



A Case Report On Acute Kidney Disease In the Setting of COVID

Kethia Phelizer, D.O., Daniel Baux, D.O., Erik Polan D.O., FACOI

INTRODUCTION

Terms:
 AKI: Acute Kidney Injury, defined by increase in creatinine
 SIADH: Syndrome of Inappropriate Secretion of Antidiuretic Hormone
 CXR: Chest X-ray
 CMP: Complete metabolic panel, includes liver panel
 BMP: Basic metabolic panel, excludes liver panel
 BID: Twice a day
 NS: Normal saline IV solution

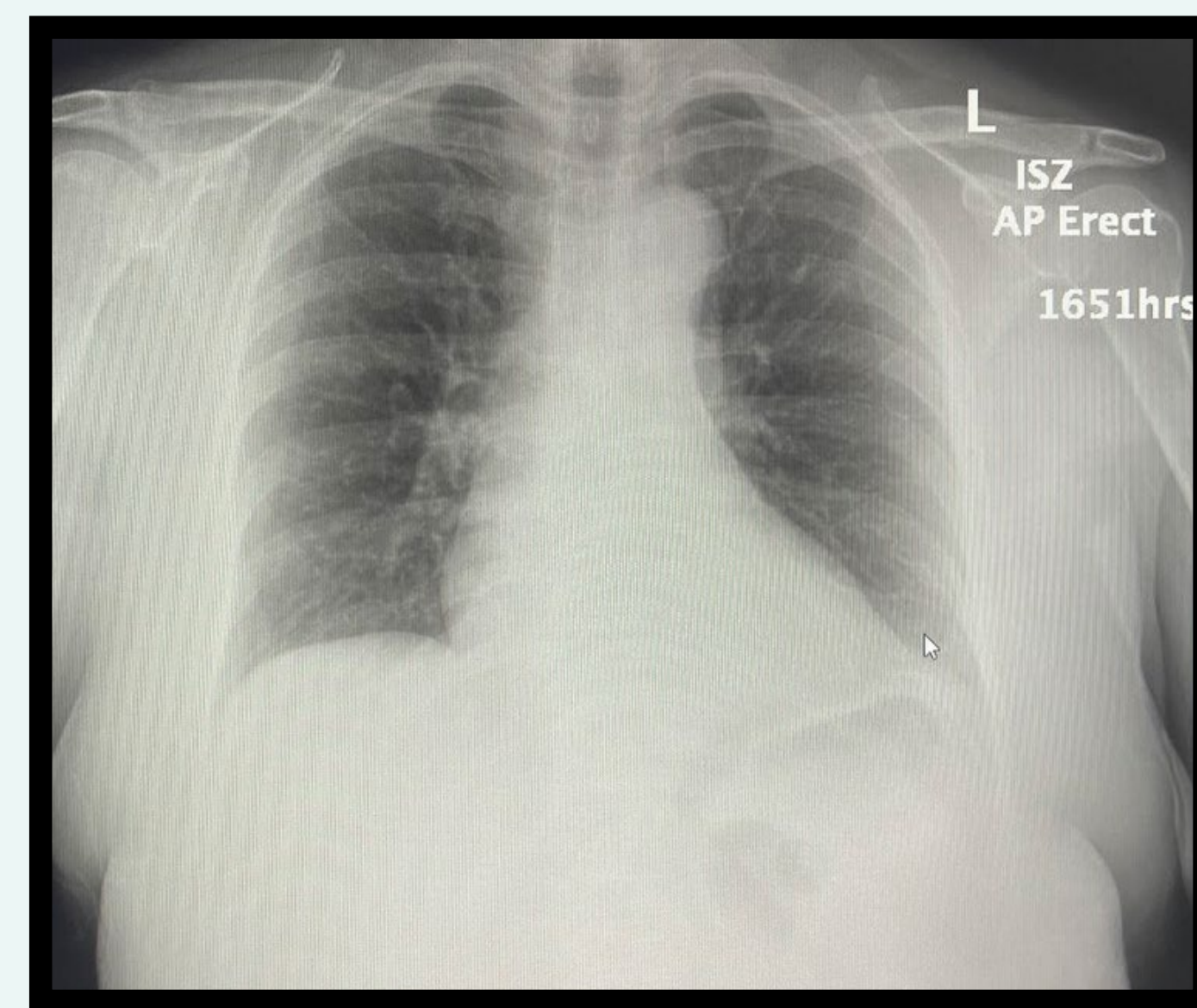
Coronavirus disease 2019 (COVID-19) increases the likelihood of organ failure in healthy individuals. COVID-19 has been shown to be associated with multiorgan failure, including acute kidney disease. The mechanism of how it causes acute kidney disease is still unknown. More patients are presenting with severe kidney injury in the setting of mild COVID-19 symptoms. In some cases if left untreated, these injuries can lead to severe complications which increase the risk of morbidity and mortality in previously otherwise healthy individuals. The aim of this study is to demonstrate a possible type of kidney injury that can occur in the setting of COVID-19.

