

Supplementary material

Biedunkiewicz B, Dębska-Ślizień A, Tylicki L. COVID-19 in patients requiring renal replacement therapy: an overview of current data and future challenges. Pol Arch Intern Med. 2022; 132: 16336. doi:10.20452/pamw.16336

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Table S1. Selected data on COVID-19 fatality rate in CKD (HD, PD and KTR) patients before and after the commencement of vaccination era (gray lines).

Article and time of analysis	Patient number and kind of KRT	Patient's characteristics	Fatality rate	Predictors of mortality
Jager ^{S1} (Europe) ERA-EDTA Registry February-April 2020	n=3285 (3160 HD, 125 PD)	Outpatient and hospitalized	20% (at 28 days)	Older age Male
Couchoud ^{S2} (France) French Rein Registry March-May 2020	n=1621 (1568 HD, 53 PD)	Outpatient and hospitalized (62%)	21%	Older age Hypoalbuminemia Ischemic heart disease
Ng ^{S3} (US) Multicenter March-April 2020	n=419 (408 HD, 11 PD)	Hospitalized	32%	Older age Mechanical ventilation Vasoactive medication Lymphopenia Elevated BUN, ferritin
Sanchez-Alvarez ^{S4} (Spain) Registry of Spanish Society of Nephrology March-April 2020	n=582 (547 HD, 35 PD)	Outpatient and hospitalized (81%)	25%	Older age Pneumonia Hydroxychloroquine – better survival
Corbett ^{S5} (UK) Imperial College Healthcare NHS Trust March-April 2020	n=300 (290 in-center HD, 8 PD, 2 home HD)	Outpatient and hospitalized	20%	Older age Inactive on transplant waitlist
Jager ^{S1} (Europe) ERA-EDTA Registry February-April 2020	n=1013 KTR	Outpatient and hospitalized	20% (at 28 days)	Older age
Cravedi ^{S6} (US, Spain, Italy) TANGO Registry March-May 2020	n=144 KTR	Hospitalized	32%	Older age Low eGFR Respiratory rate >20/min Elevated IL-6 levels
Bossini ^{S7}	n=53	Outpatient and hospitalized (85%)	33%	Age>60

(Italy) Multicenter March-April 2020	KTR			Dyspnea on admission
Caillard ^{S8} (France) French Registry March-April 2020	n=279 KTR	Outpatient and hospitalized (87%)	23% (at 30 days)	Age>60 Cardiovascular disease Dyspnea on admission
Sanchez-Alvarez ^{S4} (Spain) Registry of Spanish Society of Nephrology March-April 2020	n=286 KTR	Outpatient and hospitalized (85%)	23%	Older age Pneumonia
Sibbel ^{S9} (US) Multicenter January-April 2021	n=189 HD (BNT162b2) n=266 (mRNA-1273)	Outpatient and hospitalized (28% BNT162b2, 37% mRNA-1273)	4% (BNT162b2) 5,6% (mRNA- 1273)	N/A
Ashby ^{S10} (UK) Multicenter January-September 2021	n=79 HD (BNT162b2) n=107 (AZD1222)	Outpatient and hospitalized (24%)	6%	Period: Aug-Sept 2021 with higher risk of death
Tylicki ^{S11} (Poland) Multicenter September 2021-January 2022	n=1042 HD (BNT162b2 and mRNA- 1273)	Outpatient and hospitalized	6.7%	N/A
Demir ^{S12} (Turkey) Multicenter May-October 2021	n=82 KTR KTR (CoronaVac BNT162b2)	Outpatient and hospitalized (21%)	5%	N/A
Montagud-Marrahi ^{S13} (Spain) Multicenter February-July 2021	n=19 KTR (mRNA-1273) n=2 (BNT162b2)	Outpatient and hospitalized (52%)	5%	N/A

CKD, chronic kidney disease; HD, hemodialysis; KRT, kidney replacement therapy; KTR, kidney transplant recipient; PD, peritoneal dialysis; n, number of patients

Table S2. Selected data on the humoral response (seroconversion rate in IgG anti-spike titer antibody) in CKD i.e. HD, PD and KTR (gray lines) patients after vaccination against COVID-19.

Article	Patient number and kind of KRT	Vaccine	Doses	Seroconversion rate	Time of measurement after last dose
Stumpf ^{S14} (Germany)	n=1256 (1198 HD, 58 PD)	BNT162b2 mRNA-1273	2	95.3%	4-5 weeks
Grupper ^{S15} (Israel)	n=56 HD	BNT162b2	2	96%	30 days

Espi ^{S16} (France)	n=83 HD	BNT162b2	2	89.2%	10-14 days
Rozen-Zvi ^{S17} (Israel)	n=308 KTR	BNT162b2	2	38.4%	28 days
Dębska-Ślizien ^{S18} (Poland)	n=142 KTR	BNT162b2 mRNA-1273	2	51.4%	14-21 days
Marlet ^{S19} (France)	n=97 n=160 KTR	BNT162b2 mRNA-1273	3 4	43% 47%	95 days 52 days

