

Bulletin de la Dialyse à Domicile

Acceptance of vaccination against COVID-19 among peritoneal dialysis patients in Senegal

(Acceptation de la vaccination contre la COVID-19 chez les patients en dialyse péritonéale au Sénégal)

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Summary

Introduction

The aim of this study was to assess vaccination coverage among peritoneal dialysis patients and to identify factors associated with non-vaccination.

Patients and methods

This was a multicenter, retrospective, descriptive, and analytical study conducted over a 6-month period in 4 peritoneal dialysis units. Patients on peritoneal dialysis for at least 3 months were included.

Results

Forty-nine patients were included in our study. Of these, 30 (61.2%) were vaccinated against COVID-19, with a sex ratio of 0.8. Eighty-three percent of patients had received 2 doses. Of these, 63.3% had received the AstraZeneca vaccine, 33.3% Sinopharm, and 3.4% Johnson & Johnson. Adverse events were mainly pain at the inoculation site in 100% of cases and influenza-like illness in 25%. The reason for non-vaccination in 42% of cases was fear of vaccine side effects and/or minimization of the severity of COVID-19. Among vaccinated patients, 2 (6.6%) had tested positive for COVID-19 after vaccination, including one with a severe form 3 months after vaccination. The average age of vaccinated patients was significantly higher (47.6 years) than that of non-vaccinated patients (37.6 years) ($p=0.048$).

Conclusion

It is vital to continue applying COVID-19 prevention measures in the various peritoneal dialysis centers, and to encourage vaccination or completion of vaccination schedules, particularly in younger patients.

Key words : COVID-19, Peritoneal Dialysis, Vaccination

Résumé

Introduction

Ce travail avait pour objectif d'évaluer la couverture vaccinale chez les patients en dialyse péritonéale et de déterminer les facteurs associés à la non-vaccination.

Patients et méthodes

Il s'agissait d'une étude multicentrique, rétrospective, descriptive et analytique, réalisée sur une période de 6 mois, dans 4 unités de dialyse péritonéale. Les patients en dialyse péritonéale depuis au moins 3 mois étaient inclus.

Résultats

Quarante-neuf patients étaient inclus dans notre étude. Parmi eux 30 (61,2%) étaient vaccinés contre la COVID-19 avec un sex-ratio de 0,8. Il y avait 83% des patients qui avaient reçu 2 doses. Il y avait 63,3% des patients qui avaient reçu le vaccin d'AstraZeneca, 33,3% celui de Sinopharm et 3,4% celui de Johnson & Johnson. Les effets indésirables étaient principalement une douleur au niveau du point d'inoculation dans 100% des cas et un syndrome grippal dans 25% des cas. La raison de la non vaccination était dans 42% des cas une peur des effets secondaires des vaccins et/ou une minimisation de la gravité de la COVID-19. Parmi les patients vaccinés, 2 (6,6%) avaient été testés positifs à la COVID-19 après vaccination dont un avec une forme sévère 3 mois après le vaccin. La moyenne d'âge des patients vaccinés était significativement plus élevée (47,6 ans) que celle des non vaccinés (37,6 ans) ($p=0,048$).

Conclusion

Il est primordial de continuer à appliquer les mesures de prévention de la COVID-19 dans les différents centres de dialyse péritonéale et d'encourager la vaccination ou la complétion des schémas vaccinaux notamment chez les plus jeunes.

Mots clés : COVID-19, Dialyse péritonéale, Vaccination

Introduction

Severe Acute Respiratory Syndrome (SARS-CoV2), is a viral pneumonia secondary to Corona-Virus 2, a virus of the coronavirus family that was first isolated in Wuhan, China in December 2019. This virus, responsible for Coronavirus Disease 2019 (COVID-19) spread rapidly and the WHO declared a state of pandemic on 11 March 2020 [1].

As of July 28, 2022, over 570 million cases of COVID-19 and more than 6.3 million deaths were recorded worldwide [2].

In Senegal, the first case of COVID-19 was diagnosed on March 2, 2020 [3], and by July 28, 2022, over 87,000 cases of COVID-19 had been diagnosed and over 1,900 deaths recorded.

Faced with this pandemic, the scientific community was recommending a number of measures to curb the spread of the virus, including the mandatory wearing of masks, social distancing, hand washing, and the use of virucidal hydroalcoholic solutions [4].

At the same time, several countries began developing vaccines against SARS-CoV2, and vaccination has emerged as the best way to slow the spread of the virus.

As chronic kidney disease (CKD) is a high-risk area for COVID-19, patients on peritoneal dialysis (PD) and hemodialysis were targeted as a priority for the vaccination campaign.

