

Covid-19 Infection Associated with Psychosis in Hemodialysis Patient

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Abstract

Hemodialysis is a medical procedure to correct electrolyte imbalance, remove fluids and waste product from blood of end stage renal disease patients. Dialysis patients are immunosuppressed and hence at risk of complication of coronavirus infection. In additions dialysis for most of patients were done in-center hemodialysis, therapy is offered three times/week, for 3:5 hours per session in sites highly exposed to virus contamination, but weak immune system and low cytokine storm explain Why Corona Virus Disease-2019 (COVID-19) may be less severe in Dialysis Patients. So, death or comorbidities effect in COVID-19 patients is due to overresponse against the virus by the immune system and cytokine storm. During the frequent trips between the HD center and home, the risk of corona virus infection could be high. Moreover, hemodialysis patients constitute a distinct and high-risk group which is often associated with low immunity, decline or even loss the ability of work, substantial economic burden, inability to full family responsibilities and participate in active social life, and suffer from various complications such as, muscle weakness, pruritus, fatigue, diabetic, hypertension, and restless legs. These factors are associated with lower quality of life (LQOL) and poor clinical outcomes, leading to a higher risk of psychological problems than

that in the general population. We report a rare case of new-onset psychosis (mostly delirium) during the COVID -19 infection in Hemodialysis patient, middle age with rapid recover.

Keywords: COVID_19; Hemodialysis; Psychosis; Pruritus; Restless legs; Quality of life.

Introduction

The incidence and prevalence of end-stage kidney disease and dialysis population is increasing worldwide. Patients on dialysis are quite immunosuppressed and suffer from various medical comorbidities such as diabetes, hypertension, and cardiovascular disease. Also, these patients tend not to react to infection in the same way as general population due to their depressed immune system. In addition, researchers have showed a remarkable reduction in the numbers of T cells, T helper cells, killer T cells, and NK cells in peripheral blood mononuclear cells (PBMCs). In addition, dialysis population tend to have reduce inflammatory cytokines levels in their serum fluid, compared to non-dialysis group. More recent data, collected in the Italian region with the major SARS-CoV-2 spread [1] and in Zhongnan Hospital of Wuhan University [2], explain why the effect of COVID-19 is less sever in HD patients.

Also, patients with end-stage kidney disease are particularly vulnerable to severe COVID-19 due to the older [3]. In one study, for example, nearly one-third of hospitalized dialysis patients with COVID-19 died; those who died were older (75 versus 62 years) and had more comorbidity [4]. Although -in general population -specific and uncontrolled fears related to infection, pervasive anxiety, frustration and boredom, loneliness has been hypothesized to impair subjective wellbeing and quality of life, resilience and enhanced social support are protective factors that may help with regard to lifestyle changes and re-adaptation mechanisms (5-6).

People living with kidney disease are twice as likely to have a mental health problem in the UK, their new statement Kidney disease and mental health highlights how vulnerable kidney patients already were before the coronavirus pandemic and shows their mental health could worsen even more. Researchers have reported major fears about the effect on mental health amongst our population with chronic kidney disease who are being shielded in isolation and hence could develop a protracted period of isolation and anxiety, with no apparent sign of a way out (7-8). Psychological stress was inevitable among some dialysis patients SO It is important to identify high-risk individuals and provide psychological intervention for them in advance. Previous studies about SARS pointed out that the psychological implications of the epidemic should not be ignored in dialysis patients [9-10].

CASE PRESENTATION:

A 46-years-old single male, a known case of hypertension complicated with end-stage chronic kidney disease (CKD) in 2002 and was started on hemodialysis. He underwent a kidney transplant a few months later in 2002. He was followed closely with a good kidney function, but chronic allograft nephropathy ensues progressively and in 2014, he returned to hemodialysis thrice weekly dialysis sessions. He acquired hepatitis C virus (HCV) infection and developed chronic gout arthritis. He was a teetotal with no history of alcohol intake or smoking. He had no history of cardiac, pulmonary, or hepatic diseases. Also, there was no history of hyponatremia or hypocalcemia. He denied any history of utilization of narcotics or anticholinergic medications.

He can't recall any exposure to people with COVID-19 infection, but he was tested at the dialysis center after complaint of lost smell and taste and found to be COVID-19 positive, Ribonuclear acid-polymerase chain reaction (RNA PCR) COVID-19 obtained from nasopharyngeal swab was used to confirm COVID-19. He had mild to moderate symptoms with a productive cough, loss of smell and taste and loss of appetite three days back. On examination, he was afebrile, pulse 85beat per minute and regular, blood pressure (BP) range between 160/90 mmHg before session and 140/80 mmHg post session, his respiratory rate 22 breath per minute, oxygen saturations are 95% on air, BMI 32 Kg/m². Chest examination revealed normal air entry, no adventitious sounds or murmur, abdominal examination revealed a central distribution of adiposity but no organomegaly or masses and no audible bruits, and there was no pedal edema. He did not require admission to the hospital for further evaluation and treatment.

