

# Spontaneous Renal Rupture and Hematoma in a Covid - 19 Case

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## Abstract

**Background:** Covid-19 is a life-threatening disease-causing and accompanying multiple organ injuries in hospitalized patients.

**Case presentation:** A 73-year-old male patient was admitted to a hospital in Tehran province. He had symptoms of COVID-19 disease, and his involvement with COVID-19 was confirmed by the molecular method and patchy areas of ground-glass opacities in the computed tomography (CT) scan. He was under treatment for his diabetes and hypertension. After a few hours of admission, he had low oxygen saturation (80%); hence he became under intensive care, oxygen, and anticoagulant therapy. On day 6 of ICU admission, his clinical status became worse when he had left side pain, hematuria, glucosuria, proteinuria, and high serum creatinine level (3.28 mg/dL). CT scan imaging was indicating of renal hematoma. The surgical or any invasive intervention was impossible due to the unstable status of the patient. Packed red cell and plasma replacement therapy were not effective in the prevention of expiration of the patient on day 7 of hospitalization. Spontaneous renal hemorrhage concurrent with COVID-19 disease was the definite diagnosis for this case.

**Conclusion:** We think that COVID-19 involvement may accelerate renal injury in our case. Anyhow, there were multiple predisposing risk factors for renal hematoma, in this case, such as diabetes, anticoagulant therapy, and COVID-19. We suggest that COVID-19 involvement accelerates renal problems. Nevertheless, this conclusion should be confirmed by other reports and research by clinical scientists.

**Keywords:** Case Reports, COVID-19, Acute Kidney Injury, Intensive Care Unit, Hematuria.

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## BACKGROUND

Acute respiratory failure and diffuse alveolar damage are clinical features of coronavirus disease 2019 (COVID-19) in hospitalized patients, which lead to multiple organ injuries<sup>1</sup>. COVID-19 manifestations include mild respiratory symptoms, cerebrovascular damage, acute hemorrhagic and necrotizing encephalopathy, and intracerebral hemorrhage. COVID-19 also evokes acute kidney injury (AKI), acute ischemic stroke, and hematoma<sup>2-4</sup>. Nowadays, investigators pay attention to kidney involvement in COVID-19 patients<sup>5-7</sup>. However, more evidence is necessary to show any association between COVID-19 disease and renal involvement, particularly spontaneous hematoma (SH). However, amongst those with severe infection who need hospitalization are AKI patients<sup>1</sup>. We aim to present the clinical feature of AKI and Spontaneous renal hemorrhage potentially caused by 19-COVID infection with systemic inflammation in a confirmed case of COVID-19.

## Case presentation

A 73-year-old male patient of Persian ethnicity was admitted to a hospital in Tehran province, on March 31, 2021, with the main symptoms of shortness of breath, dry cough, anorexia, headache, body aches, and 38°C fever; he had a history of diabetes, high blood pressure, and prostatectomy.

He has received 25 mg Losartan twice a day, Metoprolol 25 mg twice a day, and Metformin 500 mg twice a day, for his history of hypertension and diabetes. The patient and his family had no history of drug or food allergies. They had no history of vasculitis, ischemia, embolism, diffuse intravascular coagulation, or bleeding. The patient just used 80 mg/day of acetylsalicylic acid. He had no history of anticoagulant usage. The patient and his family had not any mental or social disorders.

On the day of admission, a transverse thoracic computed tomography (CT) scan showed patchy areas of ground-glass opacities with consolidation (Fig.1), and the coronavirus

real-time polymerase chain reaction (PCR) assay was positive for coronavirus. The comprehensive treatment protocol for Covid-19 disease started quickly. A few hours after admission to the emergency ward, the patient was transferred to the intensive care unit (ICU) because of a low blood level of oxygen saturation rate (80%), and oxygen therapy started.

On the first day of admission to ICU, the managing team requested laboratory tests and administered Remdesivir, Meropenem, and Levofloxacin. Enoxaparin sodium (Clexane), Pantoprazole, and Methylprednisolone also were prescribed.

