El Maakoul *et al.*
The Egyptian Journal of Internal Medicine (2024) 36:54
https://doi.org/10.1186/s43162-024-00321-9

The Egyptian Journal of Internal Medicine

RESEARCH Open Access

COVID-19 and hospital activity: experience of the Nephrology Department of Ibn Sina Hospital-Rabat

Sara El Maakoul[1,2*], Loubna Benamar[1,2], Naima Ouzeddoun[1,2] and Tarik Bouattar[1,2]

Abstract

The COVID-19 pandemic has led to a major health crisis, responsible for a very high morbidity in the world. This context represented an organizational challenge and required an adaptation of health services. The purpose of this study is to evaluate the activity of the Nephrology Department of Ibn Sina Hospital of Rabat during the period of confinement of the COVID-19 pandemic.

Material and methods Retrospective study of hospitalization, dialysis and consultation activities in the nephrology, and dialysis and kidney transplantation department, during the period of confinement in Morocco from March 12 to June 16, 2020.

Results We have identified, for the considered period of three months, 65 patients hospitalized in the nephrology department versus 218 patients during the 3 months preceding the start of confinement in Morocco, which corresponds to a decrease of 70%. The mean age of the patients was 50 ± 16 years with a male predominance. Kidney biopsy was performed in 14 patients. Lupus nephritis was found in 5 patients. Twelve patients received a bolus of methylprednisolone, 7 patients required intravenous cyclophosphamide, and only 1 patient was treated with rituximab. One-hundred twenty-nine patients underwent dialysis, and 554 patients benefited from telemedicine during this period.

Conclusion Data collected in this study highlights that the global pandemic due to COVID-19 had a great impact on the activity of our department. The continuity of care for our patients has been ensured by the implementation of telemedicine and the reorganization of our hospital activity.

Keywords COVID-19, Activities, Nephrology

Background

The COVID-19 pandemic has led to a major health crisis, responsible for very high mortality worldwide.

It is due to the SARS-CoV-2 virus first identified in China on January 7, 2020. The first cases were reported on December 31, 2019, in the city of Wuhan. On March 11, 2020, the World Health Organization (WHO) declared a state of pandemic due to SARS-CoV-2 [1].

The COVID-19 pandemic is still raging, creating an environment of fear, uncertainty, and increasingly unclear prospects in the short and medium term. In order to contain its spread, most countries had adopted rigorous and urgent measures to impose sanitary and restrictive containment.

These measures led to a drop in medical activity in most hospitals. It seemed interesting to assess the impact of the health crisis during its epidemic peak on the

*Correspondence:
Sara El Maakoul
saraelmkl@gmail.com
[1] Department of Nephrology-Dialysis-Kidney Transplantation, CHU Ibn Sina, Rabat, Morocco
[2] Faculty of Medicine and Pharmacy, Mohammed V University, 10100 Rabat, Morocco

activity of the nephrology department and to evaluate the measures planned, such as teleconsultation, to safeguard essential care activities for chronic kidney failure patients.

The aim of this study is to evaluate the activity of the nephrology department during the first period of containment during the COVID-19 pandemic.

Material and methods

This is a retrospective study of hospitalization, dialysis, and consultation activities in the Nephrology, Dialysis, and Renal Transplant Department, during the period of confinement in Morocco from March 12 to June 16, 2020.

The nephrology department comprises 20 beds. It provides both inpatient clinical nephrology and renal transplantation services, as well as a day hospital and daily outpatient consultations. It also has a hemodialysis and peritoneal dialysis unit for adults.

We recorded the frequency of hospitalizations, and hemodialysis sessions from March 12 to June 16, 2020, which we compared with the frequency of hospitalizations and hemodialysis sessions in the last 3 months before the confinement, from December 18, 2019, to March 11, 2020.

Patient clinical data were collected from inpatient medical records.

We recorded demographic data: patients' age, sex, and city of residence and medical history: high blood pressure, diabetes, heart disease, cancer, and smoking.

We noted the reason for hospitalization, length of stay, and results of renal biopsy.

In terms of therapy, we specified the immunosuppressive treatment received, the indication for dialysis, and the number of extrarenal purification sessions.

