


A PROPENSITY-MATCHED COMPARISON OF HARD OUTCOMES IN CHILDREN ON CHRONIC DIALYSIS: THE ITALIAN REGISTRY EXPERIENCE

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OBJECTIVES

Data concerning outcomes of children on HD and PD are scarce and frequently refer to single pediatric dialysis center experiences. In this setting, observational studies represent the best design for survival comparisons, although the results might be influenced by treatment-selection biases.

To better investigate the association between dialysis treatment modality and patient outcomes, we sought to compare survival and transplantation rate among a large cohort of incident PD children propensity-matched to those on HD who received pre-dialysis care.

METHODS

We retrospectively reviewed the files of all patients starting a first dialysis cycle before the age of 16 years, collected over a 10-year period (from January 2004 to December 2013) by the Italian Registry of Pediatric Chronic Dialysis, a nationwide permanent chronic dialysis network involving all the 12 Italian pediatric dialysis centers.

For each patient, we estimated the propensity score to be assigned to PD versus HD as first dialysis modality with a logistic regression model that includes gender, age, primary cause of ESRD, number and type of co-morbidities, and residual urine output as predictors. We then constructed matched pairs by selecting for each CPD patient a corresponding HD patient with score p between -0.1 and +0.1. We also considered a matching caliper with a maximum tolerance level of 0.04. Cox proportional hazard models were used to compare outcomes using an intent-to-treat (ITT) analysis. In the ITT analysis, patients were followed from the date of first dialysis until death and censored at the earliest of the following: transplantation, renal recovery, loss to follow-up or study end (December 2013).

RESULTS

A total of 310 matched pairs (155 in each group) were obtained from 452 incident patients (261 PD and 191 HD). The characteristics of patients based on dialysis modality in the entire and the propensity score matched population are presented in the **Table**. After propensity score matching, covariates were well balanced between the two groups and the cumulative hazard ratio (cHR) for transplantation was 0.99 (95% CI 0.73-1.34; $p=0.95$) for HD relative to PD children. Transplantation rate at 3 years after the first dialysis cycle's initiation was 67% for PD and 62% for HD patients ($p=0.49$). The cHR for shifting dialysis modality was 1.39 (95% CI 0.78-2.50; $p=0.26$) and the cHR for death was 1.57 (95% CI 0.46-5.36; $p=0.47$) for HD as compared to PD patients. The cumulative survival probabilities for PD and HD patients were 98% and 97% at 12 months, 96.3% and 95% at 24 months, and 90% and 91.2% at 24 months ($p=0.47$).

Characteristic	Before Matching			After Matching		
	PD	HD	p	PD	HD	p
N	261	191		155	155	
Female (%) ^a	42.5%	47.7%	0.28	47%	44.5%	0.65
Age (years) ^a	5.1 (1.1-11.4)	13 (9.4-15.6)	<0.001	10.2 (5.8-13.6)	12.8 (8.6-15.6)	0.065
<2	84 (32.2%)	10 (5.2%)		10 (6.5%)	8 (5.2%)	
2-5	46 (17.6%)	17 (8.9%)	<0.01	18 (11.6%)	16 (10.3%)	0.23
>5	131 (50.2%)	164 (85.9%)		127 (81.9%)	131 (84.5%)	
Body weight (kg) ^a	15.5 (8.8-31)	38.2 (25-46)	<0.001	25.8 (17-39.6)	28.9 (24.5-37.2)	0.09
eGFR ^a	6 (8-10)	7 (3.5-10)	0.26	8 (6-10)	8 (4-10.3)	0.45
Diuresis (ml/kg/day) ^a	1.4 (0.7-2.5)	0.9 (0.3-1.6)	0.0005	1.3 (0.8-2.1)	1.0 (0.3-1.6)	0.45
Primary Renal Disease						
CAKUT	123 (47.1%)	69 (36.1%)		65 (41.9%)	59 (38.1%)	
Glomerulonephritis	62 (23.8%)	56 (29.3%)		38 (24.5%)	46 (29.7%)	
Cystic Kidney Disease	12 (4.6%)	9 (4.7%)		5 (3.2%)	7 (4.5%)	
Hereditary Nephropathy	20 (7.7%)	14 (7.3%)		17 (11%)	10 (6.5%)	
Ischemic Renal Failure	5 (1.9%)	3 (1.6%)	0.007	3 (1.9%)	3 (1.9%)	0.065
HUS	15 (5.7%)	4 (2.1%)		12 (7.7%)	4 (2.6%)	
Metabolic Disorder	3 (1.1%)	9 (4.7%)		3 (1.9%)	1 (0.6%)	
Vasculitis	0 (0%)	6 (3.1%)		0 (0%)	6 (3.9%)	
Miscellaneous	7 (2.7%)	8 (4.2%)		5 (3.2%)	6 (3.9%)	
Unknown	14 (5.4%)	13 (6.8%)		7 (4.5%)	13 (8.4%)	
N° of comorbidities						
0	187 (71.6%)	151 (79%)	0.06	110 (71%)	124 (80%)	0.12
1	63 (24.1%)	38 (19.9%)		44 (28.4%)	29 (18.7%)	
2	11 (4.3%)	2 (1.1%)		1 (0.6%)	2 (1.3%)	
Duration of RRT (months) ^a	20.6 (11-36.9)	19.3 (7.8-32.6)	0.49	19 (9.5-33.7)	17.7 (7-30)	0.66

^a Data are expressed as median and interquartile range.

CONCLUSIONS

Incident children undergoing PD and HD have distinct characteristics, that may influence the interpretation of outcomes. After adjusting for potential confounders and controlling for treatment-selection biases, no single type of dialysis (HD or PD) seems to be superior to the other in terms of hard clinical endpoints.

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