Cohort of Haemodialysis Patients with COVID-19 in an Irish Nephrology Centre

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Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has an estimated mortality of 2% (1). Patients with end stage renal disease (ESRD) on haemodialysis (HD) are particularly vulnerable for critical COVID-19 infections due to frequent attendances to medical facilities, dysregulated immune systems (2), and multiple comorbidities (3).

To limit the spread of COVID-19 in HD patients, the Irish National Renal Office (NRO) published guidelines to control spread of the outbreak on the 16/03/20 (4). As cases rose, the NRO made further recommendations on the 14/04/20 (5).

Reported mortality rates among outpatient HD units have ranged from 29-41% (6-9). We report a high mortality rate in our population, largely driven by an early nosocomial outbreak prior to the implementation of guidelines.

Methods

We conducted a retrospective observational study of all HD patients who had been confirmed SARS-CoV-2 positive with a nasopharyngeal swab between the 18/03/20 and 15/05/20 in our HD centre and 2 satellite HD centres in Dublin, Ireland. Demographic and clinical characteristic data were collected.

Patient characteristics were collected from the national renal database, eMed and additional data was collected by review of the hospital online laboratory and chart system, PIPE.

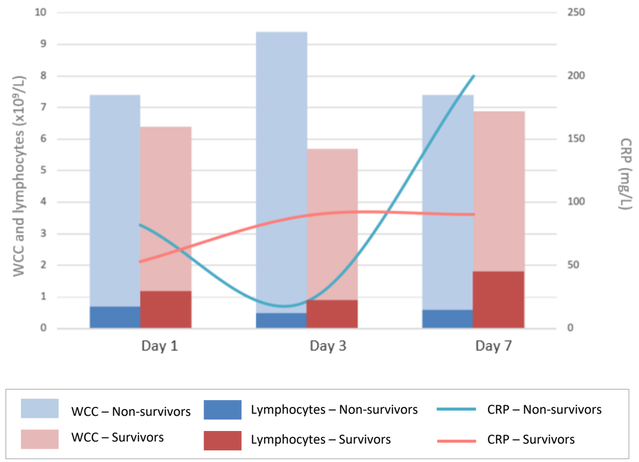

Figure 1: Laboratory results at day 1, day 3 and day 7 of Covid-19 infection

Results

Between 18/03/20 and 15/05/20, 20 patients out of 296 HD patients from our centres were infected with SARS-CoV-2, of whom 10 (50%) died. These numbers represent 20/87 (23%) of HD patients infected nationally with Covid-19 across 24 centres and 37% of the deaths (10/27). Clinical characteristics are summarized in Table 1.

The nephrology ward suffered a COVID-19 outbreak in mid-March, which was responsible for 10 of these 20 patients contracting COVID-19. A further 11th patient contracted COVID-19 in another hospital. Amongst these 11 hospital-acquired cases, 7 died and 4 recovered. 1 patient of the 6 community transmitted cases died. 2 patients who contracted COVID-19 in a nursing home died.

Worse outcomes were associated with more profound lymphopenia and higher WCC, CRP and ferritin. Patients who died had a higher CRP at day 7 of infection in particular, as shown in Figure 2.

Prior to implementation of NRO-recommended guidelines on the 14/04/20, there were 15 new cases in our HD centre, compared to 5 after.

Discussion

In comparison to international data illustrating mortality rates between 29-41% in HD centres (6-9), we report a high mortality of 50%, largely driven by an early nosocomial outbreak and underlying frailty. COVID-19 HD cohorts with similar median ages (7, 8) reported mortalities ranging from 29-30.5%.

Changes made within our dialysis centre, guided by the NRO and previous recommendations (10), included:

1. Temperature checks for all patients and surgical masks to be worn by patients and health care workers
2. Suspected cases received HD in isolated rooms, were swabbed for SARS-CoV-2, and were reviewed by a renal physician
3. Known SARS-CoV-2-positive patients were dialyzed in isolation rooms
4. All staff coming into contact with suspected or confirmed cases wore personal protective equipment (PPE) as per local guidelines
5. In-hospital nephrology teams were divided into COVID-19 teams and non-COVID-19 teams
6. The nephrology ward was closed and decontaminated following the COVID-19 outbreak, then became a COVID-19 negative ward

Interpretation of our data is limited by our small sample size, testing only symptomatic patients, meaning our numbers may not reflect the true incidence of COVID-19, and the likely natural decline in COVID-19 cases with national implementation of social distancing.

However, the significantly higher rate of mortality in our centre is difficult to ignore. Although guidelines exist for the prevention of COVID-19 in outpatient HD facilities, nosocomial transmission poses a serious potential risk for HD patients. We advocate early adoption of isolation measures, separate inpatient COVID-19 teams and separate COVID-19 HD isolation facilities.