He had various laboratory investigations including C-Reactive Protein, which was elevated (13.3 mg/dl) while ferritin, D dimer and chest x ray were normal.

Five days later, patient presented to a primary health care clinic with his brother for evaluation of insomnia, being called the wrong name for himself, isolation behaviors where stays in his room all day without any interaction with his family. In addition, he developed an auditory hallucination which prevented him from sleep, where he heard voices of people talking to him and new onset belief of someone conspiring against him.

He was provided with medical support from the private clinic and started on Quetiapine 25mg twice daily plus sodium valproate (Depakene)100 mg twice daily post dialysis session.

A three days later, he showed no improvement, and his family took him to psychiatric specialized hospital. Head computerized tomography (CT) scan was performed (as the sensitivity of MRI is

known to be higher than CT but MRI is not available in this center) and revealed no brain abnormalities and relatives refused lumbar puncture to be done.

Psychiatrist clinicians increased the dose of the Quetiapine to 25mg morning and 100 mg night and the Depakene to 400 mg night and advice to take post dialysis session.

Psychiatrist clinicians increased the dose of the Quetiapine to 50mg twice daily and the Depakene to 200 mg twice daily and advice to take post dialysis session.

Ten days later, he showed a significant improvement in his general health status and physical condition. His psychiatric hallucination and insomnia have improved, and the patients now recognize himself by the correct name and shared his family in daily activity.

Table 1: Shows the various laboratory tests before, at time of diagnosis, and post recovery from COVID 19 infection.

Variable	Pre-COVID 19	AT time of COVID 19	Post COVID 19	Range Desc
Blood glucose, mmol/L(Random)	12.7	13.08	10.1	3-7.7
Serum creatinine, umol/L	1318	1245	995	62-106
Sodium, mmol/L	137	134	133	136-145
Potassium mmol/l	5.2	4.4	6.7	3.5-5.1
Chloride mmol/l	96	94	93	98-107

Total Bilirubin,umol/l	10	10.5	10.1	0-21
ALT,u/L	25.4	30.6	29.2	0-41
ALK.PHOS,U/L	94	97	85	40-130
ALbumin,g/L	41	38.5	39.2	39.7-49.5
Total protein,g/L	70.2	70.8	77.6	64-83
Globulin,g/L	29	32	38	24-35
Corr. calcium,mmol/L	2.28	2.21	2.35	1.9-2.7
Phosphorus,mmol/L	1.21	1.41	1	0.87-1.45
Urea,mmol/L	17.1	15.2	12.2	1.7-11.9
Uric acid,mmol/L	410	428	418	202-416
Co2,mmol/L	20.1	20.6	21.7	21-31
Wbcs,10*3/ul	7.4	6.5	9.2	2.2-10
Neutrophil/abso	5.7	5	7.7	1-5
Lymphocytes/abso	1.1	0.85	0.98	1.2-4
Hgb,g/DL	11	11.1	9.6	11.5-15.5
Hct,%	37.6	37.8	32.3	35-45
Platelets,10*3/UL	133	120	199	140-400

CRP,mg/L	1.4	13.3	----	<10
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Dialysis LOG during COVID 19 period was continued as the same prior to infection and included intermittent hemodialysis, thrice weekly sessions for a minimum of four hours duration using Hemodifiltration (HDF)-machine with a High flux dialyzer, with a blood flow of 300-400 ml/minute via brachiocephalic AVF.

During dialysis session, vitals were stable and showed a blood pressure of 140/70 - 150/80 MmHg, pulse rate of 70 - 90 beats per minute and respiratory rate of 15 – 16 breaths/minute.

Consent statement: Consent and ethical approval for this publication was obtained, with reference number sRC#CRII/2021.

DISCUSSION

To the best of our knowledge, this is the first case of post kidney graft with chronic allograft nephropathy that returned back to hemodialysis as a renal replacement therapy, who developed psychotic symptoms that occurred secondary to COVID-19. He started with simple symptoms that deteriorated to loss in orientation in person and deterioration of social and family life. He was prescribed Depakene (10: 15 mg/kg/day PO initially, divided Q6-Q12hr; increase by 5-10 mg/kg/day at weekly intervals- is highly dialysable) which is an anticonvulsant drug used in the therapy of Schizo-affective and affective Psychosis, in combination with antipsychotic medication, Quetiapine (Quetiapine: Atypical Antipsychotic: 150–750 mg/day Q12 or Q8, No dosage adjustment for CRF and NOT dialysable) (11). The dose required to be escalated in few days to achieve a good and rapid recovery and return to his usual normal life status.