Table 1 Patient distribution by region of residence

	n = 65	Percentage (%)
Rabat-Salé-Kénitra	48	73.84
Casablanca-Settat	6	9.23
Fès-Meknès	1	1.53
Tanger-Tétouan-Al Hoceima	9	13.84
Béni mellal-Khénifra	1	1.53

We also recorded the number of teleconsultations, by simple telephone call, from the department's consultation diaries.

We excluded from the study patients with chronic kidney disease and confirmed COVID-19 infection who were hospitalized directly in medical wards dedicated to the management of confirmed cases.

Data entry and analysis were performed using statistical software (SPSS 25.0).

Results

During the COVID-19 pandemic, the department suspended scheduled admissions.

Nephrology hospitalization

During this period, from March 12 to June 16, 2020, we counted 65 patients hospitalized in the nephrology department versus 218 patients during the 3 months prior to the start of the containment in Morocco, representing a 70% decrease (Fig. 1).

The mean age was 50 ± 16 years, with a male predominance (sex ratio M/F = 1.5). The majority of our patients were from the Rabat-Salé-Kénitra region (73.8%) (Table 1).

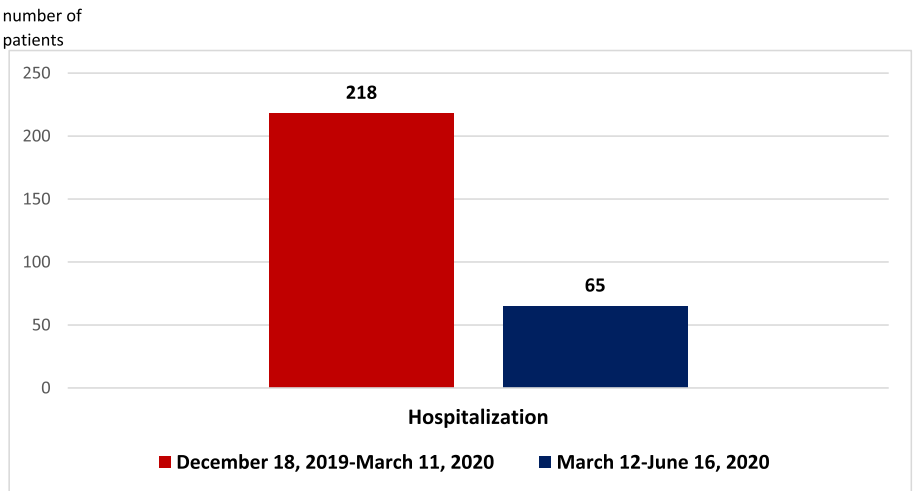

Fig. 1 Number of hospitalizations before and during the confinement period

A history of high blood pressure was found in 22 patients and diabetes in 20 (Fig. 2).

The average length of hospital stay was 7.8 ± 5 days (1–26). The majority of our patients were hospitalized for less than 5 days (Table 2).

The reason for hospitalization in chronic hemodialysis patients was an alteration in general condition in three patients. Medical peritonitis was diagnosed in five peritoneal dialysis patients (Table 3).

Renal biopsies carried out on 14 patients revealed lupus nephropathy in 5 (Table 4).

Therapeutically, 12 patients had benefited from a bolus of methylprednisolone, including 6 patients with pneumorenal syndrome, 5 patients with lupus nephropathy, and just 1 patient with membranoproliferative glomerulonephritis with positive cryoglobulin. Seven patients required cyclophosphamide infusions, including four with lupus nephropathy.

Only one patient, a renal transplant recipient, received rituximab therapy as part of the management of his lymphoma. Immunosuppressive therapy was administered only after COVID-19 infection had been ruled out by a negative RT-PCR and a chest CT scan showing no COVID-19 lesions.

Hemodialysis unit

We noted a 34.4% drop in hemodialysis sessions, 1018 sessions versus 1550 sessions in the 3 months prior to the start of confinement (Fig. 3).

One-hundred and twenty-nine patients were dialyzed during this period: 23 hemodialysis patients from our center and 106 patients hospitalized in different departments of the hospital.

The indication for dialysis on admission was hyperkalemia in 32 patients or 30% of cases (Fig. 4).

