

Abdominal Pain Due to Renal Infarction: An Unexpected Presentation of COVID-19

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ABSTRACT

Although respiratory symptoms dominate the clinical presentation of COVID-19, atypical, misleading non-pulmonary complaints can occur. Here we present a case of an otherwise healthy 28-year-old cisgender woman whose initial presentation of COVID-19 was unexplained acute abdominal pain, which was later found to be due to renal infarction. She was treated with anti-coagulation and was discharged after a short hospital stay. This case demonstrates the heterogeneous presentations that are associated with COVID-19. Medical providers must be aware that this virus may mimic a diverse array of disorders, even in the absence of respiratory symptoms.

KEYWORDS: COVID-19, hypercoagulability, renal infarction

INTRODUCTION

Pulmonary symptoms dominate the clinical presentation of COVID-19. However, the virus can affect many other organ systems. For example, case reports of hypercoagulability linked to COVID-19 include pulmonary embolism, cerebral infarction, myocardial infarction, and mesenteric ischemic events.¹⁻⁴ In addition, there have been an increasing number of cases in the literature of renal infarction in COVID-19 patients.⁵⁻¹⁷ Most patients in prior reports in the setting of COVID-19 initially presented with respiratory symptoms and suffered from serious co-morbidities. We present a case of an otherwise healthy cisgender woman with a history of well-controlled asthma whose initial presentation of COVID-19 was pain from renal infarction.

CASE PRESENTATION

A 28-year-old cisgender woman with a history of asthma and migraines presented to the emergency department with sharp, waxing and waning left lower quadrant pain for three days that acutely worsened on the night of admission. The pain was exacerbated by movement and was not responsive to over-the-counter analgesics. The patient denied fevers, chills, dysuria, hematuria, nausea, vomiting, diarrhea, cough, dyspnea, or chest pain. She was an active smoker (0.5 packs/

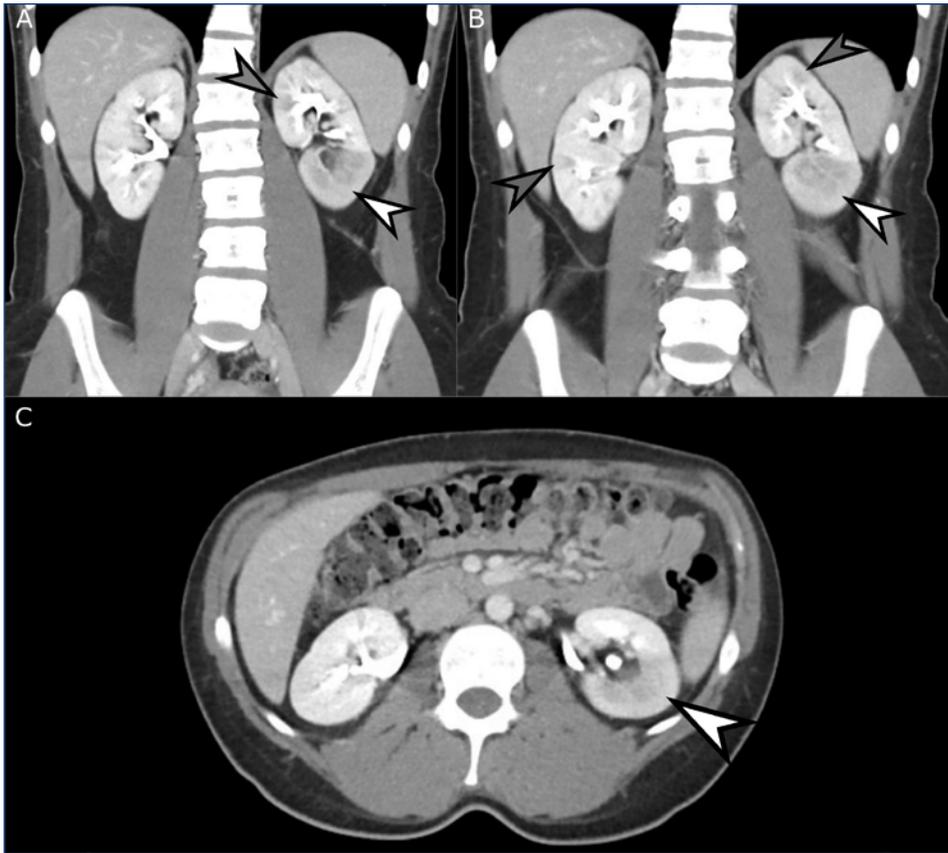
day), but had no other drug use history, such as cannabis or cocaine. She denied personal or family history of blood clots, blood disorders, or rheumatologic disorders, such as lupus or vasculitis. She had three healthy children, a history of three planned abortions, and one miscarriage at five months of gestation. She was not taking hormonal contraceptives. Her medications consisted of albuterol and fluticasone-salmeterol inhalers.