References:
1.Mahase E. Coronavirus: covid-19 has killed more people than SARS and MERS combined, despite lower case fatality rate. BMJ. 2020;368:m641.
2.Syed-Ahmed M, Narayanan M. Immune Dysfunction and Risk of Infection in Chronic Kidney Disease. Adv Chronic Kidney Dis. 2019;26(1):8-15.
3.Chowdhury R, Peel NM, Krosch M, Hubbard RE. Frailty and chronic kidney disease: A systematic review. Arch Gerontol Geriatr. 2017;68:135-42.
4. National Renal Office, HSE. Interim guidance for management of individuals on dialysis with suspected/confirmed COVID-19 infection – V1.0 16_03_20. Available from: https://www.hse.ie/eng/about/who/cspd/ncps/renal/resources/interim-guidance-for-dialysis-units-covid-19.pdf
5. National Renal Office, HSE. Covid 19 in the Dialysis and Kidney Transplant Population – 25/05/20. Available from: https://www.hse.ie/eng/about/who/cspd/ncps/renal/resources/national-renal-office-control-of-covid-19-in-the-dialysis-and-kidney-transplant-population.pdf
6.Scarpioni R, Manini A, Valsania T, De Amicis S, Albertazzi V, Melfa L, et al. Covid-19 and its impact on nephropathic patients: the experience at Ospedale "Guglielmo da Saliceto" in Piacenza. G Ital Nefrol. 2020;37(2).
7.Alberici F, Delbarba E, Manenti C, Econimo L, Valerio F, Pola A, et al. A report from the Brescia Renal COVID Task Force on the clinical characteristics and short-term outcome of hemodialysis patients with SARS-CoV-2 infection. Kidney Int. 2020.
8.Goicoechea M, Sánchez Cámara LA, Macías N, Muñoz de Morales A, Rojas ÁG, Bascuñana A, et al. COVID-19: clinical course and outcomes of 36 hemodialysis patients in Spain. Kidney International. 2020;27-34.
9. Du X, Li H, Dong L, Li X, Tian M, Dong J. Clinical features of hemodialysis patients with COVID-19: a single-center retrospective study on 32 patients [published online ahead of print, 2020 May 27]. Clin Exp Nephrol. 2020;1-7.
10.Basile C, Combe C, Pizzarelli F, Covic A, Davenport A, Kanbay M, et al. Recommendations for the prevention, mitigation and containment of the emerging SARS-CoV-2 (COVID-19) pandemic in haemodialysis centres. Nephrol Dial Transplant. 2020;35(5):737-41.

	Non-survivors (10 patients)	Survivors (10 patients)
Age (mean)	69.3 years [33-89]	68.6 years [42-91]
Gender		
Male	8 (40%)	9 (45%)
Female	2 (10%)	1 (5%)
Setting		
Inpatient	9 (45%)	5 (25%)
Outpatient	1 (5%)	5 (25%)
Symptoms		
Shortness of breath	10 (50%)	3 (15%)
Fever	9 (45%)	8 (40%)
Cough	8 (40%)	7 (35%)
GI Upset	0 (0%)	4 (20%)
Confusion/Agitation	3 (15%)	0 (0%)
Headache	0 (0%)	2 (10%)
Malaise/pre-syncope	1 (5%)	1 (5%)
Treatment		
CPAP	1 (5%)	1 (5%)
Antibiotics	5 (25%)	5 (25%)
Antivirals	0 (0%)	0 (0%)
Dexamethasone	0 (0%)	0 (0%)
Mode of transmission		
Hospital acquired	7 (35%)	4 (20%)
Home	1 (5%)	5 (25%)
Nursing Home	2 (10%)	0 (0%)
Rehabilitation centre	0 (0%)	1 (5%)
HD vintage (months)		
Mean	46.1	34.1
Median	20	21.5
Cause HD		
Diabetes Mellitus	5 (25%)	4 (20%)
Hypertension	1 (5%)	2 (10%)
Acute Tubular Necrosis	2 (10%)	1 (5%)
AD PCKD	0 (0%)	2 (10%)
Cardiorenal syndrome	1 (5%)	0 (0%)
Thrombotic Microangiopathy	1 (5%)	0 (0%)
Vascular	0 (0%)	1 (5%)
Dialysis access		
Line	10 (50%)	8 (40%)
AV Fistula	0 (0%)	2 (10%)
Comorbidities		
Heart Failure	7 (35%)	2 (10%)
Ischaemic heart disease	7 (35%)	4 (20%)
Hypertension	6 (30%)	7 (35%)
Diabetes Mellitus	6 (30%)	5 (25%)
Atrial Fibrillation	5 (25%)	1 (5%)
Chronic lung pathology	3 (15%)	1 (5%)
Stroke	2 (10%)	1 (5%)
No. medications (mean)	15.6	11.8
Clinical Frailty Score	6.2 [4-8]	5.7 [3-8]
Baseline mobility		
Independent	4 (20%)	6 (30%)
Wheelchair	2 (10%)	3 (15%)
Zimmerframe	1 (5%)	1 (5%)
Bedbound	2 (10%)	0 (0%)
Assistance of 1	1 (5%)	0 (0%)
No hospitalizations in last 12 months (mean)	4	2.25

Table 1: Clinical characteristics survivors vs. non-survivors of SARS-CoV-2 positive HD patients