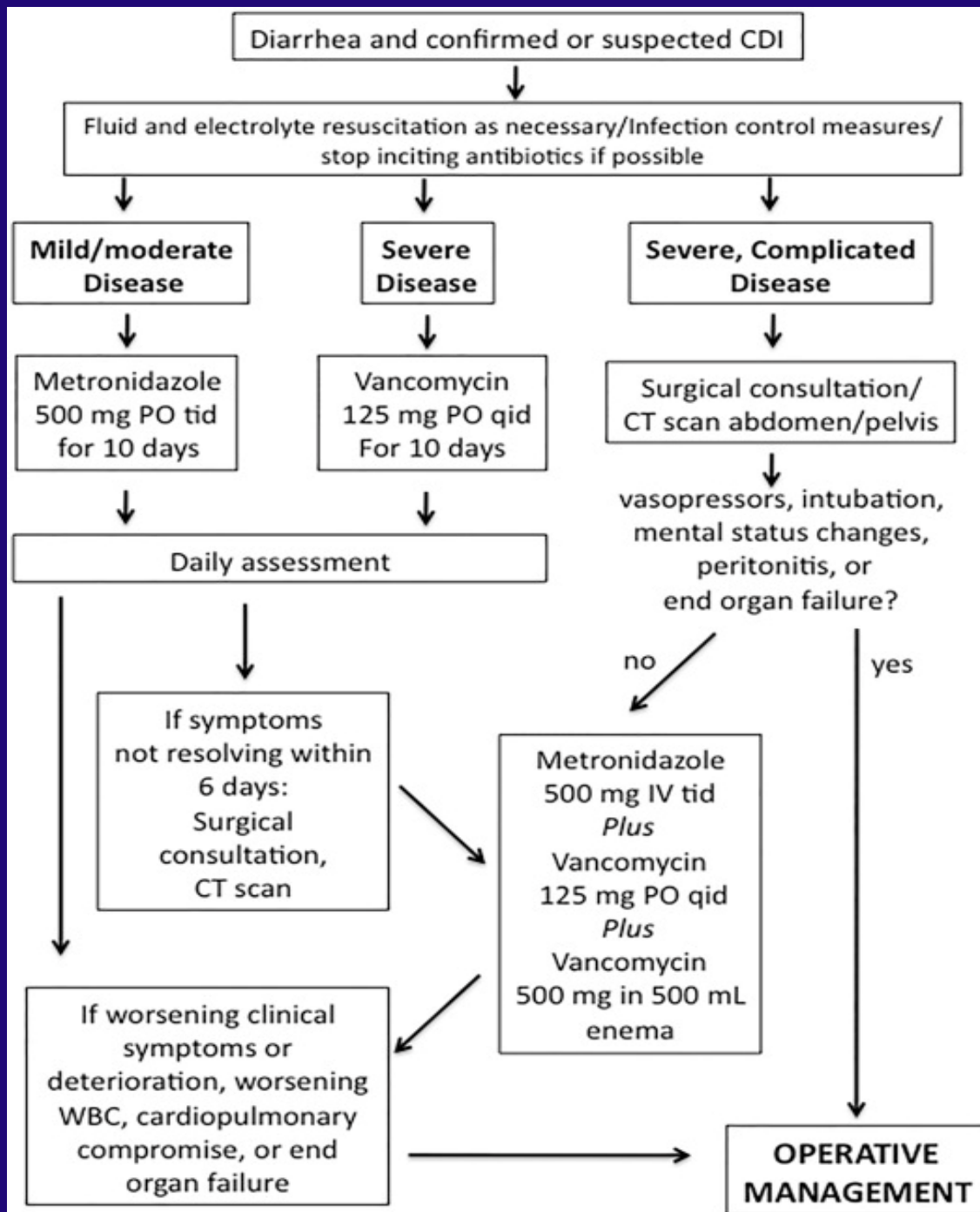
In the works...

- Less May be More: Loop Ileostomy With Colonic Lavage for Fulminant Clostridium Difficile Colitis A Prospective National Multi-Center Cohort Study
- Dr. Marylise Boutros, Jewish General Hospital (Quebec, CA)

- Patient diagnosed with fulminant colitis → he/she will be asked by the surgeon on-call if they would like to participate in this research study.
 - If they agree to be in this study → maybe asked by the surgeon to enroll in either the investigational arm (loop ileostomy) or the standard of care arm
- Start Date - January 2015, Estimated End date - December 2018

Bet Perhaps:

An Acceptable Pathway at this time!



OPERATIVE MANAGEMENT STRATEGY FOR CDAD

Does the patient have abdominal compartment syndrome?

(~5% incidence) yes

No

Exploratory laparotomy,
Subtotal abdominal colectomy
with end ileostomy.

Exploratory laparoscopy
(convert to laparotomy as
necessary)

Colonic perforation/
necrosis?

Yes
(rare)

No

Loop ileostomy/intraoperative
colonic lavage

Development of
abdominal compartment
syndrome post-op?

Yes
(~7% incidence;
Usually within 48 hours)

No

Monitor for
continued improvement

Thank You