The average number of hemodialysis sessions for hospitalized patients was two sessions. Fifty-nine patients benefited from placement of a temporary hemodialysis catheter.

Table 2 Breakdown of patients by length of hospital stay

	n = 65	Percentage (%)
≤ 5 days	27	41.5
5 ànd 10 days	23	35.4
≥ 10 days	15	23.1

Outpatient consultations in the nephrology, *dialysis*, and kidney transplant department (teleconsultation)

Outpatient nephrology consultations were suspended and carried out by telephone call in 554 patients (dialysis patients, kidney transplant, or patients with chronic kidney disease).

This teleconsultation consisted of early triage of patients before their arrival at the emergency room to detect symptoms of COVID-19, prescribe the test (RT-PCR SARS-CoV-2), start anti-COVID-19 treatment, and adjust the basic treatment, particularly for kidney transplant patients.

It also enabled us to monitor patients with chronic kidney disease, chronic dialysis patients, and kidney transplant patients.

Discussion

COVID-19 is a disease caused by the SARS-CoV-2 virus first identified in China on January 7, 2020. This emerging disease gave rise to a pandemic, a first wave of which, after its Asian emergence, successively affected the Europe, America, and Africa [1, 2].

The clinical presentation of COVID-19 is very variable, ranging from asymptomatic form to acute respiratory distress syndrome and death. Furthermore, chronic kidney disease constitutes a major risk factor for worsening

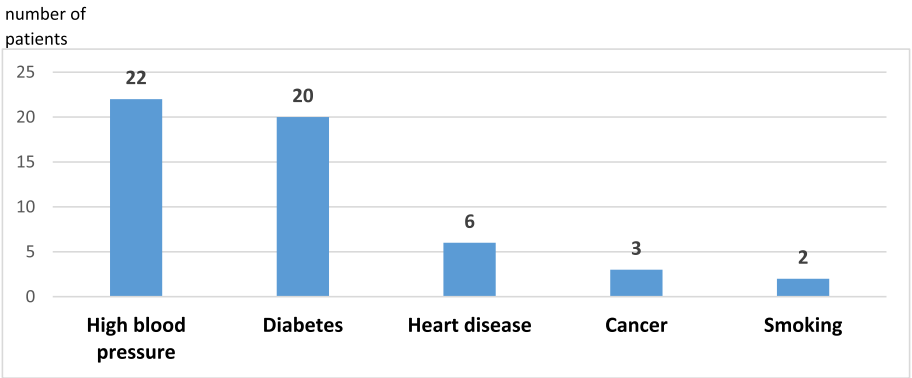

Fig. 2 Patient history

Table 3 Indications for hospitalization

	Reason for hospitalization	***n*** **= 65**
Chronic hemodialysis (*n* = 10)	Impaired general condition/anemia	3
	Febrile syndrome:	3:
	• Community-acquired pneumonia	(1)
	• Hemodialysis catheter-related sepsis	(2)
	Consciousness disorders	2
	Alveolar hemorrhage/vascularitis	1
	Arteriovenous fistula thrombosis/dialysis emergency	1
Peritoneal dialysis (PD) (*n* = 8)	Medical peritonitis	5
	Technical training	2
	PD catheter placement	1
Kidney transplants (*n* = 5)	Cutaneous lymphoma	1
	Change of double-J stent/ureterohydronephrosis	1
	Cytomegalovirus disease	1
	Bacterial pneumonia	1
	Hypertensive peak, acute lung edema	1
Acute kidney injury (AKI) (*n* = 8)	Pulmonary-renal syndrome	4
	Obstructive AKI/ neurogenic bladder	1
	Functional AKI/vomiting Bacterial pneumonia	1 1
	Inaugural ketoacid decompensation	1
Chronic kidney failure (*n* = 15)	Uremic syndrome	10
	Febrile syndrome: Non-COVID-19 pneumonia Sepsis with indeterminate starting point	3: (2) (1)
	Class IV lupus nephropathy	1
	Alveolar hemorrhage	1
Nephrotic syndrome (*n* = 15)	Edema syndrome	15
Acute pyelonephritis (*n* = 4)	Urinary burning + fever	4

Table 4 Kidney biopsy results

	n **= 14**	**Percentage (%)**
Lupus nephropathy	5	36
Agglomerate	3	21.4
AA amyloidosis	1	7.14
Cryoglobulinemia type 1	1	7.14
Diabetic glomerulosclerosis IV	1	7.14
C3 membranoproliferative glomerulonephritis	1	7.14
Minimal change disease	1	7.14
Thrombotic microangiopathy + focal segmental glomerulosclerosis	1	7.14

of COVID-19, particularly in chronic kidney deficiencies, dialysis patients, and kidney transplant recipients, given the phenotypic and functional modifications of their immune system [3, 4].

