Original Research Paper

Volume - 10 | Issue - 12 | December - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

General Medicine

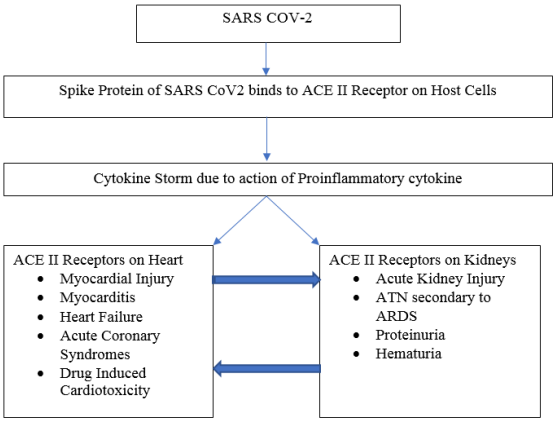
A CASE REPORT ON CARDIORENAL SYNDROME IN COVID 19 INFECTION.

Dr. Vedang N. Desai*	MBBS, 3rd Year PG Resident, Department of General Medicine, NHLMMC, Ahmedabad.*Corresponding Author
Dr. Jaydev S. Mod	MBBS, M.D. Assistant Professor, Department of General Medicine, NHLMMC, Ahmedabad.
Dr. Jayesh J. Dutt	MBBS, M.D. Professor and Head of Unit, Department of General Medicine, NHLMMC, Ahmedabad

ABSTRACT Since the WHO declared the SARS CoV-2 as a global emergency in March 2020, data compilation to try and understand the course, symptoms, pathogenesis and treatment guidelines of the illness has been undertaken. Former has been in the form of prospective and retrospective collection but also, in the unusual ones, through case series and or case reports. Clinical presentations have ranged from asymptomatic to more severe forms in the ICU. Here we report a case of Severe COVID 19 Disease in a patient with multiple comorbidities

KEYWORDS : SARS CoV-2, COVID-19, Cardiorenal Syndrome, Pulmonary, Chronic Kidney Disease, Ischemic Heart Disease, Heart Failure.

INTRODUCTION: Apart from the most common pulmonary involvement, SARS CoV-2 infection has been known to cause renal injury (though the mechanism is not clear) as well. The postulated mechanisms for kidney damage include sepsis, cytokine storm and direct cellular injury. It has been documented that COVID-19 causes myocarditis, acute myocardial infarction and exacerbation of heart failure. A new Cardiorenal Syndrome gated via the ACE 2 receptors through which the virus binds is now being described. [1],[2]



CASE DETAILS: Here we discuss the case of a 69 year old gentleman who is a non-smoker and a non-alcoholic, is averagely built and nourished, was admitted to intensive care and was discharged after having recovered.

The patient already had a multitude of pre-existing comorbidities: essential hypertension since 20 years, diabetes mellitus Type II since 10 Years, Chronic Kidney Disease since 9 years (End Stage Renal Disease since 4 years - on maintenance hemodialysis thrice/week since 10 months through a left sided Brachio-brachial fistula), Ischemic Heart Disease for 1 year with severe left ventricular dysfunction (Ejection Fraction of 25%). He complained of five days' fever (high grade, associated with chills, continuous), cough with expectoration (mucoid) for 5 days and breathlessness even at rest since the morning of the day of admission. He had been under regular hemodialysis thrice a week at a private centre for his End stage Renal Disease. He had been referred from there to rule out COVID 19 infection. With a confirmation test by Real Time PCR for SARS CoV2 from the nasopharyngeal and oropharyngeal swabs, he was admitted to the hospital (SVPIMSR, Ahmedabad). Since he was due for the next round of hemodialysis (it had been 4 days on the day of admission since he'd last undergone one), he was shifted for hemodialysis (with due precautions) on the very evening of admission. During the same, in the last half hour of the procedure, he became tachypneic on NIV support and had to be electively intubated in view of risk of respiratory fatiguability with ongoing hemodialysis. Post hemodialysis, the patient developed in house Cardiac Arrest but was revived. He was subsequently started on inotropes and maintained on mechanical ventilatory support from which he was gradually weaned off and eventually extubated.

Following this, he underwent dialysis 6 times during the hospital stay (10 days) during which he maintained a well-compensated and stable hemodynamic condition. The other ongoing medications as per the hospital protocol for moderate to severe COVID 19 infection were Injectable corticosteroids (methylprednisolone), unfractionated heparin, hydroxychloroquine, vitamin C, zinc & and an empirical coverage of infection with Inj. Cefoperazone and Sulbactam (adjusted according to creatinine clearance). Caution was maintained to avoid volume overload, since overhydration may precipitate or exacerbate ARDS, maintenance of blood pressure (mean arterial pressure >65mmHg) and good oxygenation.