On April 05, 2021, the patient complained about pain in the left side and concomitant hematuria. We requested daily laboratory tests for our patient, including urine analysis, complete blood count (CBC), blood urea nitrogen (BUN), creatinine (Cr), prothrombin time (PT), partial thromboplastin time (PTT), and international normalized ratio (INR) tests. Abdominal and pelvic ultrasounds and urological consultations were requested and done for the patient. The only finding in his sonography was lithiasis. We considered Daily monitoring of kidney function tests and precise control of nutritional material intake for the patient. The urine analysis result showed positive protein (2+), glucose (2+), hematuria (4+), and white blood cells (20-25 cells/HPF). The ultrasound showed only small stones in both kidneys. The patient's bleeding time was 3 minutes (2-7 minutes), and clotting time was 8 minutes (normal range= 8-15 minutes) were within normal limits when hematuria occurred.

Also, a rheumatology specialist checked the patient for vasculitis, ischemia, embolism, and diffuse intravascular coagulation. The patient suffered hematuria with concurrent decreased hemoglobin and hematocrit with increased PT, PTT, and INR.

On the morning of April 06, 2021, the patient received two packed red cells, two FFPs, and two cryoprecipitate bags. April 6, 2021 (evening hours), unstable hemodynamic status manifested; decreased blood pressure, diminished urine volume, and increased heart rate was evident. In addition, discoloration of the skin on the left side with a significant protrusion, pain, diffused sensitivity of the abdomen to touch, and restlessness of the patient were evident; these findings suggest hematoma. Daily follow-ups for infection status and severity, in addition to anesthesiology evaluations, were done. The patient underwent both abdominal and pelvic CT scans and abdominal and pelvic ultrasounds Sonography. Both procedures confirmed the renal rupture and hematoma. Radiologists, infectious disease specialists, nephrologists, and intensive care specialists confirmed the renal rupture and hematoma. And again on day 7 of ICU admission, nephrology, radiologist, rheumatology, surgical intervention, and oncology evaluation were done. the rheumatology consultant again evaluated the status of vasculitis, ischemia, embolism, and

diffuse intravascular coagulation. As well as an oncology and a surgery specialist assessed the patient for potential diagnosis or treatment. **Fig. 2** shows a CT scan taken without contrast from renal hematoma and rupture in this case. A computed tomography scan of his abdomen and pelvic showed a renal hematoma.

Taken image of posterior peritoneal hemorrhage due to the renal rupture is represented in **Fig.3**; this image was obtained after an emergency abdominopelvic CT scan without contrast. According to the surgical evaluation about the success or failure of drainage intervention using the Sonoguide, sonography did not perform. Anyhow, our patient had not a stable hemodynamic and clinical condition; any extra intervention could exacerbate the bleeding event. The manifestation of clinical findings guides us in evaluating the patient CBC, PT, PTT, INR, fibrin degradation product (FDP), albumin, and plasma fibrinogen. On April 06, 2021 (night hours), the patient became intubated due to decreased blood oxygen levels and consciousness. As the patient had an unstable status, MRI was not possible. We did only a CT scan, again. After evaluating the lung CT scan and other radiographic images, the visiting physician reported the "bilateral severe patchy ground glass" after evaluating the lung CT scan and other radiographic images. In addition, ultrasound-guided drainage of hematoma was impossible because of potential severe bleeding and unsafe interventions due to the unstable physiological status of the patient. The patient manifested with the anuric phase experiencing a hypovolemic and septic shock, and unfortunately, he was expired. The patient had no previous history of renal impairment, and his laboratory results were in the normal range. According to the CT scan result, the COVID-19 Reporting and Data System (CO-RADS) score was 6; such a score is representative of definite COVID.

The patient was an AKI case with a median Cr value equal to 3.28 mg/dL (normal range: 0.6-1.4 mg/dL). All medications taken during ICU inhabitation were adjusted by glomerular filtration rate. We stabilized the patient clinical status with the appropriate type and volume of intravenous fluid. Nevertheless, laboratory results included RBC count, hemoglobin, and hematocrit were changing day to day and showed an aggravated status during seven days of hospitalization. However, BUN, Cr, PT, PTT, and INR values were increased (**Table 1**). We have reported the Summary of interventions performed on the patient in **Table 2**.