The main aims of our study were to investigate vaccination coverage among peritoneal dialysis patients in Senegal, to assess the prevalence of COVID-19 among vaccinated peritoneal dialysis patients, and to identify factors associated with non-vaccination.

Patients and methods

Type and period

This was a multicenter, retrospective, descriptive, and analytical study with a period ranging from the date of the start of vaccination in Senegal (February 23, 2021) to the end of August 2022 in 4 peritoneal dialysis units in Senegal.

Study population

We included all patients in PD for at least 3 months in Senegal.

Patients whose files were incomplete or who refused to answer the questionnaire were not included.

Data collection

Data were collected on a pre-established form. The survey form recorded the reasons for vaccination, the type and dose of vaccine, and any reasons for non-vaccination.

Definition of operating parameters

In our study, patients were considered to have had COVID-19 only when the diagnosis was made biologically by a positive RT-PCR (reverse-transcriptase polymerase chain reaction) or a positive antigenic test.

In addition, severity criteria from the Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia (Trial Version 7) were used. COVID-19 was considered mild when it was asymptomatic (no clinical signs) or only slightly symptomatic (asthenia). It was considered moderate when pulmonary clinical signs and fever were present but did not require hospitalization. Finally, it was considered severe in the presence of respiratory distress with tachypnea greater than 30 cycles per minute or oxygen saturation (SaO₂) below 93%, requiring hospitalization in an intensive care unit [5].

Statistical analysis

Data were entered online on a Google Docs form and then exported to Microsoft Excel 2016. Data analysis was carried out using IBM SPSS (Statistical Package for the Social Sciences) 25. They were expressed using measures of central tendency and dispersion (mean ± standard deviation) for quantitative variables and frequencies for qualitative variables. To compare frequencies, we used Pearson's chi-square test. Means were compared using the analysis of variance test. A p-value of less than 0.05 was considered significant.

Ethical considerations

The study protocol was submitted to the National Health Research Ethics Committee at the Ministry of Health and Social Action under reference SEN2022/110.

Results

↓ Table 1. Characteristics of study patients

Parameters		Vaccinated (%) N=30	Unvaccinated (%) N=19	p-value
Average age (years)		47.6	37.6	0.048
Sex	Male	14/24	10/24	0.86
	Female	16/25	9/25	
Average time in PD (months)		21.6	12.4	0.16
Average BMI (kg/m ²)		22.6	21.9	0.57
Socio-economic standard of living High 14 (64.66%)		Low	16 (53.34%)	0.91
		9 (47.37%)	10 (52.63%)	
Instructional level	Medium	10 (33.33%)	6 (31.56%)	0.92
	Secondary	8 (26.67%)	7 (36.88%)	
	Superior	12 (40%)	6 (31.56%)	

PD=peritoneal dialysis

Epidemiological data

Of a total of 74 PD patients in Senegal, 49 were included in our study. The mean age of the patients was 43.7 ± 17.5 years. There were 24 men (49%) and 25 women (51%), giving a sex ratio of 0.96. The most frequent nephropathy was benign nephroangiosclerosis (NAS) in 32.7% of cases, followed by chronic glomerulonephritis (CGN) in 24.5%. In the remaining 32.7% of cases, the causative nephropathy was undetermined. The average length of time patients had been in PD was 18 ± 22.2 months. The majority of patients (81.7%) had been in PD for less than 18 months (*Table 1*).

Vaccination against COVID-19

Vaccination coverage

Thirty patients (61.2%) were vaccinated against SARS-CoV2, while 19 patients (38.8%) were not.

Reason for non-vaccination

In 42% of cases of vaccine refusal, the reason for non-vaccination was both fear of vaccine side effects and minimization of the severity of COVID-19. Six patients (31.6%) refused the vaccine solely out of fear of side effects, and 5 patients (26.3%) refused the vaccine only because COVID-19 did not seem serious enough to warrant vaccination.

Reason for vaccination

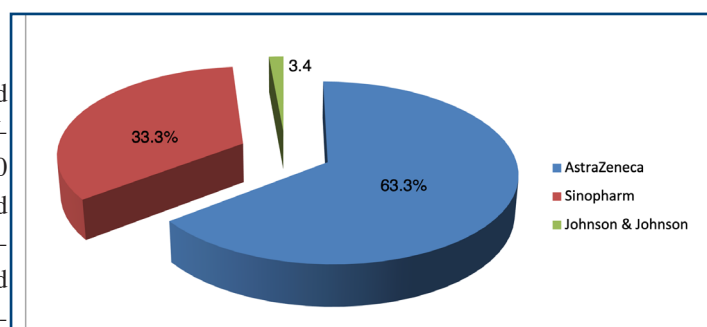
All vaccinated patients (30) were vaccinated to protect themselves, and 27 patients (90%) were vaccinated to protect those around them. No patient was vaccinated because of an external obligation (international travel, obligation to be vaccinated in the workplace or for access to certain public places, etc.).

