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Renal angiomyolipoma rupture in a young female with COVID-19

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ABSTRACT

While primarily a respiratory illness, infection with the novel coronavirus (COVID-19) is associated with pathologic changes in coagulation, characterized by both thromboembolic and bleeding events. We present the case of a 22-year-old female diagnosed with renal angiomyolipoma (AML) rupture 2 weeks after COVID-19 infection, ultimately requiring admission for hemorrhage control via endovascular embolization. Emergency medicine physicians should maintain a high index of suspicion for renal AML rupture and other spontaneous bleeding events in patients with recent COVID-19 infection due to a possible correlation between the two.

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1. Background

While primarily a respiratory illness, infection with the novel coronavirus (COVID-19) is associated with both thromboembolic and bleeding events [1–5]. The pathologic clotting associated with COVID-19 has been established in the literature, however, there is emerging data suggesting a concomitant risk of hemorrhage. The association with bleeding is most prevalent in critically ill patients, though it has been described in non-critically ill patients, such as a case of spontaneous kidney hematoma [5,6]. Renal angiomyolipoma (AML) are typically benign neoplasms which rarely present with rupture and hemorrhagic shock. We describe a case of a 22-year-old female who was diagnosed with a ruptured renal AML two weeks after COVID-19 infection.

2. Case report

A 22-year-old female presented to the emergency department with acute-onset left flank pain. Her pain began while at rest, reached maximum intensity within minutes, radiated to her left shoulder, and was described as having been “kicked in the back.” The patient denied fevers, nausea, vomiting, dysuria, and hematuria. Two weeks prior, the patient had presented to the ED with five days of cough, shortness of breath, myalgias, and fevers, and was subsequently diagnosed with COVID-19 via nasopharyngeal PCR assay. Her medical history was notable for iron deficiency anemia and an appendectomy. Her only medication

was an oral combined estrogen-progesterone contraceptive. She denied family history of renal disease or coagulopathic disorders.

Her initial vital signs included: heart rate 109, blood pressure 135/84, oxygen saturation 99%, respiratory rate 18, and temperature 36.9C. An abdominal exam revealed a soft, nondistended abdomen with focal left upper quadrant tenderness. There was no palpable mass, rebound, or guarding. The patient also had severe tenderness upon percussion of the left costovertebral angle. A tachycardic rate with normal rhythm was auscultated on cardiopulmonary exam, otherwise the remainder of her physical exam was unremarkable. Laboratory studies revealed: white blood cell count 13.8 cells/mm³, hemoglobin 13.4 g/dl, PT 14 s, APTT 35.4 s, INR 1.1. Urine studies showed microhematuria and a negative pregnancy test. A chest x-ray was unremarkable. Non-contrast computed tomography of her abdomen and pelvis demonstrated left peri-renal moderate volume hemorrhage with a fat dense lesion in the left kidney measuring 2.5 × 2.3 × 2.1 cm, consistent with ruptured renal AML. After this discovery a type and screen was ordered, urology and interventional radiology were consulted, and the patient was admitted to the intensive care unit. Interventional radiology performed embolization 12 h after admission. The intraprocedural evaluation of the renal artery system found no aneurysmal dilatation.

The patient's post-procedural course was complicated by continued hemorrhage and retroperitoneal hematoma, with a hemoglobin nadir of 6.8 g/dl requiring transfusion of 2 units packed red blood cells. She also developed diaphragmatic irritation and required supplemental oxygen by nasal canula. On hospital day 6 she developed respiratory COVID-19 symptoms and again tested positive by PCR assay for COVID-19. She was discharged on hospital day 8 with oral analgesics.

