PD INFÖR TRANSPLANTATION

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PERITONEAL DIALYSIS: THE IDEAL BRIDGE FROM CONSERVATIVE THERAPY TO KIDNEY TRANSPLANT?

Can improve patient survival – especially in the first 2-3 years

Can better retain residual kidney function

Lower cost

Better quality of life

JAMA Network Open

Original Investigation | Nephrology

Association Between Pretransplant Dialysis Modality and Kidney Transplant Outcomes

A Systematic Review and Meta-analysis

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Metaanalysis: 26 nonrandomized studies (1 case-control and 25 cohort), including 269 715 patients. Outcomes associated with pretransplant hemodialysis vs pretransplant PD were compared.

- NS lower all-cause mortality (13 studies; n = 221 815; HR, 0.92 [95% CI, 0.84-1.01]; P = .09)
- Lower risk for overall graft failure (10 studies; n = 209 287; HR, 0.96 [95% CI, 0.92-0.99]; P = .02).
- Less delayed graft function (6 studies; n = 47 118; odds ratio, 0.73 [95% CI, 0.70-0.76]; P < .001).

Figure 1. Meta-analysis of Pretransplant Dialysis Modality and the Risk of All-Cause Mortality

Source	Sample size	Adjusted HR (95% CI)	Weight, %
Snyder et al,[31] 2002	22 776	0.95 (0.85-1.06)	17.17
Goldfarb-Rumyantzev et al,[34] 2005	92 844	0.94 (0.91-0.97)	22.08
Schwenger et al,[38] 2011	57 315	0.91 (0.85-0.98)	20.01
Kramer et al,[40] 2012	29 088	0.83 (0.76-0.91)	18.69
Molnar et al,[6] 2012	14 508	0.57 (0.38-0.87)	4.12
López-Oliva et al,[7] 2014	236	0.38 (0.15-0.99)	0.92
Martins et al,[41] 2015	158	6.23 (1.46-26.59)	0.40
Dipalma et al,[42] 2016	22	0.72 (0.23-2.26)	0.64
Lin et al,[8] 2018	1812	1.18 (0.85-1.64)	5.87
Marcacuzco et al,[44] 2018	165	1.30 (0.52-3.39)	0.94
Balzer et al,[45] 2020	2006	0.64 (0.43-0.98)	4.09
Scheuermann et al,[46] 2020	83	1.72 (0.37-7.71)	0.37
So et al,[10] 2020	802	1.71 (1.17-2.51)	4.70
Random-effects meta-analysis with estimated prediction interval	221 815	0.92 (0.84-1.01) (0.72-1.17)	100