The COVID-19 pandemic had forced a change in hospital organization, affecting all services and specialties, both medical and surgical, including nephrology [5, 6].

This study provides an objective and quantitative assessment of the activity of the Nephrology Department of the Ibn Sina Hospital in Rabat during the first period of confinement during the COVID-19 pandemic.

The first data to emerge from this study is the more marked decrease in the number of hospitalizations compared to the last 3 months preceding the start of confinement. Thus, our department had suspended scheduled admissions, and only one patient had undergone peritoneal dialysis catheter placement.

This is consistent with the data from the study by Soler et al., who noted that more than half of the nephrology departments (51.6%), which participated in the survey, had suspended admissions and scheduled renal biopsies. as well as the implantation of catheters [7].

The explanation for this decrease in the number of hospitalizations is mainly linked to the overall drop in consultations in emergency departments and the fear of the majority of patients to present themselves to the hospital for fear of being contaminated by the virus and being confronted with a severe form.

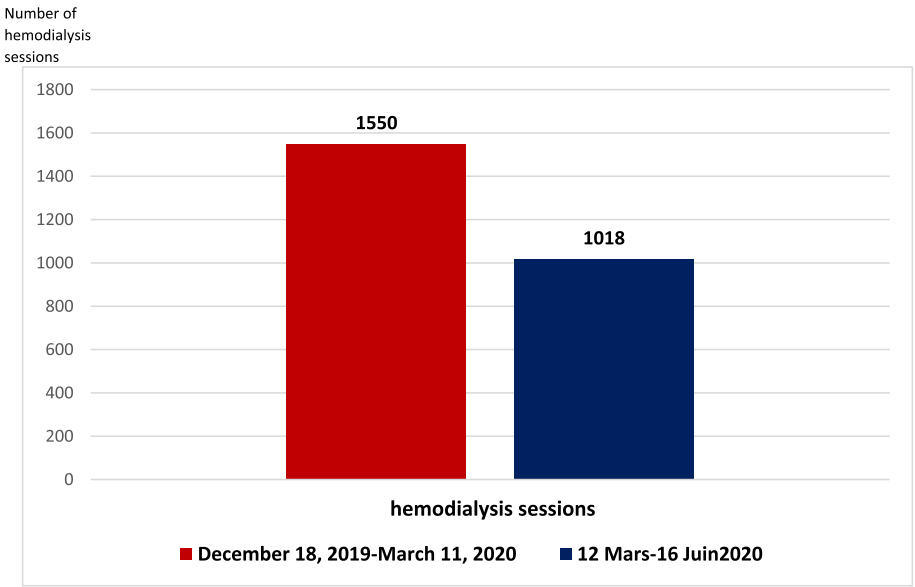

Fig. 3 Number of hemodialysis sessions before and during the confinement period

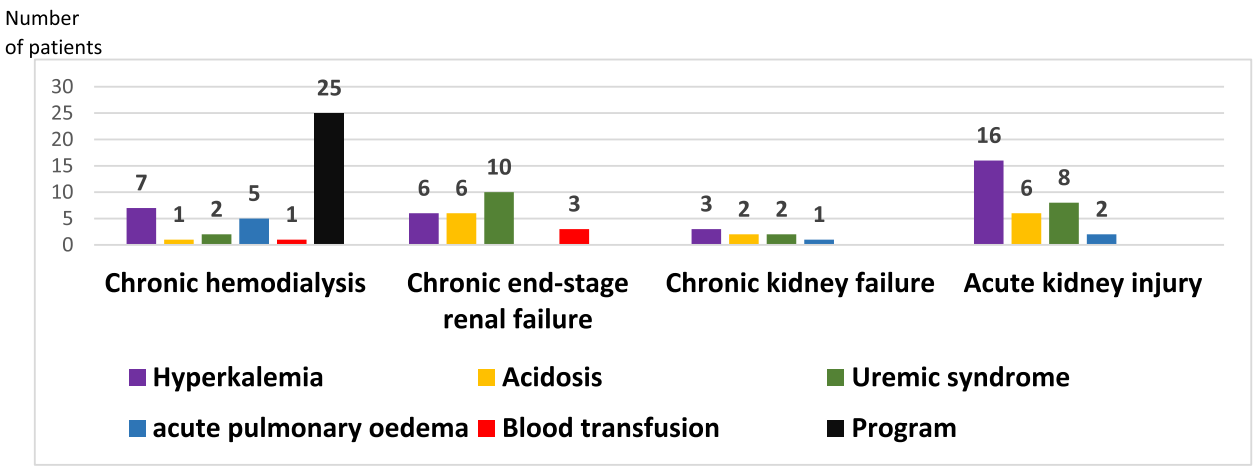

Fig. 4 Indications for dialysis on admission

However, the nephrology department had modified the organization of its activity during the first period of confinement. The majority of specialist doctors, residents, and paramedical staff were assigned to departments dedicated to COVID-19 disease. Other doctors provided care to patients for pathologies not due to COVID-19, namely chronic dialysis patients, kidney transplant recipients, and those with kidney pathology.

Kidney transplantation activity was temporarily suspended during this period. Most countries had adopted the same attitude [7, 8].

Appointments for nonurgent face-to-face consultations were also suspended, and teleconsultation was put in place, in order to limit the risks of SARS-CoV-2 infection of patients or medical and paramedical staff and to contribute to compliance with the confinement.

In the study by Soler et al., telemedicine was the only means of ensuring medical monitoring of patients in 16.5% of centers [7]. Chen et al. had reported in their study that medical consultation in nephrology was interrupted during the pandemic, and that telemedicine was a reasonable alternative method [9].