On presentation, she was afebrile, tachycardic to 112 beats per minute, had a blood pressure of 111/82 mmHg, and her oxygen saturation was 96% on room air. Her physical exam was notable for tenderness to palpation in the left upper and lower quadrants, as well as left-sided costovertebral angle (CVA) tenderness. There were no signs of peritoneal irritation.

Laboratory findings on presentation were notable for a creatinine of 1.2 mg/dL (baseline approximately 0.9 mg/dL) and mild thrombocytopenia with a platelet count of 129×10^9 Units/L. Urinalysis showed 16 RBCs/HPF and 1+ blood, but was negative for nitrites and leukocytes esterase, with 1 WBC/HPF. A SARS-CoV-2 PCR test from a nasopharyngeal sample, sent for screening prior to inpatient admission per hospital guidelines, was positive. D-dimer was 303 ng/mL (normal range: 0–300 ng/mL), LDH was 117 IU/L (normal range: 100–220 IU/L) and CRP was mildly elevated at 15.72 mg/L (normal range: 0–10 mg/L). A pregnancy test and urine toxicology were negative. A pelvic ultrasound was negative. Abdominal and pelvic computed tomography (CT) with intravenous contrast showed a hypoattenuating area in the lower pole of the left kidney with additional possible wedge-shaped, hypoattenuating regions in both kidneys (**Figure 1**). Per the radiology read, these findings could reflect renal infarcts versus pyelonephritis. Infection was felt to be less likely given the absence of clinical or laboratory signs of acute urinary tract infection. Magnetic resonance angiography (MRA) of the abdomen with and without intravenous contrast to assess for possible vasculitis demonstrated normal renal and mesenteric vasculature. EKG exhibited normal sinus rhythm. Transthoracic echocardiogram (TTE) with bubble study did not show any evidence of thrombus or shunt.

Given the concern for acute thrombosis, she was started on enoxaparin 1 mg/kg twice daily. Repeat urinalysis and urine culture were negative. An extensive hypercoagulability

Figure 1. CT images. Two coronal slices (A, B) and one axial slice (C). There is a prominent area of hypoattenuation in the lower lobe of the left kidney (white arrowheads), possible smaller wedge-shaped areas of hypodensity in both kidneys (grey arrowheads).



workup, including lupus anticoagulant, anti-cardiolipin antibody, protein C, protein S, antithrombin III, beta-2 glycoprotein antibody, factor V activity, and activated protein C resistance, was negative. Anti-neutrophilic cytoplasmic antibody, ANA and complement C3 and C4 to evaluate for a possible autoimmune process were all unremarkable.

On hospital day two, the patient reported new onset of loss of taste and alteration of smell, followed by a mild non-productive cough. She remained afebrile and without oxygen requirement throughout her hospital stay. Her creatinine decreased to 0.88 mg/dL, D-dimer down-trended to 204 ng/mL, and CRP decreased to 6.09 mg/L. Prior to discharge, her anti-coagulation regimen was switched to aspirin 81 mg PO daily and rivaroxaban 20 mg PO daily with a plan of at least three months of anti-coagulation and outpatient hematology follow-up.

DISCUSSION

While predominantly known as a respiratory disease, data indicate that patients suffering from COVID-19 have an increased risk of hypercoagulable complications, such as deep vein thrombosis, pulmonary emboli, and cerebral

infarctions.^{1,2,5} However, renal infarction, as in this case, is an uncommon manifestation and an exceedingly rare presenting complaint of COVID-19. The pathogenesis of hypercoagulability with COVID-19 is still being examined, with suggested etiologies including massive cytokine release, anti-phospholipid antibody formation, and endothelial activation.¹⁸⁻²⁰

Renal infarction can arise from a variety of etiologies which can be divided into embolic, thrombophilic (or hypercoagulable), and renal artery lesions. In a single-center retrospective case series (N = 186 cases), the most common cause (>80% of cases) of renal infarct was a renal artery lesion, which includes causes such as atherosclerotic disease, dissection, and fibromuscular dysplasia.²¹ Embolic and thrombophilic events comprised 9% and 6% of the cases, respectively.