Heterogeneity: $I^2 = 68.7\%$ (95% CI, 36.5%-81.0%); $P < .001$

Test for overall effect: $z = 1.72$; $P = .09$

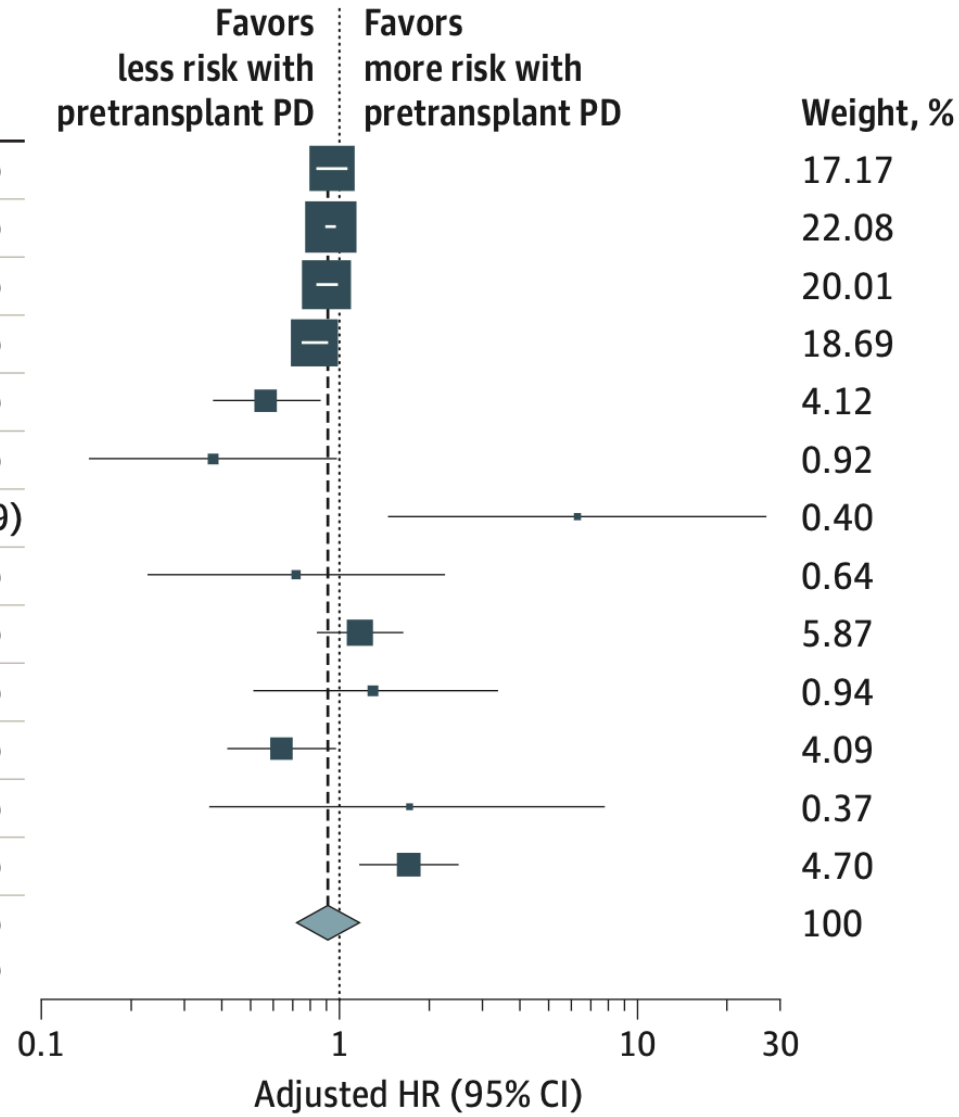

Figure 2. Meta-analysis of Pretransplant Dialysis Modality and the Risk of Overall Graft Failure

Source	Sample size	Adjusted HR (95% CI)
Snyder et al,[31] 2002	22 776	1.05 (0.97-1.13)
Chalem et al,[32] 2005	3138	0.90 (0.62-1.28)
Goldfarb-Rumyantzev et al,[34] 2005	92 844	0.97 (0.94-1.00)
Resende et al,[35] 2009	421	1.03 (0.58-1.80)
Schwenger et al,[38] 2011	57 315	0.94 (0.90-0.99)
Kramer et al,[40] 2012	29 088	0.90 (0.84-0.96)
López-Oliva et al,[7] 2014	236	1.47 (0.90-2.44)
Balzer et al,[45] 2020	2006	0.76 (0.50-1.16)
Scheuermann et al,[46] 2020	83	1.01 (0.28-3.59)
Prezelin-Reydit et al,[47] 2022	1380	0.95 (0.89-1.02)
Random-effects meta-analysis with estimated prediction interval	209 287	0.96 (0.92-0.99) (0.88-1.04)