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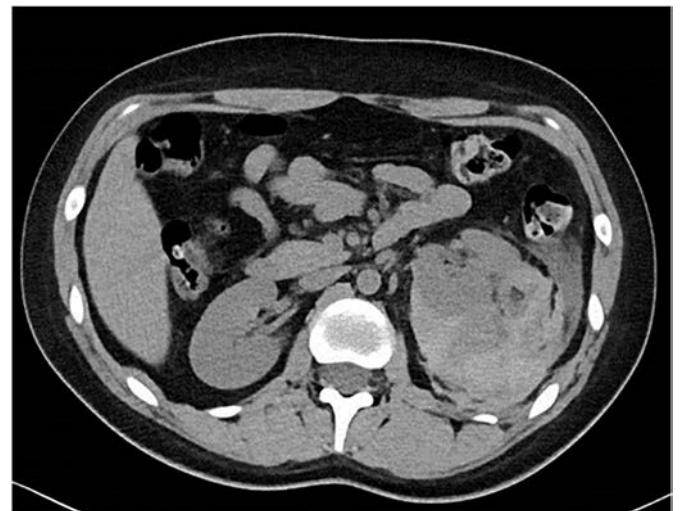
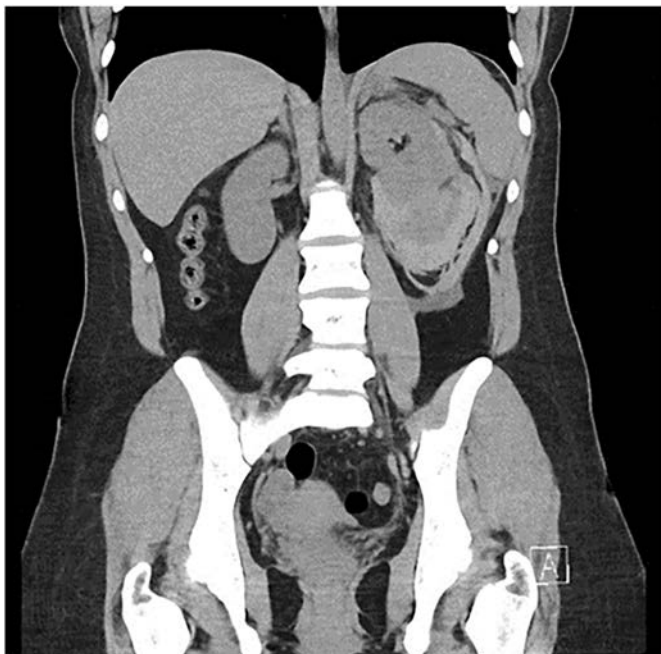
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3. Discussion

Renal AML is a benign neoplasm caused by proliferation of epithelioid cells and composed of adipose tissue, blood vessels, and smooth muscle [7]. The incidence is approximately 0.13% with a female predominance [8,9]. 80% of renal AMLs develop sporadically while the remainder are associated with tuberous sclerosis. Renal AMLs larger than 4 cm have a significantly higher risk of rupture, however, rupture can occur at smaller sizes and larger AMLs may remain stable [8,10]. The median age at time of solitary renal AML rupture is 50 years old [10,11]. Over 90% of renal AMLs are discovered incidentally on imaging, though some patients may present with Wunderlich syndrome, spontaneous, nontraumatic hemorrhage into the perinephric space characterized by the triad of flank pain, flank mass, and hypovolemic shock [11,12]. Spontaneous rupture has also been associated with coagulopathic states such as pregnancy [13–15].

A statement of causality cannot be made from a single incident of a ruptured renal AML rupture following a COVID-19 infection, though the timing is notable. The patient had none of the previously mentioned risk factors, including pregnancy, aneurysm, or AML size greater than 4 cm. Other spontaneous bleeding complications have been described after infection with COVID-19, such as retroperitoneal hematoma, gastrointestinal bleeding, hemopneumothorax, and cerebral hemorrhage, [4,5,8,16–18]. Proposed mechanisms of COVID-associated coagulopathy include direct infection of endothelial cells via ACE-2 receptors and delayed autoantibody development against endothelial cells [19,20]. Prolonged PT, APTT, and INR and elevated D-dimer are associated with poor COVID-19 outcomes and can be considered by EM physicians concerned for a COVID-related coagulopathy [21].

Rupture of a renal AML may mimic other diagnoses and can lead to life-threatening hemorrhagic shock. Understanding the possibility of increased bleeding risk in patients with recent COVID-19 infection, emergency medicine physicians should maintain a high index of suspicion for such spontaneous events. Emergency treatment considerations include blood product transfusion, reversal of anticoagulant medications, and expedient consultation to surgical, critical care, and interventional radiology services.



Images: non-contrast CT of the abdomen and pelvis demonstrating left kidney with a cortically based, interpolar 2.5 × 2.3 cm mass with central fat density. Associated moderate volume perirenal hematoma and edema.

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Disclaimer

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Declaration of Competing Interest

None

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