

CASE REPORT

A Patient with *Escherichia coli* Bacteremia and COVID-19 Co-Infection: A Case Report for the Louisville COVID-19 Epidemiology Study

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Abstract

Patients with COVID-19 may have co-infections with other microorganisms. Here we report a case of a patient with an *Escherichia coli* bacteremia secondary to a urinary tract infection, who experienced fevers while on active antimicrobial therapy.

The patient was eventually tested for COVID-19 and found to be positive. This case emphasizes the need to suspect COVID-19 even in patients with documented bacterial infection.

Introduction

Current CDC guidance encourages health care providers to consider testing for SARS-CoV-2 infection in patients with signs and symptoms consistent with COVID infection.[1] Reports of both viral and bacterial co-infection are now emerging.[2-6] We describe a patient with *Escherichia coli* bacteremia secondary to a urinary tract infection, who developed persistent high fevers despite receiving appropriate antimicrobial therapy based on susceptibility results. Due to clinical deterioration, the patient was tested for novel coronavirus infection and found to have a positive nasopharyngeal PCR. Our case report serves as a caution against ruling out SARS-CoV-2 when another infectious process may not fully explain a patient's symptoms.

Case Presentation

A 64-year-old white male presented to the emergency department with a chief complaint of burning with urination starting 4 days prior to admission. His past medical history was significant for type 2 diabetes mellitus, hypertension and pancreatitis. The patient also endorsed urinary retention, gait instability, nausea, vomiting and chills. Blood and urine cultures were collected, both of which grew pan-susceptible *E. coli*. The patient received active antibiotics for his *E. coli* infec-

tion throughout his hospitalization.

On hospital day 2, the patient had a urinary catheter placed due to continued urinary retention. He also reported diarrhea and was tested for *C. difficile* infection, which was negative. Repeat blood cultures were obtained and demonstrated no growth, confirming clearance of the patient's bacteremia.

On hospital day 4, a CT of the abdomen/pelvis was obtained, which noted an evolving prostate abscess (Figure 1). Of note, the patient also began reporting a dry cough and developed high fevers with a maximum temperature of 103.4 °F. That evening, he required Bi-PAP in order to maintain SaO₂>90%. He was eventually intubated due to respiratory failure. At this point, a nasopharyngeal COVID-19 PCR test was obtained due to rapid clinical deterioration despite adequate management of the patient's bacterial infection. The patient was also placed into COVID-19 appropriate isolation.

The patient went on to develop multi-organ failure, including acute respiratory distress syndrome (Figure 2), and required continuous renal replacement therapy and multiple vasopressors to maintain MAP>65 mmHg. On hospital day 9, the COVID-19 PCR test resulted positive, confirming COVID-19 coinfection. At this time, the patient was non-responsive off sedation and was compassionately extubated shortly thereafter.



Figure 1. CT abdomen/pelvis obtained on hospital day 2. Findings significant for 1) enlarged prostate, seminal vesicles and thick-walled urinary bladder (not visualized here), and 2) new focal 2×1.3 cm region of decreased attenuation at the right lateral periphery of the prostate. It is unclear if this represents phlegmon/early abscess in the setting of prostatitis.

Discussion

SARS-CoV-2 can present with a constellation of non-specific symptoms. In our patient, nausea and diarrhea were possibly the first COVID-19 related symptoms to present. This was followed by a non-productive cough, fevers, and eventual respiratory decompensation.[7, 8] Initially, the patient’s fevers while on antibiotics were thought to be attributable to his undrained prostate abscess. However, given that this patient was initially afebrile and then developed high fevers while receiving antibiotics, this raised suspicion for a second infectious process. The median incubation period of SARS-CoV-2 appears to be about 5 days.[9-11] Lauer *et al.* reported that in their cohort, <2.5% of patients displayed any symptoms within 2.2 days.[9] Based on this information, it seems most likely that our patient acquired COVID-19 prior to presenting to the hospital.

Guidelines from the Surviving Sepsis Campaign suggest that based on current evidence, the presence of another respiratory pathogen does not necessarily rule

out the possibility of COVID-19.[12] In this case, there was delay in clinical suspicion and COVID-19 testing. During the first four days of hospitalization, the patient was not in isolation resulting in numerous health-care worker exposures. This highlights the importance of the aforementioned recommendation. Universal patient screening upon admission may have identified this patient as a COVID-19 case earlier.