Heterogeneity: $I^2 = 37.2\%$ (95% CI, 0%-68.8%); $P = .11$

Test for overall effect: $z = 2.26$; $P = .02$

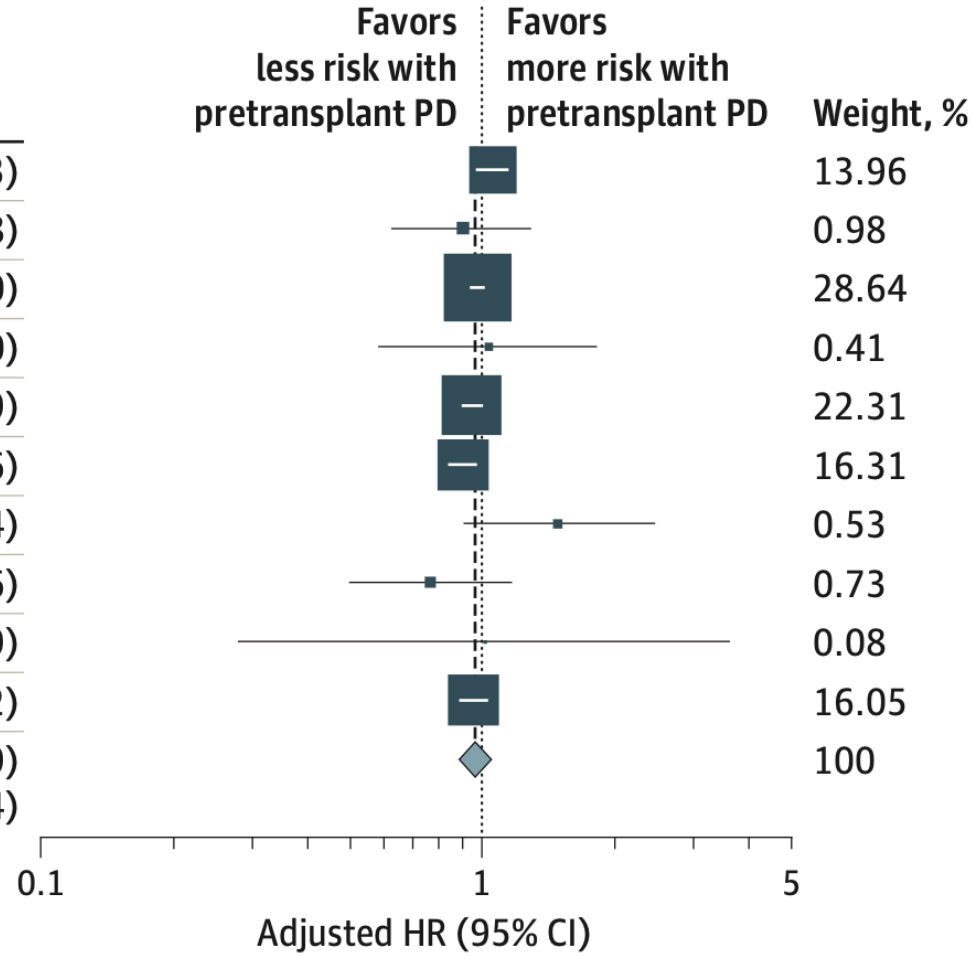

Figure 3. Meta-analysis of Pretransplant Dialysis Modality and the Risk of Delayed Graft Function

Source	Sample size	Adjusted OR (95% CI)	Weight, %
Bleyer et al,[28] 1999	9291	0.71 (0.63-0.80)	10.47
Van Biesen et al,[30] 2000	119	0.60 (0.40-0.91)	0.96
Snyder et al,[31] 2002	22 776	0.74 (0.67-0.81)	15.79
Fontana et al,[33] 2005	174	0.83 (0.47-1.49)	0.50
Sezer et al,[39] 2011	250	0.72 (0.70-0.74)	69.26
Molnar et al,[6] 2012	14 508	0.92 (0.73-1.16)	3.02
Random-effects meta-analysis with estimated prediction interval	47 118	0.73 (0.70-0.76) (0.67-0.79)	100