INVESTIGATIONS:

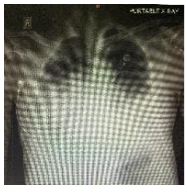
REAL TIME PCR FOR SARS-COV2: POSITIVE
ABG: Type I Respiratory Failure, Taken On NIV With 100% FiO2
pH- 7.51
PCO2- 25.6
PO2- 90
HCO3- 20.1
So2 – 97.9
P/F RATIO : 0.9

HEMOGRAM	Reference Range	DAY 0	DAY 3 (1 cycle of Dialysis done)	DAY 6 (2nd cycle of dialysis done)	DAY 8 (3rd cycle of dialysis done)
Haemoglobin (G/dl)	12-18	8.7	8.6	9.8	10.3
Total Counts/cumm	5200-12400	4380	6060	13630	19520
Neutrophil: Lymphocyte Ratio		6.7	9.66	18.0	29.3
Absolute Platelet Count/cumm	130-400 * 103	161000	121000	122000	94000

Peripheral Smear		MACROCYTIC NORMOCHROMIC RBCs with NORMOCYTIC HYPOCHROMIC RBCs. WBCs ADEQUATE ON SMEAR. PLATELET COUNT ADEQUATE ON SMEAR. MP NOT SEEN.	MACROCYTIC NORMOCHROMIC RBCs with NORMOCYTIC HYPOCHROMIC RBCs. WBCs ADEQUATE ON SMEAR. PLATELET COUNT SLIGHTLY REDUCED ON SMEAR. MP NOT SEEN.	NORMOCYTIC HYPOCHROMIC RBCs WITH ANISOPOIKILOCYTOSIS. WBCs SLIGHTLY RAISED WITH NEUTROPHILIC LEUKOCYTOSIS. PLATELET COUNT SLIGHTLY REDUCED ON SMEAR. MP NOT SEEN.	NORMOCYTIC HYPOCHROMIC RBCs WITH ANISOPOIKILOCYTOSIS. WBCs SLIGHTLY RAISED WITH NEUTROPHILIC LEUKOCYTOSIS. PLATELET COUNT SLIGHTLY REDUCED ON SMEAR. MP NOT SEEN.
Liver Function Tests					
ALT U/L	10-49	17	102	18	15
AST U/L	0-34	30	76	32	31
ALP U/L	45-129	176	118	142	141
S. Bilirubin Total mg/dl	0.3-1.2	0.34	0.39	0.89	0.51
S. Bilirubin Direct mg/dl	0-0.3	0.2	0.21	0.46	0.33
S. Bilirubin Indirect mg/dl		0.14	0.18	0.43	0.18
Albumin: Globulin Ratio	1.5-2.5	1.48	1.36	1.53	1.44
Renal Function Test					
Blood Urea mg/dl	15-45	87.2	137.8	124.3	148.6
Serum Creatinine mg/dl	0.7-1.3	6.91	4.93	4.33	4.79
Serum Sodium mmol/L	132-146	141	134	136	132
Serum Potassium mmol/L	3.5-5.5	5.4	4.8	4.5	4.9
Serum Ferritin ng/ml	10-282	>1650	>1650	1264.7	1151.9
Serum Lactate Dehydrogenase U/L	100-250	304		419	426
C-Reactive Protein mg/L	>5-Positive	96.09	133.01	39.39	<0.6
D-dimer mcg/ml	<0.5- NEG >0.5 - POS	1.48	1.38	3.46	>4.0
Procalcitonin ng/ml	0-0.1	0.84		29.87	
HIV-ELISA	HBSAG-ELISA	HCV-ELISA	NON REACTIVE	INTERLEUKIN-6 LEVELS (0-4.4 Pg/ml) – 16.1 (Positive)	URINE – R/M : ALBUMIN +2, BLOOD +, PUS CELLS- 14-15/HPF, RED CELLS – 4-5/HPF. FEW GRANULAR CASTS SEEN.
NT-PRO BNP Pg/ml	1-125	>5000	>5000		

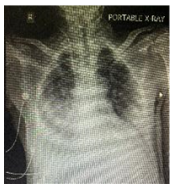
URINARY ACR - 2094.4 MG/G
CPK TOTAL - 20
S. CA- 9.4 / S. PO4- 5.86 / S. URIC ACID- 4.9
S. VITAMIN D- 10.27
VITAMIN B12- 212
CULTURE AND SENSITIVITY – BLOOD (AEROBIC/ANAEROBIC) – NO GROWTH AFTER 48 HRS OF INCUBATION
CULTURE AND SENSITIVITY – URINE – Enterococcus faecalis.

