Stealthy Encounter: COVID-19-Associated AKI Unveiled in the Emergency Room

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INTRODUCTIONS

- Acute kidney injury (AKI) necessitates immediate identification of underlying causes for effective management.
- In the emergency department (ED), the primary focus is on stabilizing the patient and identifying factors to prevent catastrophic complications of AKI.
- While ED physicians primarily address common non-infectious pre-renal, intrinsic, and post-renal causes, rare presentations can still be missed.
- This case highlights the uncommon presentation of a COVID-19-induced AKI in the ED.

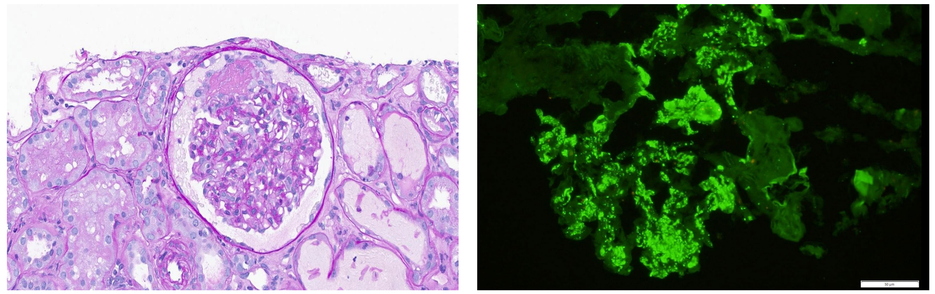
CLINICAL HISTORY

- A 69-year-old male presented to the emergency room with a one-week history of gross hematuria.
- His medical history included obesity, hyperlipidemia, tobacco use, hypertension, psoriasis, and irritable bowel syndrome.
- In the ED, he was diagnosed with acute kidney injury (AKI). His baseline creatinine of approximately 1 mg/dL and it has worsened acutely to 2.2 mg/dL.
- His blood pressure was markedly elevated at 200/100 mmHg.

INVESTIGATIONS

- Initial urinalysis revealed significant hematuria (>100 RBCs per high-power field), leukocyturia (20-30 WBCs per high-power field), and significant proteinuria (>300 mg/dL) on urinalysis.
- Imaging studies, including renal ultrasound and CT abdomen pelvis, were normal.
- Empirical antibiotics were administered for a possible urinary tract infection.
- The patient was discharged within 24 hours after responding well to fluids,antibiotics, and antihypertensive medications.
- Plans for outpatient follow-up were made.

CASE IMAGING



Kidney biopsy revealed focal necrotizing and crescentic glomerulonephritis, mesangial proliferation, and C3 deposits

FOLLOW-UP AND HOSPITALIZATION

- During outpatient follow-up, the patient was readmitted to the ED due to worsening symptoms, including bilateral flank pain and dark urine.
- Extensive investigations revealed severe acute renal failure, with creatinine rising to 5.7 mg/dL.
- Urine analysis showed significant hematuria, orange turbidity, and leukocyturia.
- His workup was negative for autoimmune renal disease, urine cytology, and other infectious tests, and normal imaging, but he tested positive for SARS Coronavirus.
- He underwent kidney biopsy which demonstrated focal necrotizing and crescentic glomerulonephritis, mesangial proliferative changes, and C3 deposits, consistent with COVID-19-associated renal pathology.

Test Name	ED - Day 1	Follow-up Outpatient	Hospitalization Day 1	Hospitalization Day 2	Post-Hospitalization (1 month)	Post-Hospitalization (2 months)
Sodium, P	134 (L)	134 (L)	132 (L)	141	139	138
Potassium, P	3.3 (L)	3.6	3.5 (L)	3.8	3.6	3.7
Chloride, P	94 (L)	94 (L)	92 (L)	100	99	99
Bicarbonate, P	31 (H)	25	26	31 (H)	31 (H)	27
Anion Gap, P	9	15	14	10	9	12
BUN	29 (H)	93 (H)	93 (H)	31 (H)	15	16
Creatinine	2.27 (H)	6.43 (H)	5.01 (H)	2.56 (H)	1.83 (H)	0.88
eGFR	31 (L)	<15 (L)	<15 (L)	27 (L)	37 (L)	>90
Creatine Kinase, P	81	-	-	-	-	-
Calcium, Total, P	8.7 (L)	7.5 (L)	7.4 (L)	9.1	8.6 (L)	8.9
Glucose, P	120	132	200 (H)	113	127	112
Phosphorus	-	-	-	4.8 (H)	-	-

Trends in Laboratory Test Results During Patient Care

TREATMENT AND OUTCOME

- The patient received Remdesivir, pulse steroids, and a prolonged prednisone taper.
- This treatment resulted in gradual improvement of renal function during a 10-day hospital stay.
- Upon discharge, the creatinine level was 5 mg/dL.
- Continued improvement led to stable creatinine levels of 1.5-1.8 mg/dL at follow-up.
- Hematuria and proteinuria resolved on urinalysis.

DISSCUSION

- Managing AKI in the ED demands a structured approach to identify and address causes promptly.
- This involves initial stabilization, perfusion assessment, edema evaluation, targeted diagnostics, and imaging for post-renal issues.
- Viral infections, such as those causing direct nephrotoxicity, sepsis-induced renal compromise, or immune-mediated glomerulopathies, are crucial considerations.
- These viral infections are often not fully addressed by guidelines focused on pre-renal, intrinsic renal, and post-renal etiologies.

CONCLUSION

- Our experience underscores the importance of recognizing uncommon presentations such as COVID-19-associated AKI.
- These cases are initially missed but can cause significant deterioration.
- Incorporating viral panels into diagnostic protocols based on clinical indicators can aid in early detection and intervention.
- This approach optimizes acute care and improves outcomes in emergent settings like the ED.

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