## DISCUSSION

AKI is an increase in serum Cr over baseline<sup>8,9</sup>. Bonet was reported spontaneous renal hematoma (SRH) in 1679<sup>10</sup>, and Wunderlich described it later in 1856<sup>11</sup>. SRH may present with acute flank pain, tenderness, and symptoms of internal bleeding<sup>12</sup>. It may mimic acute abdominal conditions like acute appendicitis or perforated viscus and dissecting

aneurysm<sup>13</sup>. A meta-analysis by Zhang et al. reported that 61.5% of cases of spontaneous perirenal hemorrhage have been due to tumors (31.5% malignant and 29.7% benign), 17% owing to vascular diseases, 2.4% were because of infection, and 6.7% were idiopathic<sup>14</sup>. McDougal et al. had a literature review in 1989 and found that in 123 cases, tumor involvement has been the notable cause of perirenal hematoma in 57-87% of cases. Vasculopathy was present in 11-26%, followed by the infection (5-10% of cases), while a few were idiopathic<sup>15</sup>. Recently, Lal et al. reported a case of bilateral SRH due to metastasis of choriocarcinoma<sup>16</sup>. This condition might be accountable to antiplatelet drug therapy<sup>17</sup>. Also, Cozzoli et al. reported this condition even during pregnancy<sup>18</sup>.

Literature suggests that infection with COVID-19 provokes arterial and venous thrombotic events<sup>19</sup>, which could be contributing to the multisystem damage. In an autopsy study done by Falasca et al., histopathological hallmarks of widespread vascular injury were found in the liver, kidney, bone marrow, and spleen<sup>20</sup>. Our COVID-19 case involved acute renal impairment during admission to ICU. This finding was consistent with Naicker et al. report<sup>1</sup>. This finding was consistent with the previous report by Naicker et al. Our case had multiple risk factors collectively resulting in the patient's death. High blood pressure, anticoagulant therapy, inflammation, and infection after COVID-19 involvement were the considerable risks for this reported case.

## CONCLUSION

SRH could be raised after a variety of conditions. Acute respiratory diseases like COVID-19 involvement may aggravate SRH clinical outcomes. Therefore, we suggest that the renal function of COVID-19 patients should be under special attention and monitoring. Hence, proper intervention for AKI management, as early as possible, is vital for patients with multiple risk factors that exist with COVID-19 infection concurrently. We reported a case showing that SRH can be potentially from COVID 19 infection with systemic inflammation. However, additional studies are warranted to determine the cause-effect relationship between COVID-19 and AKI-induced SH.

## Consent for publication

Written informed consent was obtained from the patient's next of kin to publish this case report and any accompanying images. A copy of the written consent is available for review by the journal's Editor-in-Chief.

**Ethics approval and consent to participate:** The authors considered all the ethical considerations based on the international ethical protocols, and the ethics committee approved the work of Laleh hospital in Tehran city.

**Availability of data and materials:** The information in this manuscript was collected from the corona ward of Laleh

Hospital in Tehran. All data generated or analyzed during this study are gathered in this manuscript.

**Competing interests:** The authors declare that they have no competing interests.

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**Authors Contributions:** MT and AL analyzed and interpreted the patient data, performed the physical examination, and was a significant contributor to writing the manuscript. All authors read and approved the final manuscript.

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Table 1: Laboratory findings during seven days of hospitalization of the studied COVID-19 case suffering a spontaneous renal hematoma

