Clostridiodes difficile in COVID-19 Patients, Detroit, Michigan, USA, March–April 2020

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We describe 9 patients at a medical center in Detroit, Michigan, USA, with severe acute respiratory syndrome coronavirus 2 and *Clostridiodes difficile*. Both infections can manifest as digestive symptoms and merit screening when assessing patients with diarrhea during the coronavirus disease pandemic. These co-infections also highlight the continued importance of antimicrobial stewardship.

Coronavirus disease (COVID-19), which is caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), predominantly includes pulmonary symptoms; however, <10% of cases also include gastrointestinal events, including abdominal pain, diarrhea, and vomiting (*1*–*4*). During the COVID-19 pandemic, clinicians must be vigilant of co-infections in patients with COVID-19.

Several studies have collected data on concomitant antibiotic use in patients with COVID-19. A single-center study of 52 critically ill patients cited hospital-acquired infection in only 7 (13.5%) patients, yet 49 (94%) patients received antibiotic therapy (*5*). Another study, which analyzed 113 deceased patients from a cohort of 799 moderate-to-severely ill COVID-19 patients during January 13–February 12, 2020, reported that 105 (93%) deceased patients and 144 (89%) survivors had received empiric antibacterial therapy with either moxifloxacin, cefoperazone, or azithromycin (*6*). These antibiotics are strongly associated with *C. difficile* infection (CDI) (*7*). We report an observation of CDI as a co-occurrence or sequalae of overuse of antibiotics in COVID-19 patients.

We conducted a clinical surveillance review of CDI for all laboratory-confirmed COVID-19 patients treated at any of the hospitals belonging to Detroit Medical Center (Detroit, Michigan, USA). We screened patients by using TheraDoc software (https://www.theradoc.com) during March 11–April 22, 2020. We abstracted data regarding baseline demographics, medical history, symptoms, laboratory values, microbiologic findings, concomitant antibiotic use, and treatment for CDI. We obtained institutional review board approval for this study.

We identified 9 cases of co-infection with SARS-CoV-2 and *C. difficile*. This cohort mainly included elderly patients who were predominantly female (Table). The rate of CDI at the center was 3.32/10,000 patient-days during January–February 2020 and increased to 3.6/10,000 patient-days during March–April 2020.

We noted prior CDI in 3 patients; these infections occurred 1–4 months before admission. All patients were confirmed to be positive for *C. difficile* by PCR and showed symptoms of diarrhea in addition to other characteristic signs and symptoms, such as abdominal pain, nausea, and vomiting. Two patients had diarrhea and were found to be positive for *C. difficile* at admission, whereas the remaining 7 had onset of diarrhea only after COVID-19 diagnosis; median duration from CDI diagnosis to COVID-19 diagnosis in these 7 patients was 6 days. This group of patients

Table. Baseline demographic and clinical characteristics of 9 patients with *Clostridium difficile* and severe acute respiratory syndrome coronavirus 2 co-infection, Detroit, Michigan, USA, March–April 2020*

Characteristic	Value
Age, y, median	75
Sex	
F	7
M	2
Race	
African American	6
Caucasian	1
Unknown	2
Hospitalization in prior 60 d	5
Required intensive care unit and vasopressors	4
ATLAS score, median†	6
Charlson comorbidity index score, median	8
Symptoms at admission	
Cough	4
Shortness of breath	3
Fever	4
Diarrhea and abdominal pain	2
Laboratory results	
Ferritin, ng/mL, median‡	1,459.4
Leukocyte count, x 10^3 cells/mm^3), average	12.0
Creatinine, mg/dL, average§	4.22
Microbiologic findings	
Blood culture positive	2
Respiratory culture positive	2

*Values indicate no. patients unless otherwise indicated. Some patients had >1 symptom.
†Scoring information available at https://www.mdcalc.com/atlas-score-clostridium-difficile-infection.
‡Ferritin was only obtained in 8 patients.
§Three patients were on dialysis.

were severely ill, having high ATLAS scores (https://www.mdcalc.com/atlas-score-clostridium-difficile-infection) and multiple underlying conditions; hypertension (n = 8) and diabetes (n = 5) were the most frequent of these conditions.

Three patients received antibiotics in the month before admission; 8 received antibiotics at admission. One patient was initiated on antibiotics on day 15; this patient was also receiving antibiotics the month before admission. The most commonly administered antibiotics were cefepime (n = 5), ceftriaxone (n = 3), meropenem (n = 2), and azithromycin (n = 2). Specific CDI therapies were oral vancomycin (n = 6); vancomycin and intravenous metronidazole (n = 1); no treatment (n = 1); and a combination of oral vancomycin, intravenous metronidazole, rectal vancomycin, fidaxomicin, and fecal microbiota transplantation (n = 1). One patient who did not receive antibiotics was considered to be colonized with *C. difficile*. Four (44.4%) patients died during hospital admission, 1 (11.1%) was discharged to hospice, 1 (11.1%) is still hospitalized, and 3 (33.3%) were discharged to a long-term care facility.

