Waves of infection and waves of communication: the importance of sharing in the era of Covid-19

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On March 11th, 2020, the World Health Organization declared that the novel Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2)-associated disease (Covid-19) could be defined as a pandemic [1]. In Italy, more than 1.6 million cases and 55,576 deaths nationwide were recorded by the end of November [2].

Data concerning CKD suggest that the incidence is remarkably higher than in the general population. For example, the incidence of SARS-CoV-2 was 10 and 18.3% in two haemodialysis (HD) Centres in Wuhan at the beginning of the outbreak in China [3, 4]. Similarly, the hard-hit province of Lecco (Lombardy, Italy) reported 1,838 cases in the general population (0.5%) and 55 cases among the 209 HD patients, thus reaching a rate of 26% in this group during the March outbreak [5]. In the same period, between February 24th and April 9th, the Italian Society of Nephrology reported a prevalence of 3.5% in haemodialysis and of 1.4% in peritoneal dialysis, with a high case fatality rate: 33.7% in HD, 45.6% in PD and 24.7% in kidney transplant patients, thus providing an alarming frame of the impact of Covid-19 in dialysis centres on a national scale [6].

In Lazio region, a limited and possibly reassuring number of cases and deaths (22,000 and 1,000 out of 5,863,785 inhabitants, i.e. 0.37% and 0.01%, respectively, see Fig. 1) had been reported by the end of April 2020 [7].

In order to avoid the dramatic scenario that unfolded in Northern Italy, all the directors of public and private dialysis Centres in the Lazio region agreed to periodically fill in the

questionnaire proposed by the Italian Society of Nephrology, that is described in detail elsewhere [6]. Data on SARS-CoV-2 infections were reported as aggregate numbers, while cumulative data were obtained through the analysis of patient flows between peripheral hospitals and centralized Covid-19 facilities. From April to October, the survey was repeated six times (April 1st [T1] and 16th [T2], May 7th [T3], June 10th [T4], July 25th [T5] and October 1st [T6]) and included an average of $4,373 \pm 355$ patients, which represents a mean coverage of 92% of HD/PD patients in our region, based upon 2019 data [8]. Table 1 shows the number of patients surveyed at each time point, while Fig. 1 shows how point prevalence decreased from 0.59% at T1 to 0.13% at T5, but then climbed back up to 0.19% at T6. The death toll increased from 12 to 26 during the period of observation. Importantly, no deaths occurred in PD patients. Data on acute kidney injury (AKI) and on kidney transplant recipients were probably underestimated since the survey only included intensive care units where dialysis is managed by nephrologists, and transplant centres were not involved.

As for healthcare workers, the number of SARS-CoV-2-positive cases increased to 13 between the first and second survey and then decreased, remaining stable at around 7. While the initial increase was likely due to the implementation of a testing policy among asymptomatic workers, afterwards, spread was limited by preventive measures such as the mandatory use of face masks for both patients and operators. Moreover, almost all centres adopted a telephone triage protocol to contact patients the day before their HD session or scheduled outpatient visit to avoid admission in case of symptoms. Finally, separate entrance and exit pathways were created, thereby avoiding overcrowding of patients and caregivers in small spaces, and furthermore, single-patient transports to the dialysis facilities were implemented.

Testing among all health workers, regardless of symptoms, increased from 10% (April) to 42.2% (July) and 39.7% (October). The vast majority of HD and PD Centres

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Fig. 1 Point prevalence of SARS-CoV-2 infections in the HD/PD population in Lazio Region compared to the general population in both the Region and in Italy. Timing of the progressive lockdown easing (Phase 2 and Phase 3) is represented. National and Regional epidemiological data are . *HD* haemodialysis, *PD* peritoneal dialysis

sis, *T1*,...*T6* Time point 1,...Time point 6 available at <https://www.epicentro.iss.it/coronavirus/sars-cov-2-dashboard> and https://www.dep.lazio.it/covid/covid_map.php. *HD* haemodialysis, *PD* peritoneal dialysis, *T1*,...*T6* Time point 1,...Time point 6

(70–75.4%) tested only symptomatic patients until July. Thereafter, a growing number of HD and PD centres (from 3.3 to 19%) started implementing periodic testing of all patients.