Infection with certain coronaviruses is associated with recent-onset psychotic symptoms; however, new-onset psychosis in otherwise asymptomatic patients infected with COVID-19 has not been described (12). CRP, which was elevated in this case report, was considered a potential peripheral marker of immune activation, which is a causal or triggering role in schizophreniform psychosis (13). Despite CRP increased in the bacterial infection than in the viral infection, interestingly, CRP had been suggested as a serum marker of disease aggravation in COVID-19 patients (13). Others found that even after accounting for identified inflammatory conditions, demographic factors had been found to influence the reference limits of CRP, therefore, demographic factors, including age, sex, and race, had been suggested to be used to adjust the upper reference limit for CRP.

The CRP is an acute-phase protein, which operates as an initial sign of infection such as a viral infection or in any inflammatory conditions. It is a protein, which is manufactured in the hepatic cells and is usually observed at a range of less than 10 mg/L in the plasma body fluids. During infectious or inflammatory disease states, CRP levels rise rapidly within the first 6 to 8 hours and peak at levels of up to 350–400 mg/L after 48 hours (14-15).

Elevated baseline D-dimer had been reported in covid-19 patients and it had been found to be associated with inflammation and CRP level, but there were no association with the venous thromboembolism (VTE) score in covid-19 patients. Interestingly, D-dimer level decreased with the drop in the CRP level. In the present study, our patient apart from CRP, all tests were normal including CT brain to check for One report documented a brief psychotic reaction among 3 patients who were negative for COVID-19, attributed to fear of COVID-19 infection, and another described a case of COVID-19–related delusions in a COVID-19–negative patient who had an underlying diagnosis of schizophrenia (16-17). Infected people with COVID 19 - SARS-CoV-2 were reported to develop changed mental condition, which is defined as an acute alteration in personality,

behavior, cognition, or consciousness (18). Individuals who acquired COVID 19 infection may develop hematological disorders such as formation of thrombosis or clotting abnormalities. These blood clots may consequently render the patients with thromboembolic phenomenon including cerebrovascular accidents, and multiple organ systems attacks and failures, while also attacking the brain, with headaches, dizziness, and loss of taste and smell. In the present case a brain CT was done to exclude stroke and other pathology.

The American College of Radiology Appropriateness Criteria favor head/brain radiological-imaging for the assessment of patients with altered mental status in most clinical scenarios. Hence, we propose that if there is a clinical warning for head radiological-imaging of COVID-19 patients with a changed mental status, the radiologist must contemplate studying the HIS (health information system) electronic record in more detail or converse the pros and cons with the main primary clinicians in order to safeguard all concerned and hence the paybacks of such investigation offset the dangers and risks in the setting of a viral outbreak (19).

The immune response in SARS-CoV-2 infection is of interest and there might be a hyperinflammatory but in our case all these were normal or just slightly high as for CRP.

The neuropsychiatric consequences (mental disorders that are the sequelae of brain damage or disease) can arise either through direct effects of infection of the CNS or indirectly via an immune response or medical therapy. The present case had mostly mild symptom with normal CT scan of the brain and there were no neurological abnormalities. However, systemic review stated that the etiology of the psychiatric consequences of infection with coronavirus is likely to be multifactorial and might include the direct effects of viral infection in the brain.

The good effect of Depakene, which is an anticonvulsant drug in the therapy of schizo-affective and affective Psychosis, in combination with antipsychotic (Quetiapine) induced sedation in this patient after increasing the doses of both medications.

Summary & Conclusion

This is a case of acute psychosis included auditory hallucination and persecutory delusion(suspiciousness) with confusion as patient was not aware of himself and it seems that he also had reduced awareness of the surrounding and being hypoactive with social isolation and less verbal communication.

These symptoms are suggestive of delirium more than any things. The patient had multiple risk factors to develop delirium given his medical background. With high CRP and confused patient lumbar puncture must be done to rule out encephalitis and this was not done due to his relative refused, so more likely that COVID-19 infection was causing the psychosis(delirium).

It is clear that once his medical problem causing the delirium improved (suspected COVID-19) his psychotic symptoms and confusion improved. Both medications quetiapine and depakine work only as sedative.

The unusual or rarity in this case is the hypo active state of delirium as most delirium cases had hyperactive state. COVID 19 may affect mental health by different ways. In general, small numbers of people had psychiatric disorder post COVID 19 infection. Dialysis patients already overwhelmed with various medical comorbidities and psychiatric problems and hence quality data,

and ongoing surveillance is essential in every dialysis center. Nephrologist must be aware of the possibility of various psychiatric disorders such as depression, anxiety, fatigue, post-traumatic stress disorder, and rarer neuropsychiatric syndromes in dialysis patients with COVID 19 infection.

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