CASE REPORT

60 y.o. Caucasian female with history significant for migraines and HTN who presented to the ED with vomiting and diarrhea and poor oral intake for a 4 day duration prior to presentation. She carried no prior history of renal disease. Laboratory evaluation noted her to be severely hyponatremic (Na 116) in the ED, resulting in admission to the ICU. Patient tested positive for COVID-19 but chest X-ray did not demonstrate pneumonia. There were no acute abnormalities noted on CT of the head. Serum and urine osmolality was tested. The patient's Sodium was checked every 4 hours, and Intravenous Normal saline was provided in boluses as required. Later, the patient was treated with fluid restriction and Urea BID, 3% NS at 100 mL, and Tolvaptan QAM for 2 days.



CT head without acute abnormalities or anatomical changes



Chest X-ray without acute abnormalities

RESULTS & DISCUSSION

With initial normal saline treatment, the patient's Sodium only improved to 119, then decreased to 116 again. Additional pertinent labs include: serum osmolality 252, urine osmolality 405, urine Na 117, uric acid 2.5, TSH 0.59, and cortisol 27.4. These study results confirmed SIADH while ruling out other common causes of hyponatremia. Patient's sodium did correct with the aforementioned therapy. Following fluid restriction, the patient's labs were: urine osmolality 691, urine Na 53, urine K 59, and a serum sodium of 116 again. After utilizing Urea twice, 3% NS infusion at 100ml/hr and Tolvaptan once, the Sodium started to improve. In the course of 48 hours, the patient's sodium increased from 116 to 131. In addition the Urine Na and osmolality were 32 and 677, respectively. On the final day of treatment, no follow up urine electrolytes were obtained. During the patient's entire stay, her creatinine maintained her baseline of 0.8.

COVID-19 can present with symptomatic hyponatremia even without other classic symptoms of the disease. Considering the patient did not have any other comorbidities or causes of SIADH, it was determined that COVID-19 infection caused it. More studies need to be conducted to determine incidence rates and pathogenesis of SIADH in patients infected with COVID-19 to help with future treatment plans and identification.

	14	15	16	17	18	19	20	21	22
	10/5/2021 0643	10/5/2021 0243	10/4/2021 1853	10/4/2021 1450	10/4/2021 1403	10/4/2021 0730	10/3/2021 2148	10/3/2021 1328	10/3/2021 1123
GENERAL CHEMISTRY									
Sodium	119	119	116		117	120	119		119
Potassium	4.0	3.2	3.8		3.7	4.0	3.9		3.3
Chloride	83	84	81		82	84	84		82
CO2	27.3	25.1	27.8		25.6	25.8	26.0		26.1
Anion Gap	9	10	7		9	10	9		11
BUN	16	18	20		23	8	7		8
CREATININE	0.64	0.59	0.64		0.62	0.59	0.60		0.69
eGFR (MDRD)	94.66*	103.97*	94.66*		96.19*	103.97*	101.97*		86.79*
Glucose	121	136	136		119	125	114		131
Calcium	8.6	8.4	8.4		8.6	9.0	8.2		8.8
Phosphorus		2.9				2.4			
Magnesium		1.8		2.0		1.9			
Alk Phos									76
Albumin									3.8
Total Protein									8.2
Uric Acid							2.3	2.5	
Lipase									108
AST									21
ALT									27
Bilirubin Direct									0.6
Bilirubin Total									
LD									1.0
Lactic Acid									