There are different categories of benefits of teleconsultation reported in the literature. It promotes self-management of the disease and also saves time by avoiding travel. According to Vidal-Alaball et al.,

teleconsultation during COVID-19 made it possible as follows:

- Reduce the time required to confirm a diagnosis and start treatment and/or quarantine.
- Monitor patients at home, which avoids their travel and reduces the risk of infection within the hospital.
- Reduce the risks of contamination for patients and healthcare professionals.
- Inform patients.
- Ensure the training of health professionals.
- Save the cost of protective equipment [7, 10].

Telemedicine in nephrology opens an organizational path for future virtual medicine, with webcams and applications facilitating a medical visit adapted to our patients with kidney disease [11, 12].

However, the disadvantages of telemedicine frequently reported by the general population are the loss of human contact and the weakening of the patient-physician relationship. These disadvantages are also cited by healthcare professionals (43% of doctors, 23% of nurses) [13].

Thus, advanced age and the socio-economic context are also two variables that have a negative impact on the development and acceptability of this digital approach [14].

Indeed, the development of new technologies can contribute to the installation of new forms of visual and auditory interaction, in order to improve the patient-physician relationship via telemedicine.

Telemedicine is tending to become more widespread, especially as it has proved its effectiveness during the period of confinement [15]. However, it seems necessary to experiment with this procedure in nephrology through clinical studies, to better analyze this practice, anticipate difficulties, and measure the benefit/risk balance for patients with chronic kidney disease.

Conclusion

The data collected in this study underlines that the global pandemic due to COVID-19 and the confinement established in Morocco had a great impact on the activity of our service both in terms of hospitalization, the activity of outpatient consultations, and of the kidney transplant program.

The continuity of care for our patients was ensured by the implementation of teleconsultation and the reorganization of our activity in the department.

However, we must learn from lived experiences, to develop emergency plans in crisis situations and to optimize the effectiveness of care pathways and guarantee the safety of health personnel.

Abbreviations

WHO World Health Organization
PD Peritoneal dialysis
AKI Acute kidney injury

Acknowledgements

None.