Date/time	03.31 Admision	04.01	04.02	04.03	04.04	04.05	04.06 morning	04.06 evening	04.06 night
RBC (×10 <sup>6</sup> cells/μL)	6.49 <sup>+</sup>	-	-	5.43	-	5.16	3.3 <sup>†</sup>	2.54 <sup>†</sup>	2.15 <sup>†</sup>
Hb (g/dL)	19.7 <sup>+</sup>	-	-	16.1	-	15	6.3 <sup>†</sup>	7.4 <sup>†</sup>	6.2 <sup>†</sup>
HCT (%)	54.7 <sup>+</sup>	-	-	47.4	-	44.7	18.5 <sup>†</sup>	22.1 <sup>†</sup>	18.1 <sup>†</sup>
PLT (×10 <sup>3</sup> cells/μL)	150	-	-	300	-	288	322	193	135 <sup>†</sup>
BUN (mg/dL)	21.5	20.1	31.8 <sup>†</sup>	32.7 <sup>†</sup>	33.2 <sup>†</sup>	42.5 <sup>†</sup>	50.5 <sup>+</sup>	41.1 <sup>+</sup>	36.5 <sup>+</sup>
Cr (mg/dL)	0.69	0.6	1.15	1.16	1.07	1.18	1.65 <sup>+</sup>	3.28 <sup>+</sup>	4.4 <sup>+</sup>
PT (sec)	16 <sup>†</sup>	-	-	-	-	18 <sup>+</sup>	29.3 <sup>+</sup>	-	62.1 <sup>+</sup>
PTT (Sec)	38.5 <sup>+</sup>	-	-	-	-	37.2 <sup>+</sup>	50.1 <sup>+</sup>	-	-
INR (Ratio)	1.24 <sup>+</sup>	-	-	-	-	1.4 <sup>+</sup>	2.33 <sup>+</sup>	-	5.14 <sup>+</sup>
D-Dimer	-	0.63 <sup>†</sup>	-	0.18	0.1	0.5 <sup>†</sup>	-	0.38	-
Fibrinogen (mg/dL)	-	-	-	-	-	-	124	-	-
FDP (μg/mL)	-	-	-	-	-	-	> 5 <sup>+</sup>	-	-

‡ Upper than the normal range

† Lower than the normal range

Table 2: Summary of the interventions performed on the patient

Date/time	Interventions performed for the patient
03.31	The patient was admitted to the emergency ward at 9 AM. The comprehensive treatment protocol for Covid-19 disease started quickly. Transverse thoracic CT scan and PCR test were performed.
03.31	The patient was transferred to the ICU at 1 PM because of a low blood level of oxygen saturation rate (80%)
04.01 to 04.04	The patient was thoroughly cared for and monitored, and laboratory tests and treatments were performed.
04.05	The patient complained the pain in the left side and concomitant hematuria at 10 PM. The anticoagulant drug (Clexane) was held, and the samples for necessary tests were sent quickly.
04.05	Abdominal and pelvic ultrasound was done at 11 PM. Urological and rheumatology consultations were requested. One bag packed with red cells was reserved.
04.06	The patient received two bags packed with red cells, two units FFP and two cryoprecipitate bags at 5 AM.
04.06	The hemodynamic status of the patient became unstable at 4 PM. Discoloration of the skin on the left side with significant protrusion, pain, and diffuse abdomen sensitivity to touch occurred. Careful monitoring of the hematoma position was performed
04.06	emergency consultation for rheumatology, oncology, surgery, and Urological were requested again at 4.30
04.06	The patient Intubated at 6 PM
04.06	The patient died at 8 PM.

\*\*\*It should be noted that the patient was under complete care and monitoring on all days and hours.