	1	2	3	4	5	6	7	8	9
	10/8/2021 0458	10/7/2021 1140	10/8/2021 2159	10/8/2021 1843	10/8/2021 1417	10/8/2021 0952	10/6/2021 0816	10/6/2021 0221	10/5/2021 2202
GENERAL CHEMISTRY									
Sodium	131	130	121	132	129	123	124	126	121
Potassium	4.3	4.5	4.8	4.5	4.5	4.2	4.7	4.7	4.5
Chloride	95	93	95	94	93	88	89	91	88
CO2	25.0	24.5	25.5	29.6	27.3	27.8	24.8	28.3	27.6
Anion Gap	11	13	11	8	9	7	10	7	5
BUN	40	35	31	34	26	25	26	30	31
CREATININE	0.69	0.74	0.78	0.85	0.76	0.82	0.69	0.76	0.74
eGFR (MDRD)	86.79*	80.05*	75.34*	68.22*	77.63*	71.11*	86.79*	77.63*	80.05*
Glucose	126	110	134	136	153	174	107	106	112
Calcium	9.0	9.2	9.4	9.7	9.6	8.6	8.5	8.7	8.5
Phosphorus	4.3	4.1					3.1		
Magnesium	2.2	2.4					2.3		
Alk Phos	75	78					70		
Albumin	3.9	3.9					3.5		
Total Protein	7.5	7.7					7.3		
Uric Acid							2.9		
Lipase							17		
AST	24	20					19		
ALT	32	25					0.1		
Bilirubin Direct	0.1	0.1					0.1		
Bilirubin Total	0.4	0.4					0.4		
LD	199	187					179		
Lactic Acid									

CONCLUSION

Kidney disease and injury can take the forms of acute kidney injury (AKI), hematuria, or proteinuria in patients with COVID-19, depending on the specific pathophysiology. Some patients, especially African Americans, present with focal segmental glomerulosclerosis. Up to half of the patient's diagnosed with COVID-19 in the hospital also present with AKI. Nephrological complications are associated with increased mortality in patients with COVID-19. Patient's with COVID-19 also have a higher incidence of AKI compared to patients with similar comorbidities. In this particular case, the patient presents with SIADH or Syndrome of Inappropriate Secretion of Antidiuretic Hormone. SIADH features euvolemic hyponatremia, hypo-urea, high urine osmolality, and low serum osmolality and otherwise normal renal function. There have been dozens of case studies reporting SIADH and severe hyponatremia as the initial and isolated symptom of COVID-19. Usually, SIADH is caused by central nervous system disorders, pneumonia, endocrine diseases, paraneoplastic syndromes, and various drugs but our patient had none of these. Previous studies showed that COVID-19 may be associated with SIADH in the presence of fever and lung disease but sometimes hyponatremia could be the only defining symptom.

REFERENCES

Moledina DG, Simonov M, Yamamoto Y, et al. The Association of COVID-19 With Acute Kidney Injury Independent of Severity of Illness: A Multicenter Cohort Study. Am J Kidney Dis 2021; 77:490.

Habib, Mhd Baraa et al. "Acute symptomatic hyponatremia in setting of SIADH as an isolated presentation of COVID-19." IDCases vol. 21 e00859. 1 Jun. 2020, doi:10.1016/j.idcr.2020.e00859

Yousaf Z., Al-Shokri S.D., Al-Soub H., Mohamed M.F.H. Covid-19 associated SIADH; a clue in the times of pandemic! Am J Physiol Endocrinol Metab. 2020 doi: 10.1152/ajpendo.00178.2020.

ACKNOWLEDGEMENTS

1. Transitional Year Residency, Philadelphia College of Osteopathic Medicine, Philadelphia, PA
2. Department of Internal Medicine, Philadelphia College of Osteopathic Medicine, Philadelphia, PA
3. Division of Internal Medicine, Chestnut Hill Hospital, Philadelphia, PA