

The impact of infection on kidney allograft failure in an under-resourced country: the Iraqi Kurdistan experience during the COVID-19 pandemic.

Besoz L Hama¹, Alaa A Ali², Dana A Sharif¹, Michael D Hughson²

¹Department of Nephrology and Medicine, Sulaimania University Medical College, Sulaimania, Iraq
²Department of Pathology, Hiwa Oncology and Shorsh General Teaching Hospitals, Sulaimania, Iraq

Background

Because of the cost and complexity of dialysis, kidney transplantation is the World's most widely used replacement therapy for end-stage kidney disease. This kidney transplantation is practiced where resources for infection identification and control do not usually meet the standards of developed countries.

Materials and Methods

- This is a cross-sectional study of all kidney transplants performed in Sulaimania Governate of Iraq from 2015 through 2019 and followed-up through 2021.
- There were 656 patients.
- Outcomes consisted of return to HD (RHD), death with a functional graft (DWFG), and all graft loss (RHD+DWFG).
- Infections consisted of pyelonephritis, PCR+ BKV viremia (BKV), PCR+ COVID-19, and non-kidney-deep infections (NK-deep infections). NK-deep infections were defined as non-COVID pneumonia, septicemia, gastrointestinal infections, and hepatitis.
- Breslow proportional hazard functions analyzed outcomes, and logistic regression tested the relationships between infections and outcomes. Results include 95% confidence intervals.

Results

Table 1: Clinical characteristic of recipients

Characteristic	Value
Total number of recipients, n(%)	656 (100)
Average age of recipients (yr)	39.2±14.0
Male, %	68.6%
Living/Deceased donor, %	100%
Pre-transplant HD, n (%)	416 (63.4%)
First time transplant, %	96%
Pre-transplant DSA, %	13.1%

Abbreviations: Continuous variables of age is expressed as mean ±SD. HD, Hemodialysis; DSA, Donor-specific antibody.