CDI is a challenging disease, with a recurrence rate of 15%–20% and a mortality rate of 5% (*8*). When CDI is present as a co-infection with COVID-19, CDI therapy can be difficult to monitor if diarrhea persists because of COVID-19.

These cases highlight the importance of judicious use of antibiotics for potential secondary bacterial infection in patients with COVID-19. Antibiotics are known to have unintended consequences, such as *C. difficile* infection. All 9 patients received antibiotics; the median duration of antibiotic use before PCR-positive CDI was 5 days. All patients in our cohort were elderly, an age group at higher risk for complications from overuse of antibiotics, such as adverse events, antibiotic resistance, and concomitant infections like CDI (*9*). Secondary infections on top of CDI can increase the risk for death in patients with severe COVID-19; in this cohort, 4 patients died and 1 was discharged to hospice. To prevent CDI co-infections during the COVID-19 pandemic, integrated use of antimicrobial stewardship is needed to monitor appropriate antibiotic use.

Symptoms of CDI can complicate diagnosis of COVID-19 because both conditions can have similar manifestations; in a study of 206 COVID-19 patients, 19.4% had diarrhea as the first symptom onset (*10*). Of the 2 patients who had CDI diagnosed at admission, 1 patient solely had gastrointestinal symptoms, which possibly led to delayed diagnosis of COVID-19. Both COVID-19 and CDI should be considered when evaluating patients with diarrhea during the COVID-19 pandemic. Distinguishing between actual CDI versus colonization also is vital; 1 patient in our cohort was colonized. A limitation of this study is the small number of cases. However, in the face of the COVID-19 pandemic and the extensive use of antibiotics, clinicians should remain aware of possible CDI and SARS-CoV-2 co-infection.

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SARS-CoV-2 RNA Detection on Disposable Wooden Chopsticks, Hong Kong

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We detected severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) RNA on disposable wooden chopsticks used by 5 consecutive asymptomatic and postsymptomatic patients admitted for isolation and care at our hospital. Although we did not assess virus viability, our findings may suggest potential for transmission through shared eating utensils.

In late 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged in China (*1*), spreading primarily through droplets and contact with respiratory secretions or fecal materials (*2*,*3*). It has been shown that SARS-CoV-2 remains viable on plastic and stainless steel for 72 hours (*4*), and SARS-CoV on wood for 60 hours (*5*). Chopsticks have been essential eating utensils for >3 millennia, particularly in Asia, and are made mainly of wood and plastic; metal chopsticks are found in some countries, such as South Korea. Personal chopsticks are often used to pick food from communal dishes. We investigated whether chopsticks could be a potential vehicle of transmission for SARS-CoV-2.

We recruited 5 consecutive patients admitted for isolation and care at our hospital: 1 patient who was asymptomatic, 2 whose symptoms had subsided, 1 with moderate coronavirus disease (COVID-19) caused by SARS-CoV-2 infection, and 1 with severe COVID-19. Before mealtimes, each patient was given a pair of wooden chopsticks packed in a sealed plastic bag. These chopsticks are widely available in Hong Kong, including in canteens of public hospitals. They are made of plain wood, not bamboo, and not painted with color or lacquer. After mealtimes, we collected the used chopsticks. We dipped the tips of the chopsticks in 1 mL of phosphate-buffered normal saline and shook them for 30 sec to release saliva and oral fluid. We detected SARS-CoV-2 RNA by quantitative reverse transcription PCR (*6*). We collected serial sputum samples and nasopharyngeal and throat swabs to document respiratory shedding and for comparison of viral RNA concentrations among specimen types. The Joint Chinese University of Hong Kong—New Territories East Cluster Research Ethics Committee approved this study.

Patient A, 47-year-old woman, was a close contact of a confirmed case-patient. Her diagnosis was based on a surveillance throat sample collected during quarantine. She was admitted to the hospital for isolation and appeared asymptomatic throughout her stay. A pair of chopsticks collected 2 days after admission (12 days after her last exposure) was positive for SARS-CoV-2 RNA (Figure). Two respiratory samples collected after admission were also positive. High-resolution computed tomography (HRCT) of her lungs revealed small consolidations and ground-glass opacities in both lower lobes, left upper lobe, and right middle lobe.

Patient B, a 22-year-old woman, had a runny nose, headache, and fever develop on the day she returned from Europe. Her symptoms subsided after admission. Two chopsticks collected 1–2 days after symptoms had subsided were positive for SARS-CoV-2 RNA (Figure). Viral RNA was detected from respiratory specimens until 8 days after symptoms had subsided. HRCT revealed small patchy ground-glass opacity in the anterior segment of the left upper lobe of the lungs.

Patient C, a 67-year-old man with hypertension and minor coronary artery disease, had fever, cough with whitish sputum, and loose bowel movements develop 2 days after returning from Europe. Chopsticks collected 5 and 7 days after illness onset were positive for SARS-CoV-2 RNA (Figure). All respiratory