Overall, from April to October, we recorded 79 positive cases among HD patients and 3 among PD patients, corresponding to a prevalence of SARS-CoV-2 infections of 1.88% in HD/PD. Of note, case fatality rate was confirmed to be high: 31.71%.

When compared to the investigation by Quintaliani et al. [6], our results indicate that during the “*first wave*” of the pandemic the limited diffusion of the virus among the general population of Lazio and the preventive measures that were taken allowed the prevalence of cases among HD and PD patients to be contained. The same is true even considering similar high risk healthcare settings, such as nursing homes, where outbreaks affected almost all the residents and attending staff [9].

Cooperation was the key to such remarkable results in containing the spread of infection among dialysis patients: in Lazio region, patients on chronic dialysis are treated by public or private Centres, the latter accounting for 58% of the facilities [8]. Over the course of our survey, all the

participating nephrologists regularly received an up-to-date report which provided a regional picture of the ongoing SARS-CoV-2 situation. This form of cooperation allowed harmonization of efforts and practices, and, for the first time, both public and private institutions were enthusiastically involved. Indeed, previously, cooperation and communication among nephrology units had generally been limited to the bare minimum, while during the Covid-19 epidemic cooperation was characterized by precise and punctual feedback from all Centres. Over the last few months countless emails and telephone and video calls have shaped new *waves of communication*, giving rise to a nephrology network, which served as a hub for shared data and management strategies. Moreover, this experience clearly highlighted that more precise data collection is both feasible and necessary for better and more coordinated management of the clinical conditions that are still lacking common registries, such as AKI and kidney transplant recipients.

Decidedly, “sharing is caring” and the experience of these challenging times has highlighted the role of this invaluable resource.

Table 1 Data on SARS-CoV-2 infections and related diseases among patients and health workers in haemodialysis and peritoneal dialysis Centres in Lazio Region that adopted prevention and containment measures

	01/04/20	16/04/20	07/05/20	10/06/20	25/07/20	01/10/20
	T1	T2	T3	T4	T5	T6
Surveyed HD/PD Centres in Lazio region (% of total)	85.7	92.9	92.9	94.3	92.9	91
Number of surveyed patients	3855	4324	4717	4762	4483	4094
Number of HD patients/Number of PD patients	3,543/312	3,969/355	4,361/356	4,403/359	4,117/366	3,749/345
Data on SARS-CoV-2 infections at time points						
Infected patients (HD/PD)	21/2	18/3	19/3	9/0	6/0	8/0
Patients in isolation	5	16	11	6	3	2
Patients in Low-Intensive Care Unit	18	14	7	2	2	1
Patients in High-Intensive Care Unit	5	4	0	0	1	0
Covid-19-related deaths (HD/PD) [cumulative data]	12/0	16/0	16/0	17/0	20/0	26/0
Number of KTx patients at HD/PD Centres	n.a	1646	1907	1914	1904	1263
Infections in KTx patients	n.a	2	2	1	0	0
Covid19-related deaths in KTx patients	n.a	0	0	0	0	0
Number of AKI episodes in infected patients	n.a	15	14	18	7	18
Infections in HD/PD health workers	0	13	8	8	7	6
Data on prevention and containment measures (% of Centres adopting each measure)						
Telephone triage	88.3	96.9	96.9	95.5	81.3	86.2
Modified entrance/exit routes and waiting rooms	100	100	100	98.5	100	100
Use of face mask by all patients/health workers	100	100	100	100	100	100
Testing approach in patients						
All patients	3.3	10.8	10.8	16.7	17.2	19
Patients who came into contact with infected subjects	26.7	13.8	13.8	16.7	32.8	44.8
Patients with Covid-19 symptoms	70	75.4	75.4	66.7	50	36.2
Modified mode of transportation of patients	95	98.5	98.5	98.5	95.3	98.3
Testing approach in health workers						
All health workers	10	36.9	36.9	43.9	42.2	39.7
Health workers who came into contact with infected subjects	25	7.7	7.7	7.6	29.7	36.2
Health workers with Covid-19 symptoms	65	55.4	55.4	48.5	28.1	24.1

AKI acute kidney injury, Covid-19 SARS-CoV-2-associated disease, HD haemodialysis, KTx patients kidney transplant patients, PD peritoneal dialysis, SARS-CoV-2 novel Severe Acute Respiratory Syndrome-Coronavirus-2, T1,...,T6 Time point 1,..., Time point 6

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