Development of *Clostridioides difficile* Screening for Inflammatory Bowel Disease Patients

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Objectives

Patients with inflammatory bowel disease (IBD) are at greater risk for developing *Clostridioides difficile* infections and are more likely to experience severe outcomes from infection. We sought to develop an optimized method for detecting toxigenic *C. difficile* carriage in patients with IBD using colonoscopy wash fluid, and to assess impact of bowel preparation and culture-based enrichment techniques.

Methods

We evaluated 120 colonoscopy washes collected from 115 patients diagnosed with Crohn's disease (CD) or ulcerative colitis (UC) (Table 1) presenting for routine exams. Selective enrichment was evaluated with plating of centrifuged wash material to CHROMID® C. difficile agar (Figure 1). This method evaluated growth in Brain Heart Infusion (BHI) broth enhanced with taurocholate and antibiotics followed by plating to CHROMID® C. difficile agar. *C. difficile* was identified by colony morphology (Figure 2) and speciated via mass spectrometry (MALDI-TOF) or RapID™ ANA. Toxin carriage in *C. difficile* strains was determined by quantitative or qualitative PCR.

Table 1. Demographics of total patient population. 25 C. difficile isolates were retrieved from 16 patients.

Patient Demographics		Total patients (n = 115)
Sex	Male	40 (34.78%)
	Female	75 (65.22%)
Age range	20-92 (years)	
Condition	Crohn's disease	58 (50.43%)
	Ulcerative colitis	57 (49.57%)
Total *C. difficile* (+) patients		16 (13.91%)

Figure 1. Workflow for colon wash fluid processing

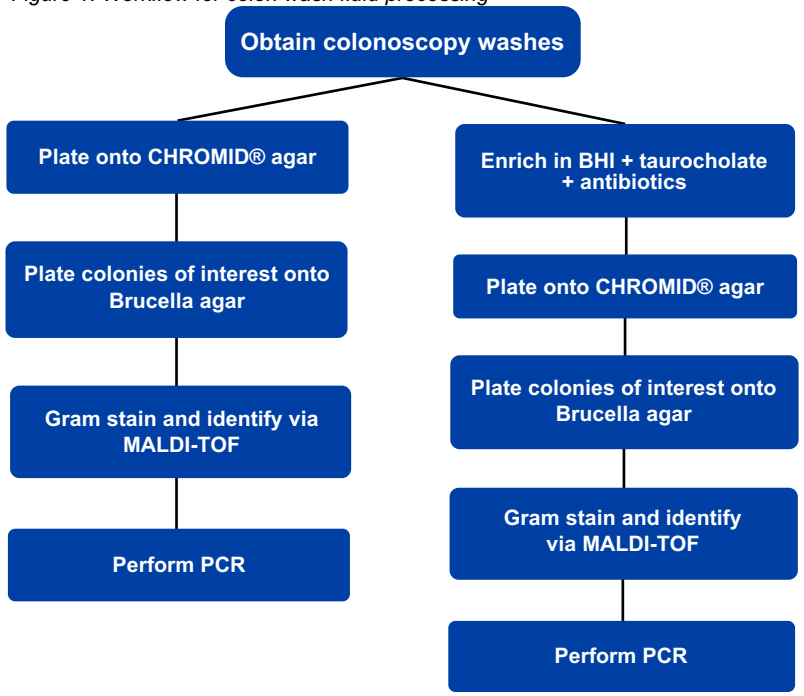
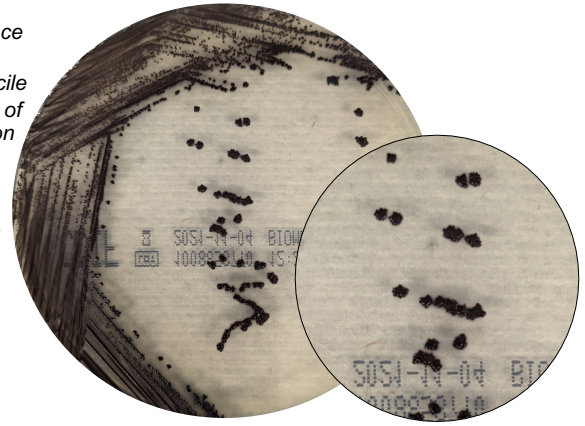


Figure 2. Appearance of C. difficile *on CHROMID® C. difficile agar after 48 hours of anaerobic incubation at 37°C. Isolated* C. difficile *colonies appear flat, black, and diffuse (jagged edges).*



Results

Enhanced BHI broth with taurocholate, D-cycloserine, and cefoxitin has a greater sensitivity of detection at 12.5% than the direct culture of wash fluid at 8.33%, making it more effective at isolating *C. difficile* than direct culture alone (Figure 3). There was also an increase in total toxin B positive isolates following enhancement compared to direct culture (93.3% vs. 60%).

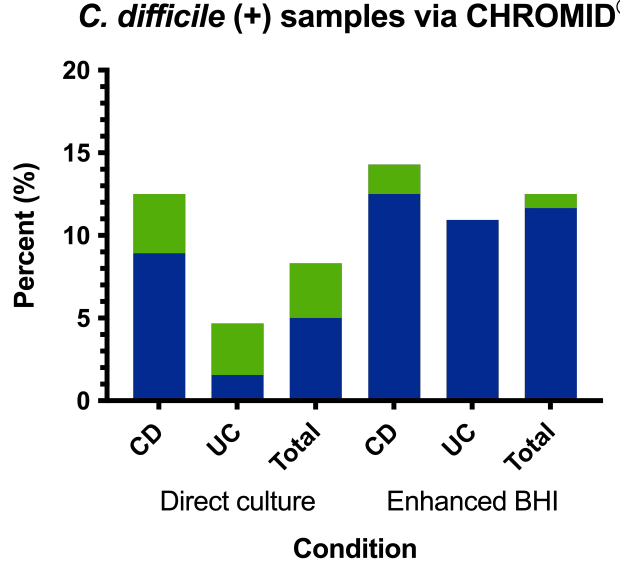


Figure 3. Asymptomatic carriage of toxin B positive and toxin B negative C. difficile strains isolated from 120 colonoscopy washes.

Conclusion

Increased qualitative testing can identify the presence of *C. difficile* in patients that initial processing, the direct culture of washes, may miss. More effective *C. difficile* identification, in particular toxigenic *C. difficile*, can change the course of treatment in IBD patients.

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