Heterogeneity: $I^2 = 10.4\%$ (95% CI, 0%-64.9%); $P = .35$

Test for overall effect: $z = 15.36$; $P < .001$

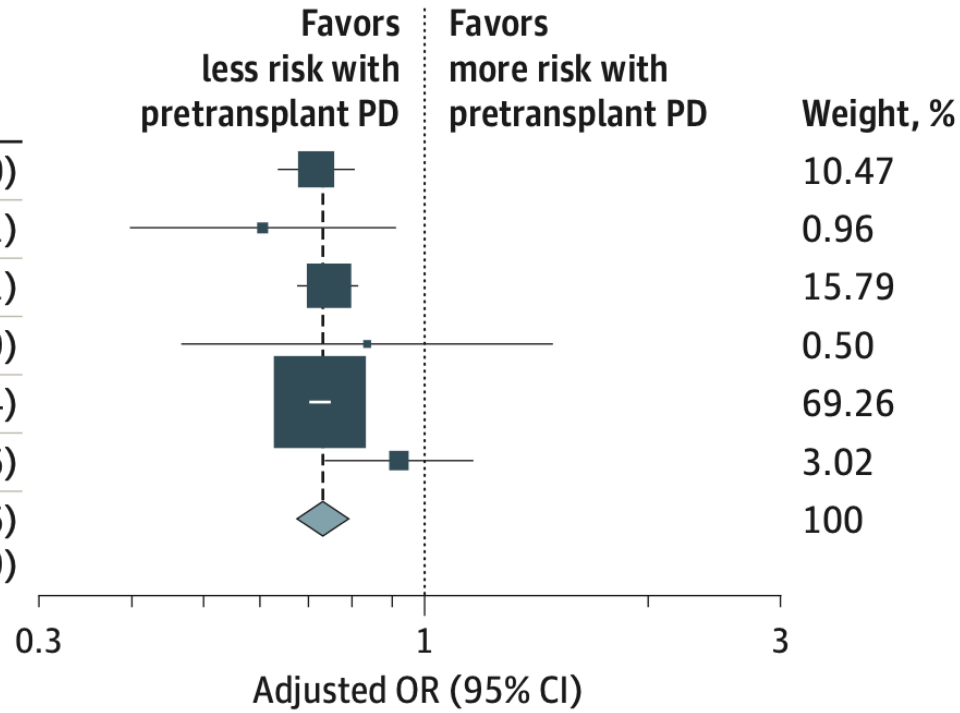

Table 2. Summary of Findings and Strength of Evidence

Kidney transplant outcomes	No. of included studies (sample size)	Effect estimate, OR or HR (95% CI)	*P* value	E-value for point estimate (95% CI upper limit)	95% Prediction interval	Heterogeneity				Strength of evidence (outcome classification)
						Q statistic	*P* value	I^2 index (95% CI), %	τ^2	
Primary outcomes										
All-cause mortality	13 (n = 221 815)	HR: 0.92 (0.84-1.01)	.08	1.388 (1.000)	0.72-1.17	38.37	<.001	68.7 (36.5-81.0)	0.010	Very low (trivial)
Overall graft failure	10 (n = 209 287)	HR: 0.96 (0.92-0.99)	.02	1.254 (1.084)	0.88-1.04	14.34	.11	37.2 (0.0-68.8)	0.001	Very low (beneficial with PD)
Death-censored graft failure	5 (n = 96 439)	HR: 0.98 (0.85-1.14)	.81	1.155 (1.000)	0.62-1.56	15.23	.01	73.7 (0.0-87.5)	0.016	Very low (trivial)
Delayed graft function	6 (n = 47 118)	OR: 0.73 (0.70-0.76)	<.001	2.098 (1.976)	0.67-0.79	5.58	.35	10.4 (0.0-64.9)	<0.001	Low (beneficial with PD)
Secondary outcomes										
Acute rejection	1 (n = 2006)	OR: 0.70 (0.51-0.97)	.03	2.211 (1.230)	NA	NA	NA	NA	NA	Insufficient data
Graft vessel thrombosis	3 (n = 3084)	OR: 1.35 (0.50-3.65)	.55	2.037 (1.000)	1.00×10^{-5} to 1.23×10^{5}	7.28	.03	72.5 (0.0-89.7)	0.550	Very low (trivial)
Oliguria (not producing urine in the first 24 h)	1 (n = 9291)	OR: 0.74 (0.62-0.87)	<.001	2.057 (1.557)	NA	NA	NA	NA	NA	Insufficient data
De novo heart failure	1 (n = 27 701)	OR: 0.84 (0.78-0.91)	<.001	1.667 (1.429)	NA	NA	NA	NA	NA	Insufficient data
NODAT	2 (n = 2204)	OR: 1.57 (0.56-4.45)	.39	2.522 (1.000)	NA	5.48	.02	81.8 (NA)	0.463	Very low (trivial)

Abbreviations: HR, hazard ratio; NA, not applicable; NODAT, new-onset diabetes after transplant; OR, odds ratio; PD, peritoneal dialysis.

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Effect of Pretransplant Dialysis Modality on Outcomes After Simultaneous Pancreas-Kidney Transplantation

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	HD (n=37)	PD (n=59)	P-value
Delayed graft function	5(14%)	5 (9%)	0.5
Biopsy-proven acute rejection			
Kidney	4 (11%)	4 (7%)	0.7
Duodenum	6 (16%)	3 (5%)	0.08
Pancreas	2 (5%)	2 (3%)	0.64
Relaparotomy	10 (27%)	14 (24%)	0.81
Intra-abdominal infection	3 (8%)	4 (7%)	
Pancreatitis	0 (0%)	2 (3%)	
Gastrointestinal bleeding	4 (11%)	3 (5%)	
Other bleeding	2 (5%)	5 (8%)	
Ureteral stricture	1 (3%)	0 (0%)	
Gastrointestinal bleeding	8 (22%)	6 (10%)	0.15
Other major bleeding	3 (8%)	10 (17%)	0.36
Intra-abdominal infection	3 (8%)	6 (10%)	1.0
Pancreatitis	6 (16%)	10 (17%)	1.0
Mild	2 (5%)	2 (3%)	
Moderate	3 (8%)	5 (9%)	
Severe	1 (3%)	3 (5%)	

COMBINED LIVER AND KIDNEY FAILURE PATIENTS

Patients face multiple challenges, including complications related to fluid shifts, bleeding esophageal varices, and spontaneous infections.