On Admission (DOA - 1)



Post Intubation & 1 CYCLE OF HD (DOA - 3)

Post Extubation (DOA - 5)



Ultrasonogram revealed Bilateral small sized kidneys with lost Corticomedullary Differentiations and Bilateral pleural effusion with underlying Consolidation in the lungs.

2D ECHO (done roughly 4 months prior to current Hospitalisation)	Bedside ECHO (done during current Hospitalisation)
• Valves - Normal • Moderate MR And Moderate TR • LA- Mildly dilated • RA- Normal • LV- Dilated with Severe LV Dysfunction. Global LV Hypokinesia, LVEF 25% • RV- Normal • Septae - Normal • Great Arteries- Normal • Moderate PAH Noted, RVSP – 53 Mm Hg • Grade 1 Diastolic Dysfunction	• LVEF 20-25% • Global LV Hypokinesia • Moderate MR, TR • RA and RV mildly dilated, dysfunction + • No Clots, Vegetations, Effusion.

DISCUSSION:

DIFFERENTIAL DIAGNOSIS:

Here we present a case of a patient of COVID 19 with all possible comorbidities and who sustained a cardiac complication while undergoing hemodialysis but was successfully salvaged from it.

For the complication during the hemodialysis procedure, the following possibilities were considered: -

- Volume Overload (AKI On CKD)

- Pulmonary Thromboembolism
- ADHF (Acute Decompensated Heart Failure)
- COVID Related Pneumonitis

Criteria	Reference Patient (ESRD Due to IgA Nephropathy, On Maintenance Hemodialysis * 3 Years)	Patient Under Study (ESRD * 9 Months, On Maintenance Hemodialysis * 10 Months)
Age/Sex Country of Residence	56 Year/Male Utah, USA	69 Year/Male Ahmedabad, India
Travel/Contact History	Travel to South Korea in early January return to USA in late January, no obvious contact traceable with positive case	None
Comorbidities	Hypertension, IHD (P/PTCA Status), CKD (IgA Nephropathy), on Maintenance Hemodialysis thrice/week since past 3 years.	Essential Hypertension, DM Type II, CKD (ESRD since 1 Year – On Maintenance Hemodialysis thrice/week since past 10 months) BPH, IHD
Duration of Current Illness (Prior to Hospitalisation)	5 Days	5 Days
Symptoms at Presentation	Low Grade Fever, Nausea, Vomiting, Diarrhea	High Grade Fever, Cough with Mucoid expectoration, Breathlessness (Severe Acute Respiratory Illness – SARI Cat IV, ICMR)
Need for Mechanical Ventilation	Yes, 1 day after Admission, need for Invasive Mechanical Ventilation in View Of ARDS.	Yes, Immediately on Admission with NIV followed by Invasive Ventilation 12 hours Post Admission
Treatment administered	Lopinavir- Ritonavir from Admission Hydroxychloroquine from Admission Inj. Tocilizumab Post Admission Hemodialysis Thrice/Week	T. Azithromycin T. Hydroxychloroquine Inj. Methylprednisolone Inj. Unfractionated Heparin Hemodialysis Daily/Alternate Day – 6 times in 10 days
Outcome	Mortality	In House Cardiac Arrest Revived Hemodynamically Stable and Compensated on Room Air Discharged for readmission to non COVID facility

Above, we have iterated a patient (reference is a case report published in the American Journal of Nephrology - www.karger.com/ajn) and compare the clinical course and outcomes of the reference patient and our study patient. [3]

- In our patient, the acute event might have been due to a direct consequence of the virus on the myocardium itself or a result of the exacerbation of the underlying co morbidities (severe hypoxia, renal failure). Early and aggressive management to prevent and treat volume overload, maintain adequate Oxygenation and maintain adequate perfusion with target Mean BP > 65 mm of Hg helped in recovery and prevention of further complications in the patient. Judicious use of Immunosuppression with corticosteroids (to abort cytokine storm) under cover of antimicrobial coverage to avoid secondary infections probably helped prevent common in house complications such as hospital acquired Infections (HAIs). [4]

- What needs to be explored is whether there exists a correlation between duration of comorbidities and the resultant target organ damage and COVID disease severity & resultant mortality..

REFERENCES:

1. JACC: Heart Failure Volume 8 No 6, 2020
2. Clinical Kidney Journal – Oxford 2020 1-6
3. AMERICAN JOURNAL OF NEPHROLOGY - www.karger.com/ajn
4. www.kidney.org > coronavirus