To our knowledge, this case is one of the first reports of an otherwise healthy young patient whose initial presenting symptom of COVID-19 was pain from abdominal pain, later found to be a renal infarct. Her hypercoagulability workup was negative, and she denied any family history of bleeding or clotting disorders, making a primary hypercoagulable pathology less likely. Her only hypercoagulable risk factor was active tobacco smoking; she denied any other drug use and at the time of presentation was not using hormonal contraceptives. A negative TTE suggested that a cardiac embolic event was less likely. In addition, a negative MRA excluded other etiologies such as fibromuscular dysplasia or vasculitis.

Our literature review revealed 13 articles with a total of 16 other cases of renal infarcts in the setting of COVID-19 (Table 1). Including the case presented here, 4/16 patients had female sex assigned at birth. Three of these patients were also the youngest among the case reports (28, 39, and 41 years) and included the only three patients whose presenting symptom was flank or abdominal pain. In contrast to this case, the other patients presenting with flank pain had other comorbidities such as poorly controlled hypertension, diabetes mellitus, and obesity. All other patients in this small sample size presented with fever and/or respiratory symptoms.

Table 1. Literature review of renal infarcts in the setting of COVID-19

Article	Patient Age	Patient Sex	Past medical history	Presenting symptom(s)
Mukherjee et al. ⁷	71	Male	None	Fever, cough, dyspnea, chest discomfort
Xu et al. ¹⁸	46	Male	Kidney and pancreas transplants	Dyspnea and cough
Post et al. ⁵	62	Male	HTN, Henoch-Schönlein glomerulonephritis, kidney transplant	Dry cough, fever, dyspnea
Post et al. ⁵	58	Male	Obstructive sleep apnea	Fever, cough, rhinorrhea, abdominal pain, increasing dyspnea
Tascón et al. ¹⁰	56	Male	T2DM, mixed dyslipidemia, uncomplicated diverticulosis	Malaise, fever, cough, diarrhea
Imoto et al. ¹¹	64	Male	Gastric and duodenal ulcers	Fever
Besutti et al. ¹²	54	Male	Asthma, smoking history, ulcerative colitis	Syncope, dyspnea, fatigue, fever
Besutti et al. ¹²	53	Male	HTN, mitral valve replacement	Fever, cough, sore throat
Ramanathan et al. ⁹	54	Male	None	Dry cough, dyspnea, fever
Ammous et al. ⁶	62	Male	HTN, Asthma	Dyspnea
Kundal et al. ¹³	39	Female	Poorly controlled HTN, obesity, OCP use, patent foramen ovale	Right flank pain
Añazco et al. ¹⁴	41	Female	Diabetes Mellitus, obesity	Low back pain, respiratory failure, DKA, shock
Webb et al. ¹⁵	49	Male	CKD, Deceased donor kidney transplant	Cough, fever, dyspnea, and myalgia
Mantica & De Rose ¹⁶	67	Female	Lung adenocarcinoma	Nausea and abdominal pain
Lushina et al. ¹⁷	84	Male	HTN	Respiratory distress
This case	28	Female	Asthma, Migraines	Left lower quadrant pain

Abbreviations: HTN: hypertension; T2DM: Type 2 Diabetes Mellitus; OCP: oral contraceptive; DKA: diabetic ketoacidosis

This case suggests that COVID-19 may present with potentially misleading non-pulmonary complaints that mimic a wide array of other diseases. Especially during the current pandemic, physicians need to be aware that COVID-19 should be considered in selected patients in the absence of pulmonary symptoms or systemic signs such as fever. Further research is necessary to evaluate the relationship between COVID-19 and hypercoagulable events. This is particularly important in the setting of recent pauses in vaccine roll-out due to vaccine-associated thrombotic complications.^{22,23}

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