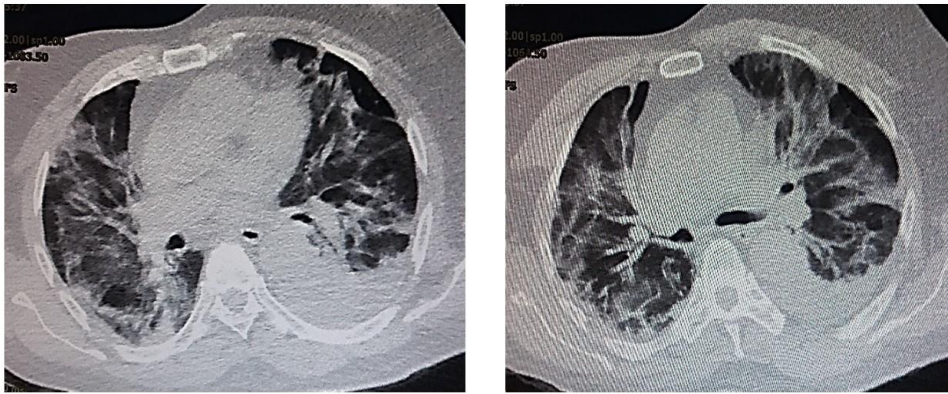


Figure 1: Chest computed tomography scan of the patient on admission to the ICU

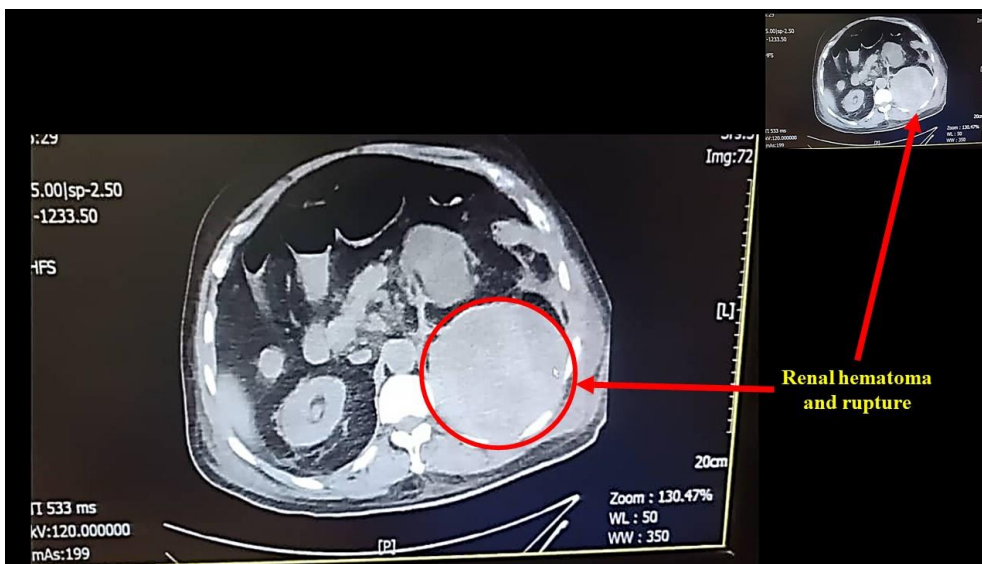


Figure 2: Abdominopelvic Computed tomography scan without contrast; renal hematoma and rupture are evident, resulting in local hematoma at the posterior peritoneal hemorrhage shown in Figure 3

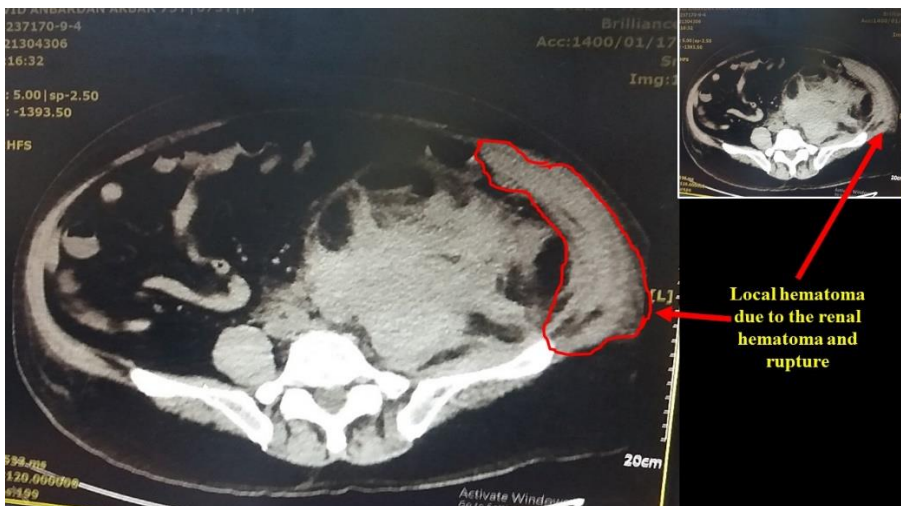


Figure 3: Abdominopelvic Computed tomography scan without contrast; Posterior peritoneal hemorrhage due to the renal rupture