RRT in the form of hemodialysis is often poorly tolerated due to intravascular instability found in cirrhotic subjects.

The ideal treatment is simultaneous liver-kidney transplantation.

PD is an alternative strategy to hemodialysis in this context, as it provides both renal clearance and management of large-volume ascites.

PD has been rarely practiced in patients with liver failure due to concerns about increased peritonitis rates, protein loss, which could have a negative impact on the suitability of transplantation.

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Short

Peritoneal Dialysis is Feasible as a Bridge to Combined Liver-Kidney Transplant

Ruth Ellen Jones, Yun Liang, Malcolm MacConmara, Christine Hwang, and Ramesh Saxena

Small single-center series of 12 patients who were awaiting combined liver and kidney transplant and put on PD, there was no mortality and the need for large-volume paracentesis often seen in cirrhotics was obviated. A quarter of the subjects were subsequently successfully transplanted, suggesting that PD is a viable bridging therapy for patients with liver and kidney failure who await SLKT.

Outcomes at study conclusion	
Mortality	0
Transplant status	
Not candidates	5 (42%)
Listed for SLKT	4 (33%)
Received SLKT	3 (25%)
Average follow-up (months)	54 (8–118)
Peritonitis (events per patient per year)	0.2
Hospitalizations (per patient per year)	1.2
Large-volume paracentesis	0
Peritoneal dialysis treatment failure	0

Peritoneal Dialysis is Associated With A Better Survival in Cirrhotic Patients With Chronic Kidney Disease

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Medicine • Volume 95, Number 4, January 2016

Well-designed study comparing 285 PD to 1140 hemodialysis patients with cirrhosis has shown that PD is associated with a lower mortality independent of patients' comorbidity, severity of liver cirrhosis, and serum albumin levels.