Clinical outcomes in patients with COVID-19 and bacterial coinfections have not been well-described. Fan and colleagues describe a case of a patient with COVID-19 and *Mycoplasma pneumoniae* infection.[3] These authors suggest that failing to treat other causes of infection in COVID-19 patients is likely to increase morbidity and mortality.

Worse outcomes were observed in patients with bacterial coinfection and H1N1 influenza. These patients were more likely to require mechanical ventilation and longer ICU stays than patients without coinfection.[13] Additionally, patients with bacterial coinfection had an

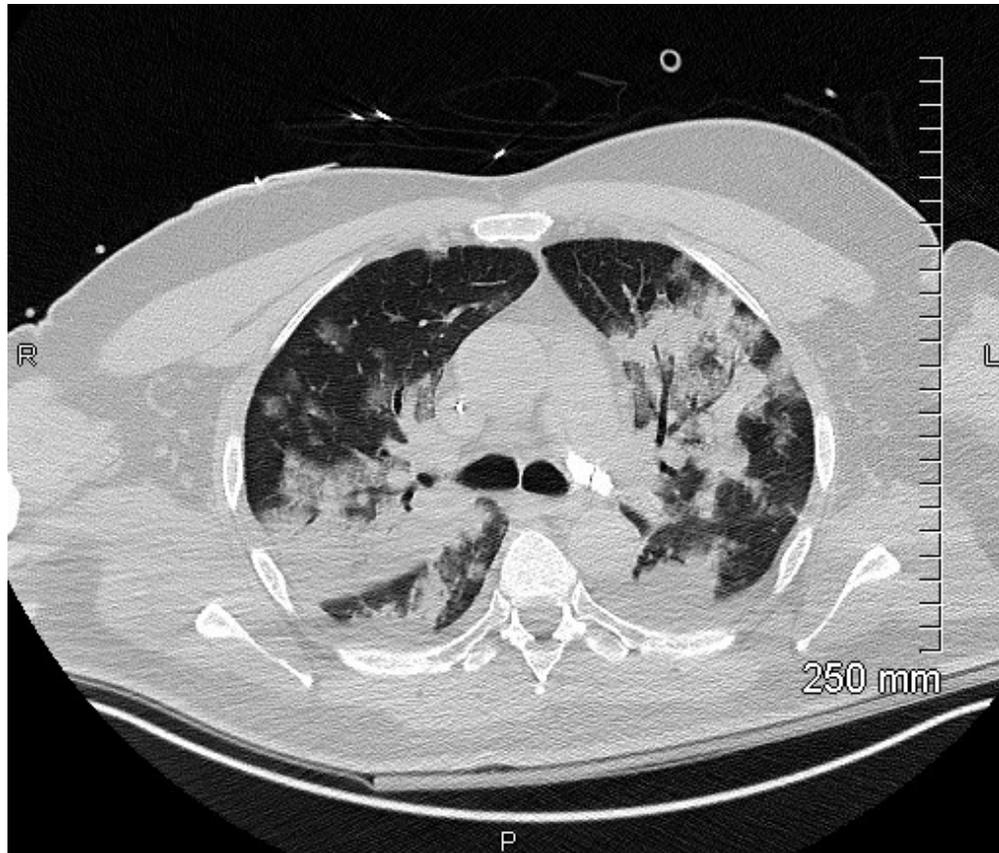


Figure 2. CT chest obtained on hospital day 5. Findings include extensive bilateral dense consolidation involving the upper and lower lobes. There is a small left pleural effusion. Overall appearance is consistent with widespread pneumonia and acute respiratory distress syndrome (ARDS).

inpatient mortality rate of 31%, versus 21% in patients with influenza alone ($P=0.002$).^[13] It is possible that similar outcomes may be observed in the SARS-CoV-2 pandemic, but further data is needed before any conclusions may be drawn.

In conclusion, this case highlights the importance of considering COVID-19 infection even in the setting of a confirmed alternate infectious diagnosis. Clinicians should consider isolation and testing for coinfection if clinically appropriate.

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