Authors' contributions

SE is involved in the clinical care of the patient, the drafting of the text, sourcing, writing the review, and editing. TB have revised the work. All authors read and approved the final version of the manuscript

Funding

There was no funding support for this study.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Consent for publication

A consent was obtained from the patients for an anonymous publication.

Competing interests

The authors declare that they have no competing interests.

Received: 18 April 2024 Accepted: 18 May 2024
Published online: 24 May 2024

References

1. Zhou F, Yu T, Du R et al (2020) Clinical course and risk factors for mortality of adult in patients with COVID-19 in Wuhan, China: a retrospective cohort study. The Lancet 395:1054–1062
2. Chen N, Zhou M, Dong X et al (2019) Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet 2020:395
3. Allareddy V, Roy A, Rampa S et al (2014) Outcomes of stem cell transplant patients with acute respiratory failure requiring mechanical ventilation in the United States. Bone Marrow Transplant 49:1278–1286
4. Williamson EJ, Walker AJ, Bhaskaran K et al (2020) Factors associated with COVID-19-related death using Open SAFELY. Nature 584:430–436
5. Sánchez-Álvarez JE, Pérez Fontán M, Jiménez Martín C, Blasco Pelícano M, Cabezas Reina CJ, Sevillano Prieto ÁM, et al (2020) SARS-CoV-2 infection in patients on renal replacement therapy. Report of the COVID-19 Registry of the Spanish Society of Nephrology (SEN). Nefrologia (Engl Ed) 40(3):272–78. https://doi.org/10.1016/j.nefro.2020.04.002. English, Spanish.
6. Albalate M, Arribas P, Torres E, Cintra M, Alcázar R, Puerta M, et al (2020) Grupo de Enfermería HUIL; Grupo enfermería HUIL. High prevalence of asymptomatic COVID-19 in haemodialysis: learning day by day in the first month of the COVID-19 pandemic. Nefrologia (Engl Ed) 40(3):279–86. https://doi.org/10.1016/j.nefro.2020.04.005. English, Spanish.
7. Soler MJ, Heras MM, Ortiz A et al (2020) Impacto de la pandemia COVID-19 en los Servicios de Nefrología Espanoles. Nefrologia 40:579–584
8. Sahay M, Kute V, Prasad N et al (2020) Corona, COVID and kidney transplantation. Indian J Transplant 14(1):1–4
9. Chen G, Zhou Y, Xia J et al (2020) When the COVID-19 pandemic changed the follow-up landscape of chronic kidney disease: a survey of real-world nephrology practice. Ren Fail 42(1):733–739
10. Vidal-Alaball J, Acosta-Roja R, Pastor Hernández N, Sanchez Luque U, Morrison D, Narejos Pérez S et al (2020) Telemedicine in the face of the COVID-19 pandemic. Aten Primaria. 52(6):418–422. https://doi.org/10.1016/j.aprim.2020.04.003

11. Singh K, Diamantidis CJ, Ramani S et al (2019) Patients and nephrologists evaluation of patient-facing smartphone apps for CKD. Clinical Journal of the American Society of Nephrology [Internet] 14:523–529
12. Oliva-Damas N, Oliva-Damaso E, Rodriguez-Perez JC et al (2019) Improved nephrology referral of chronic kidney disease patients: potential role of smartphone apps. Clin Kidney J 12(6):767–70 (Breviation)
13. Agence du numérique en santé. Le baromètre de la Télémédecine de l'ANS. Janvier 2020. Consultable sur:https://esante.gouv.fr/sites/default/files/mediaentity/documents/barometrejanvier2020.pdf
14. Rubenstrunk A, Vanmairis C, Douard A, Dubuisson A, Deltombe J, Deldyck J (2018) Les TÉLÉconsultations diététiques en dialyse : une solution pour une réactivité accrue au service d'un plus grand nombre de patients. Nephrol Ther 14:253–254. https://doi.org/10.1016/j.nephro.2018.07.015
15. Croissance record du recours à la téléconsultation en mars. https://www.ameli.fr/espace-presse/communiques-et-dossiers-depresse/les-derniers-communiques-de-la-caisse-nationale/detail-d-uncommunique/3881.php.

Publisher's Note