Number of doses

Twenty-five patients (83%) had received 2 doses of vaccine (15 with AstraZeneca and 10 with Sinopharm), while the remaining 5 patients (17%) had received a single dose (4 with AstraZeneca and 1 with Johnson & Johnson). No patient had received 3 doses.

Type of vaccine

Nineteen patients (63.3%) had received the ChAdOx1 nCoV-19 vaccine (AstraZeneca), 10 patients (33.3%) had received the BBIBP-CorV vaccine (Sinopharm), and 1 patient had received the JCOVDEN vaccine (Johnson & Johnson).



↑ Figure 1. Distribution of patients according to vaccine received

Side effects after vaccination

Sixteen vaccinated patients (53%) experienced side effects after vaccination. All patients experiencing side effects (16) had pain at the inoculation site, and 4 (25%) had flu-like symptoms.

COVID-19 after vaccination

Two patients (7% of those vaccinated) contracted COVID-19 after vaccination, including one with a severe form 3 months after vaccination. Both these patients were vaccinated with the Sinopharm vaccine.

Factors associated with non-vaccination

Vaccinated patients were older than unvaccinated patients, with an average age of 47.6 versus 37.6 years. This difference was statistically significant, with a p-value of 0.048 (Table II).

↓ *Tableau II. Factors associated with non-vaccination (multivariate analysis)*

Parameters			Vaccinated (%) N=30	Unvaccinated (%) N=19	p-value
Average age (years)			47.6	37.6	0.048
Sex	Male		14/24	10/24	0.86
	Female		16/25	9/25	
Average time in PD (months)			21.6	12.4	0.16
Average BMI (kg/m ²)			22.6	21.9	0.57
Socio-economic standard of living High 14 (64.66%)		Low	16 (53.34%)	10 (52.63%)	0.91
		9 (47.37%)			
Instructional level	Medium		10 (33.33%)	6 (31.56%)	0.92
	Secondary		8 (26.67%)	7 (36.88%)	
	Superior		12 (40%)	6 (31.56%)	

Discussion

Vaccination coverage

Vaccinated patients accounted for 61.2% of cases. In the general population, only 8.7% of Senegalese had received 1 dose of SARS-CoV2 vaccine, and 6.4% had received 2 doses [2]. The higher vaccination coverage of PD patients compared with the general population may be related to the prioritization of chronically ill patients during the first phase of the vaccination campaign, but also to the important work carried out by nephrology and PD teams to raise patients' awareness of the fact that End-stage renal disease constitutes a high-risk terrain for progression to severe forms of COVID-19. In Togo, Tsevi et al. reported that only 50% of hemodialysis patients were vaccinated against SARS-CoV2 [6]. In France, Bensouna et al. reported a much higher vaccination coverage of 96.7%, compared with 80.9% for the general population [2,7].

In the United States, Garcia reported vaccination coverage of 80% in a population of hemodialysis patients [8]. In Africa, the low vaccination coverage of renal replacement therapy (RRT) patients, and more generally of the general population, can be explained by the proliferation of “conspiracy theories” and “fake news” on social networks calling into question the efficacy and safety of vaccines and even the actual existence of COVID-19. This mistrust has been further exacerbated by the low apparent impact of COVID-19 on the African continent compared with the rest of the world [9].

Fear of long-term vaccine side effects and minimization of the seriousness of COVID-19 were both reasons for vaccine refusal in 42% of our patients. In Togo, a study of a population of chronic hemodialysis patients reported fear of vaccine side effects in 51.2% of patients, doubts about vaccine quality in 49.6%, and doubts about vaccine efficacy in 33.3% of cases [6]. A study by Blanchi et al. conducted in several hemodialysis centers in France and Italy found that doubts about efficacy and fear of side effects were the main reasons for vaccine refusal. On the other hand, a relationship of trust between nephrologist and patient was correlated with acceptance of vaccination [10].

Furthermore, Andrian reported in a study of hemodialysis patients in France that 90% of unvaccinated patients were not convinced of the vaccine’s efficacy, and 84% had doubts about the vaccine’s quality and possible long-term side effects [11].