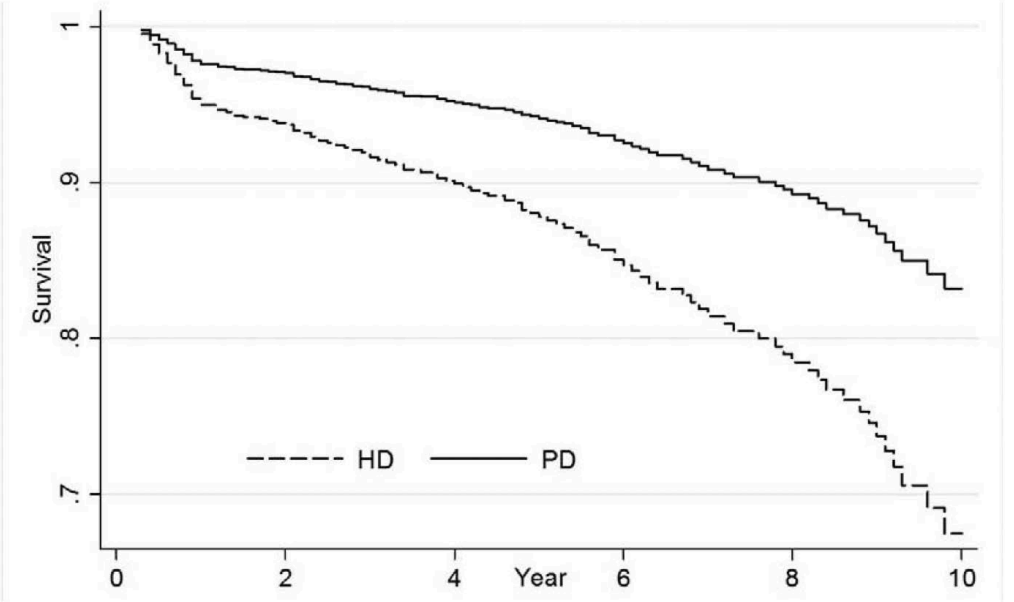


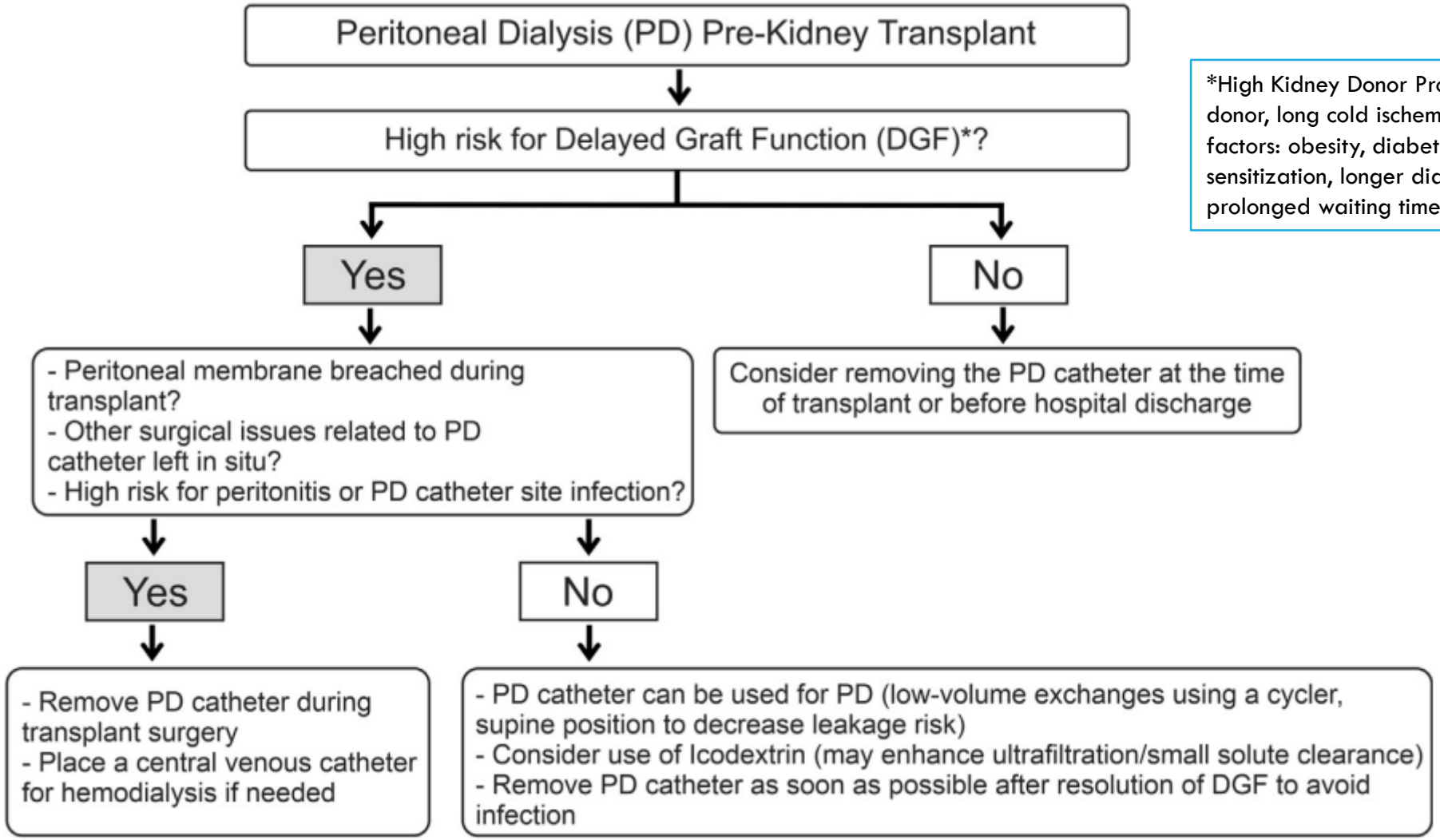
FIGURE 2. Survival curve of cirrhotic patients on peritoneal dialysis or hemodialysis with adjustments for confounders in China Medical University Hospital Cohort.

PD FOR DGF AFTER KTX: TO DO OR NOT TO DO?

DGF is commonly 20-25% and is more usual with DCD, uDCD, ECD and longer CIT.

In renal transplant recipients with DGF, post-transplant PD led to increased treatment failure (PD to HD). PD did not result in rapid recovery of transplanted renal function and had a high probability of peritonitis. (Yan et al 2018)

In carefully selected patients, PD can be continued safely for DGF without any effect on short-term or long-term transplant outcomes compared with patients converted from PD to HD or those continued on HD. (Gardezi et al 2021)



*High Kidney Donor Profile Index: deceased donor, long cold ischemia time, recipients' factors: obesity, diabetes mellitus, prior allo-sensitization, longer dialysis vintage, and prolonged waiting time.

Issa et al. Kidney Int Rep (2021) 6, 1494–1496;