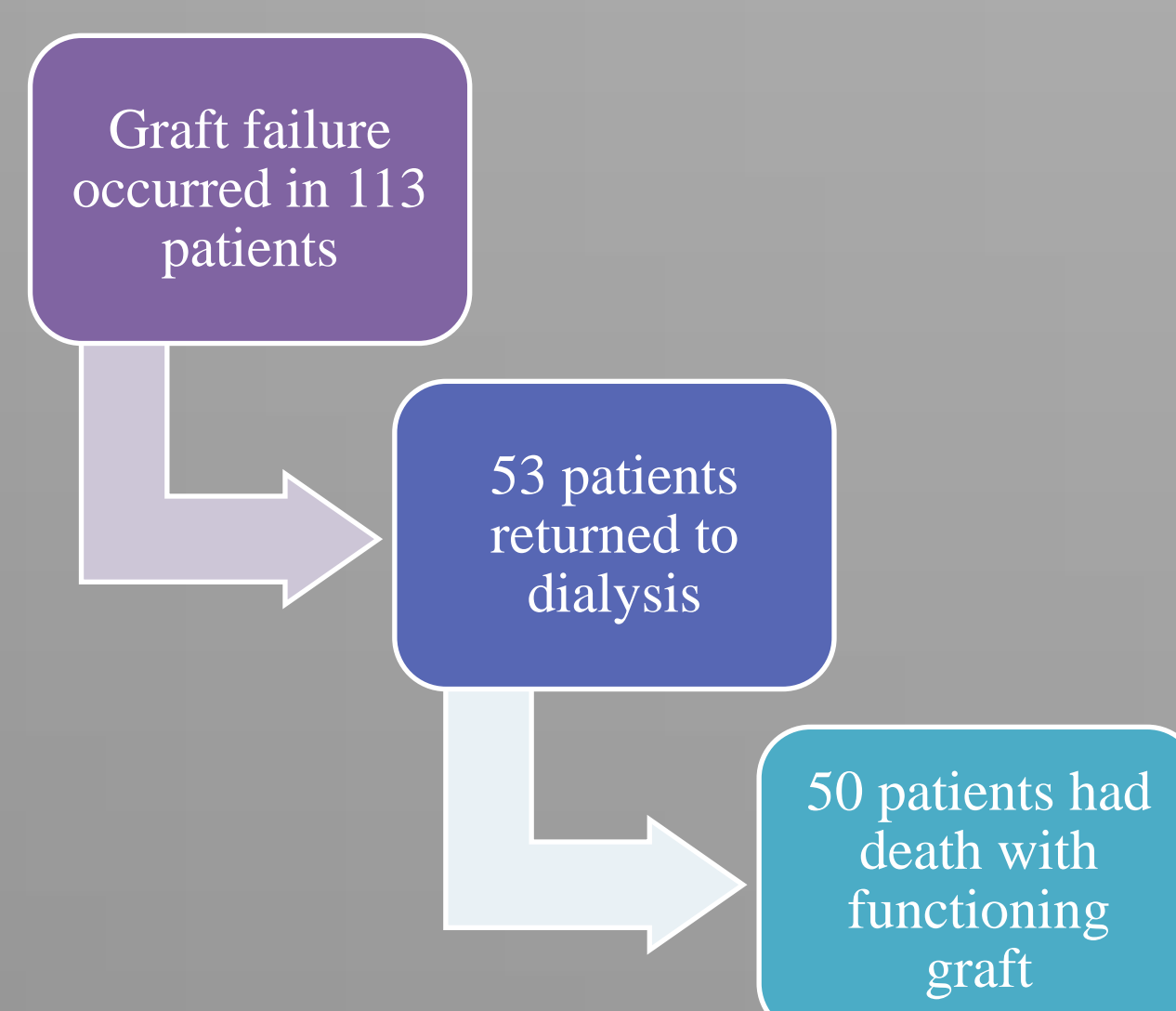


Figure 1: Graft outcome

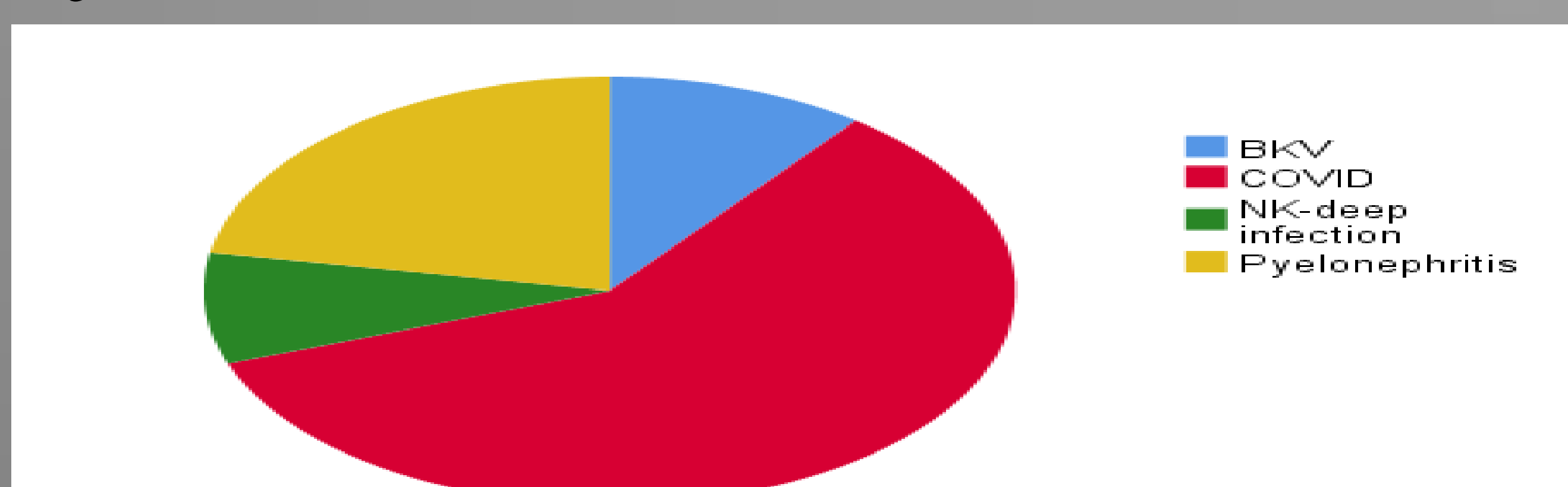
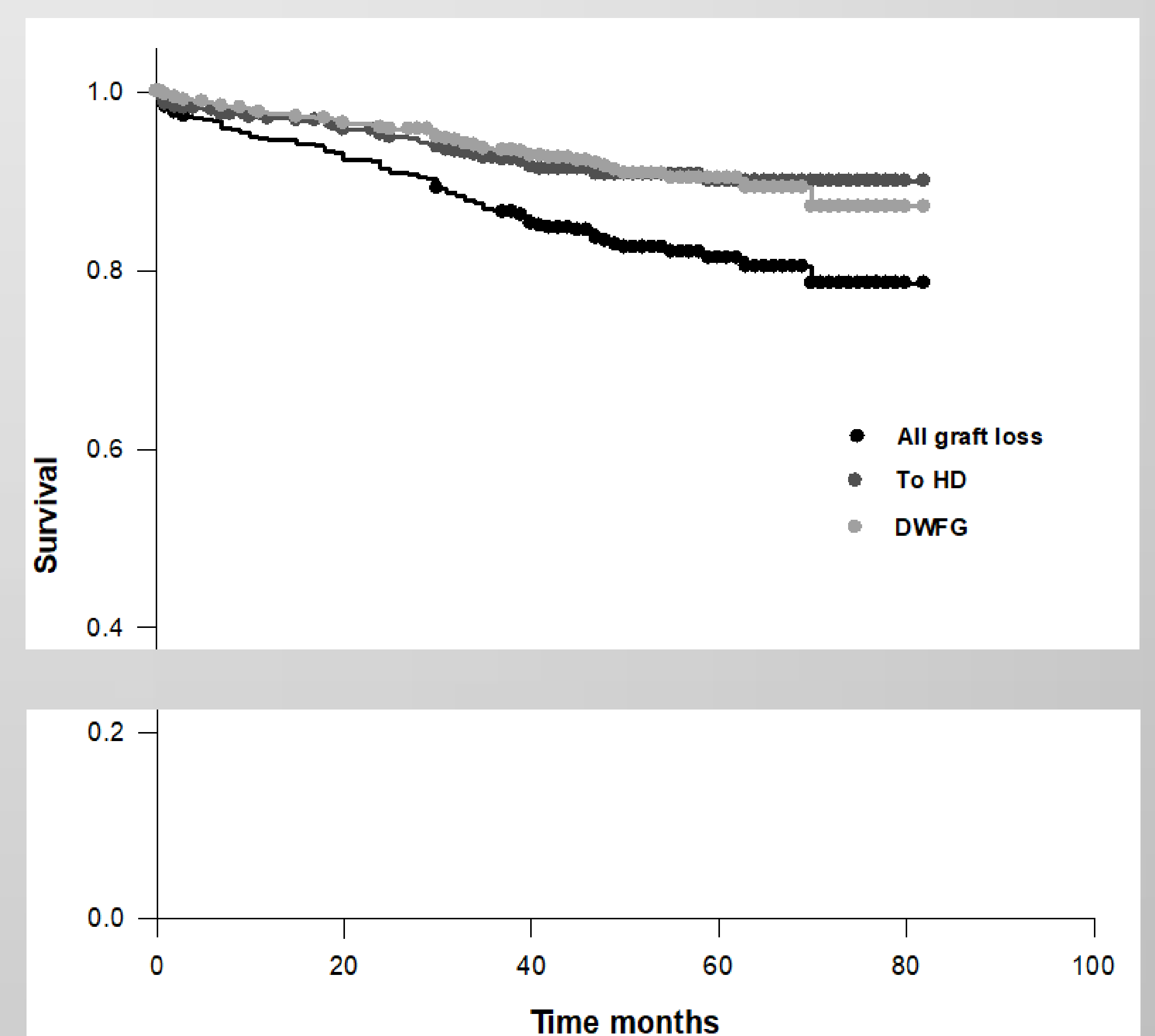


