

Trends in Mortality in Pediatric Chronic Dialysis Patients

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Introduction

There are few published data analyses describing survival trends over time of pediatric dialysis patients. Our goal is to describe mortality rates over a 15 year period.

Methods

- We used USRDS database to identify chronic hemodialysis (HD) or peritoneal dialysis (PD) patients aged 18 and under for each year from 1995 to 2010.
- Follow-up was 1 year, censored by change in the type of renal replacement therapy.
- For each annual cohort, we calculated the mortality rate per time at risk (per 100 patient years).
- A Poisson regression model was used to estimate the (unadjusted) rates and corresponding confidence intervals. The differences between pairs of rates were evaluated using chi-square tests.
- To investigate the potential effect of confounding variables on our estimates, rates were estimated separately by type of dialysis and subgroup of patient characteristics.
 - Hemodialysis or peritoneal dialysis
 - Age, gender, race, and primary cause of renal failure.

Results

- The average yearly cohort of patients studied included about 1,200 at risk patients of whom 60% were HD and 40% were PD, and the majority were over 10 years of age. The most common causes of dialysis were congenital/reflux/obstructive (45%) and glomerulonephritis (30%).
- Compared to PD patients, HD patients were slightly older and more often non-white.
- The unadjusted mortality rates among cohorts of PD patients have decreased over time while the mortality rates among cohorts of HD patients have not changed (Figures 1 and 2). These results are statistically significant as shown by the confidence intervals in figures 1 and 2 and the pairwise test in Figure 3.
- The mortality rates were significantly higher for patients under 10 years of age, and downward trends in mortality rates among PD cohorts appear in all age groups (Figures 4 and 5).

Table 1
Period Prevalent hemodialysis patients, by year and demographic. All numbers, except N patients, are reported as percentages.

Year	1995	2000	2005	2010
N patients	623	630	721	674
Age 0-4	5.78	5.08	4.58	7.12
Age 5-9	7.70	9.05	8.46	9.5
Age 10-14	26.23	25.24	23.55	25.37
Age 15-18	45.19	60.63	62.41	58.01
Female	43.62	44.92	47.85	47.48
Congenital/reflux/obstruct.	46.39	47.78	51.46	54.01
Cystic kidney disease	3.05	3.97	3.33	0
Glomerulonephritis	37.72	36.35	29.13	25.22
White	55.54	51.90	53.81	64.99
Black	38.36	43.44	38.14	30.42
ESRD STATUS				
Incident	25.20	27.94	25.80	29.23
Prevalent	74.80	72.06	74.20	70.77

Table 2
Period prevalent peritoneal dialysis Patients, by year and demographic. All numbers, except N patients, are reported as percentages.

Year	1995	2000	2005	2010
N patients	592	470	565	481
Age 0-4	19.59	21.91	22.65	30.56
Age 5-9	14.86	15.32	15.75	15.18
Age 10-14	27.53	27.66	31.15	23.28
Age 15-18	38.01	35.11	30.44	30.98
Female	45.95	48.30	45.84	44.07
Congenital/reflux/obstruct.	52.03	58.72	57.70	62.58
Cystic kidney disease	5.74	4.68	3.72	3.74
Glomerulonephritis	32.60	29.36	30.44	24.32
White	72.30	66.81	63.19	76.09
Black	23.31	27.02	28.32	18.92
ESRD STATUS				
Incident	18.07	27.02	22.65	24.12
Prevalent	81.93	72.98	77.35	75.88

Figure 1

Mortality rates per 100 patient years for period prevalent hemodialysis patients. Error bars mark the 95% confidence intervals.

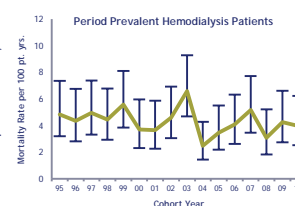


Figure 2

Mortality rates per 100 patient years for period prevalent peritoneal dialysis patients. Error bars mark the 95% confidence intervals.

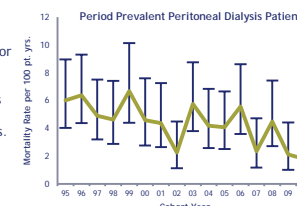


Figure 3

Test of difference in mortality rates between 1995 and 2010, separated by dialysis type.

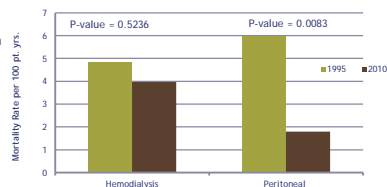


Figure 4

Mortality rates per 100 patient years for hemodialysis patients over time, separated by age.

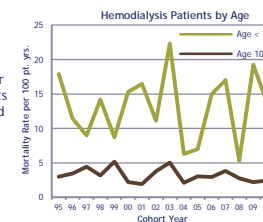
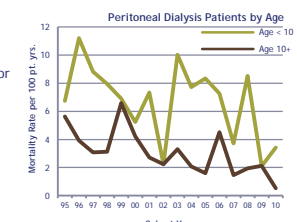


Figure 5

Mortality rates per 100 patient years for peritoneal dialysis patients over time, separated by age.



Conclusions

- In general, the overall mortality rate among all pediatric dialysis patients has not changed dramatically over the past 15 years.
- The mortality rate among peritoneal dialysis patients, however, has declined significantly over time.
- Younger patients have nearly double the mortality rate when compared to older pediatric patients.
- PD patients have a lower mortality rate than HD patients.
- Of note are older pediatric PD patients who show the most steady improvement in mortality rates over time.