CKD, chronic kidney disease; HD, hemodialysis; KTR, kidney transplant recipient; PD, peritoneal dialysis; n, number of patients

SUPPELEMNTARY REFERENCES

- S1. Jager KJ, Kramer A, Chesnaye NC, Couchoud C, SanchezAlvarez JE, Garneata L, Collart F, Hemmeler MH, Ambuhl P, Kerschbaum J, Legeai C, Del Pino Y Pino MD, Mircescu G, Mazzoleni L, Hoekstra T, Winzeler R, Mayer G, Stel VS, Wanner C, Zoccali
- S2. Couchoud C, Bayer F, Ayav C, et al. Low incidence of SARS-CoV-2, risk factors of mortality and the course of illness in the French national cohort of dialysis patients. *Kidney Int.* 2020; 98: 1519-1529.
- S3. Ng JH, Hirsch JS, Wanchoo R, et al. Outcomes of patients with end- stage kidney disease hospitalized with COVID-19. *Kidney International.* 2020 Dec;98(6):1530-1539.
- S4. Sánchez-Álvarez JE, Pérez Fontán M, Jiménez Martín C, et al. SARS- CoV-2 infection in patients on renal replacement therapy. Report of the COVID-19 Registry of the Spanish Society of Nephrology (SEN). *Nefrologia.* 2020; 40:272–278.
- S5. Corbett RW, Blakey S, Nitsch D, et al. Epidemiology of COVID-19 in an urban dialysis center. *J Am Soc Nephrol* 2020; 31:1815-23.
- S6. Cravedi P, Suraj SM, Azzi Y, et al. COVID-19 and kidney transplantation: results from the TANGO International Transplant Consortium. *Am J Transplant.* 2020.
- S7. Bossini N, Alberici F, Delbarba E, et al. Kidney transplant patients with SARS-CoV-2 infection: The Brescia Renal COVID task force experience. *Am J Transplant.* 2020
- S8. Caillard S, Anglicheau D, Matignon M, et al. An initial report from the French SOT COVID Registry suggests high mortality due to Covid-19 in recipients of kidney transplants. *Kidney international.* 2020 Dec;98(6):1549-1558.
- S9. Sibbel S, McKeon K, Luo J, et al. Real-World Effectiveness and Immunogenicity of BNT162b2 and mRNA-1273 SARS-CoV-2 Vaccines in Patients on Hemodialysis. *J Am Soc Nephrol.* 2022 Jan;33(1):49-57.

- S10. Ashby DR, Caplin B, Corbett RW. Severity of COVID-19 after Vaccination among Hemodialysis Patients An Observational Cohort Study, *CJASN*. 2022; 17; 843-850.
- S11. Tylicki L, Biedunkiewicz B, Puchalska-Reglińska E, et al. COVID-19 vaccination reduces mortality in patients on maintenance hemodialysis. *Front Med (Lausanne)*. 2022 (in press).
- S12. Demir E, Dheir H, Safak S, et al. Differences in clinical outcomes of COVID-19 among vaccinated and unvaccinated kidney transplant recipients. *Vaccine*. 2022 May 26;40(24):3313-3319.
- S13. Montagud-Marrahi E, Cucchiari D, Cuadrado-Payan E, et al. SARS-CoV-2 Infection After Full Vaccination in Kidney Transplant Recipients. 2021 Dec 1;105(12):278-279.
- S14. Stumpf J, Siepmann T, Lindner T, et al. Humoral and cellular immunity to SARS-CoV-2 vaccination in renal transplant versus dialysis patients: A prospective, multicenter observational study using mRNA-1273 or BNT162b2 mRNA vaccine. *Lancet Reg Health Eur*. 2021; 9:100178
- S15. Grupper A, Sharon N, Finn T, et al. Humoral Response to the Pfizer BNT162b2 Vaccine in Patients Undergoing Maintenance Hemodialysis. *CJASN*. 2021;16(7):1037–42
- S16. Espi M, Charmetant X, Barba T, et al. The ROMANOV study found impaired humoral and cellular immune responses to SARS-CoV-2 mRNA vaccine in virus-unexposed patients receiving maintenance hemodialysis. *Kidney Int*. 2021;100(4):928–36.
- S17. Rozen-Zvi B, Yahav D, Agur T, et al. Antibody response to SARS-CoV-2 mRNA vaccine among kidney transplant recipients: a prospective cohort study. *Clin Microbiol Infect*. 2021;27(8):1173.e1–4.
- S18. Dębska-Ślizień A, Ślizień Z, Muchlado M, et al. Predictors of Humoral Response to mRNA COVID19 Vaccines in Kidney Transplant Recipients: A Longitudinal Study—The COViNEPH Project. *Vaccines*. 2021;9(10):1165
- S19. Marlet J, Gatault P, Maakaroun Z, et al. Antibody Responses after a Third Dose of COVID-19 Vaccine in Kidney Transplant Recipients and Patients Treated for Chronic Lymphocytic Leukemia. *Vaccines*. 2021;9(10):1055.