Figure 2: Number of cases by infection's type.

Figure 3: Kaplan-Meier kidney survival by death with a functional transplant and return to hemodialysis among 656 Iraqi Kurdistan transplant patients



Failure	12 months		60 months	
	Survival% (95%CI)	Events-n (at risk)	Survival % (95%CI)	Events (at risk)
All cause	94.6 (92.5-96.1)	34 (565)	81.3 (77.5-84.7)	102 (122)
To dialysis	97.0 (95.3-98.1)	19 (565)	90.0 (86.7-92.5)	54 (122)
Death	97.5 (95.9-98.5)	15 (565)	90.3 (87.0-92.8)	48 (122)

- There were 11 COVID deaths, 9 causing DWFG and 2 occurring after RHD.
- Thirty patients had NK-deep infections that involved 13 RHD and 17 DWFG patients.
- NK-deep infections were the most significant variable associated with all graft loss (OR=222.5, 29.0-1707.9, p>0.001).
- BKV adversely affected all graft loss (OR=2.6, 1.1-6.2, p=0.03), but nearly all pyelonephritis resolved with treatment, and its effect on graft survival was not significant (OR=0.53, 0.22-1.26, p=0.15)

Discussion

- The one and five-year survivals of this cohort of kidney transplant patients were surprisingly good. Nevertheless, an infection commonly with pneumonia or septicemia contributed to 34.0% of DWFG and 24.5% of RHD.
- Recovery occurred in 94.8% of COVID-infected patients, but a fatality rate of 5.2% resulted in 18.0% of DWFG.
- As COVID wanes, a modest improvement in graft survival is expected, but NK-deep infections will remain critical factors influencing 5-year graft loss.