This lack of confidence may be related to the vaccine manufacturing process, such as rapid development that does not allow sufficient hindsight and formal proof of safety, the development of new vaccine processes such as RNA vaccines that have generated fears among patients, and also the lack of transparency in vaccine development and during clinical trials [12,13].

On the other hand, populations may have had concerns about being used as guinea pigs, as was the case for the tenofovir trials on populations at risk of contracting HIV, or more recently in 2015 in Ghana for the Ebola vaccine [14,15].

Reason for vaccination

All vaccinated patients were vaccinated to protect themselves, and 90% were vaccinated to protect those around them as well as themselves.

A Togolese study of hemodialysis patients found similar reasons to our study. Indeed, 90.9% of patients were vaccinated to protect against severe forms of COVID-19, 54.5% because of their advanced age, and 43.2% because of their comorbidities [6]. In France, where much higher vaccination coverage (96.7%) is reported, the reasons for vaccination were not included in the study, but this could be explained by the fact that a health pass was often required in many situations, unlike in Senegal, where it has always been voluntary [7,16,17].

Number of doses

In our study, no patient had received a complete 3-dose vaccination schedule. A majority (83%) had received 2 doses, and the remaining 17% a single dose.

In the various studies carried out in the West and in China, all vaccinated patients had received

a complete vaccination schedule, i.e., 3 doses, or 2 doses if the Johnson & Johnson vaccine was used [6,8,15].

This can be explained by the rush for vaccines in Senegal only at the start of the campaign and the growing lack of interest in vaccination among the population, given the much lower impact and mortality of COVID-19 in Africa.

Type of vaccine

Sixty-three percent of patients were vaccinated with AstraZeneca's vaccine, 33.3% with Sinopharm's, and only 1 patient with Johnson & Johnson's vaccine. No patient was vaccinated with an mRNA vaccine. In the West, in all studies found, dialysis patients were vaccinated with mRNA vaccines (Pfizer-BioNTech) [7,18-20]. This may be explained by the fact that, in Senegal, vaccination was reserved primarily for patients with chronic diseases, and dialysis patients in particular. At the start of the vaccination campaign, only vaccines from AstraZeneca and Sinopharm were available. These vaccines were chosen not only for their availability, but also for their accessible method of storage (in a refrigerator between 2 and 8°C), unlike the Pfizer-BioNTech vaccine, which requires a freezer to ensure a temperature below -15°C [4]. Furthermore, the predominant use of mRNA vaccines in the West was due to a better humoral response in dialysis patients, as reported by Chen and Grupper, leading them to be recommended as first-line vaccines for dialysis patients [21,22].

Side effects after vaccination

Fifty-three percent of patients experienced side effects after vaccination, such as pain at the inoculation site in 100% of cases, flu-like symptoms in 25%, and diarrhea in 6.3%. In Seck's study, 81.5% of patients reported no adverse effects. Of the 18.5% who did experience adverse reactions, 6.2% reported flu-like symptoms, 6.2% localized myositis, and 3.7% diarrhea [23]. A study by Zitt et al. in Austria found pain at the inoculation site in 38% of cases, diarrhea in 8%, and asthenia in 8% [24].

The disparity in results between our study and the literature can be explained by the different vaccines used in the studies. Indeed, patients in our study were vaccinated using 3 different vaccines (AstraZeneca, Sinopharm, and Johnson & Johnson), whereas in Seck's study, patients used only the AstraZeneca vaccine, and those in Zitt et al.'s study only the Pfizer-BioNTech vaccine. Given the multitude of vaccines used in our study, it is difficult to establish an adverse event profile for each vaccine.

COVID-19 after vaccination

Only 6.7% of vaccinated patients tested positive for SARS-CoV2 after vaccination. These results are in line with various studies carried out in dialysis patients, which have shown that not only was their vaccine response diminished, but also that protective antibody levels fell more rapidly than in the general population, currently justifying the need for a second booster dose 3 months after the first booster (i.e., 4 injections in total) [25,26].

Conclusion

It is vital to continue applying COVID-19 prevention measures in the various peritoneal dialysis centers, and to encourage vaccination or completion of vaccination schedules, particularly in younger patients, preferring the use of mRNA vaccines recommended by learned societies.

Conflict of interest

The authors declare no conflict of interest for this article.

Financing

None

Ethical considerations

The study protocol was submitted to the National Health Research Ethics Committee at the Ministry of Health and Social Action under reference SEN2022/110.

In addition, all patients included in our study signed a free and informed consent form.

Contribution of the authors

HE collected the data and helped write the article.

MM took part in writing the article.

AN contributed to the writing of the article.

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