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Outcomes of Dialysis Modality Switch: A Matched Cohort Analysis from a National Renal Replacement Therapy Registry

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1,784

MATCHED PATIENTS
(892 PAIRS)

13

YEARS OF
FOLLOW-UP

64.2%

PD-FIRST
INITIATORS

591

DEATHS WITHIN
2 YEARS

65.0

MEDIAN AGE
(YEARS)

66.1%

MALE
PATIENTS

1 INTRODUCTION & BACKGROUND

- HD and PD are the principal RRT modalities for ESRD. Survival differences between them have narrowed substantially in contemporary cohorts.
- Patients switch modalities due to technique failure, complications, evolving comorbidity, or patient preference. PD-to-HD transfer rates: 10–20%/year; HD-to-PD: <5% of HD starters.
- Evidence on mortality after modality switch is **inconsistent** and may vary by transition direction and timing — large registry data are needed.
- This study examines short- and long-term mortality after switch, stratified by **direction** (PD→HD vs. HD→PD) and **timing** (early ≤180d vs. late >180d), and compares cause-of-death patterns.

PD → HD
573 pairs
10–20%/year

HD → PD
319 pairs
<5%/year

2 METHODS

Israeli National RRT Registry (INRRTR) 2010–2022
Mandatory reporting · All Israeli ESRD patients

20,533 patients
initiated dialysis

Excluded (n=198)
switch post-2022, post-transplant,
or <30-day episodes

941 Switchers
(eligible after 30-day rule)

19,394 Non-switchers
(potential controls)

↓ 1:1 Matching

1,784 patients · 892 matched pairs

MATCHING CRITERIA

Age ±5 years

Initial dialysis modality (HD or PD)

Survival ≥ time to switch

COVARIATES ADJUSTED

Sex · Population group

Peripherality · Orthodoxy

Incident cohort · Facility type · Primary renal disease

PRIMARY OUTCOMES

All-cause mortality

3 months

6 months

1 year

2 years

STATISTICAL ANALYSIS

CONDITIONAL COX MODELS

KAPLAN-MEIER CURVES

BINARY LOGISTIC REGRESSION

SAS V9.4

Early Switch
≤ 180 days
from initiation
n = 306 pairs

Late Switch
> 180 days
from initiation
n = 586 pairs

3 RESULTS

OVERALL SURVIVAL PROBABILITIES

— Non-switchers — Switchers

All patients · 2-year survival

59.6%

69.8% (p<0.001)

PD-initiators · 2-year survival

51.9%

72.5% (p<0.001)

Late-switch PD initiators · 2-year

50.6%

72.5% (p<0.001)

MEDIAN TIME TO SWITCH

324 days

(IQR: 120–712 days)

ADJUSTED HAZARD RATIOS (2-YEAR MORTALITY)

PD-FIRST · ALL SWITCHERS

HR 0.461

95% CI: 0.348–0.611 · p<0.001

Significantly lower 2-year mortality among PD-initiated switchers vs. non-switchers

PD-FIRST + LATE SWITCH ★ KEY FINDING

HR 0.421

95% CI: 0.306–0.579 · p<0.001

Greatest reduction in mortality — late PD-to-HD transition; significant across all follow-up landmarks (3m, 6m, 1yr, 2yr)

HD-FIRST + EARLY SWITCH

HR 1.614

95% CI: 0.951–2.740 · p=0.07 (borderline)

Tendency toward higher 2-year mortality among early HD-to-PD switchers

HD-FIRST · ALL SWITCHERS

HR 1.181

95% CI: 0.826–1.690 · p=0.36

No significant mortality difference regardless of timing among HD initiators

CAUSES OF DEATH ANALYSIS

Among 591 deaths within 2 years (258 switchers, 333 non-switchers). Primary causes: similar distribution across groups.

Cause of Death	Switchers	Non-SW
Heart disease	20.1%	21.3%
Renal disease	20.5%	18.0%
Other causes	Largest share in both groups	

MULTIPLE CAUSE-OF-DEATH (NOTABLE FINDINGS)

Early switchers

OR 1.765 (1.032–3.019)

Higher odds of heart disease as contributing cause

HD-first late switchers

OR 3.645 (1.154–11.511)

Higher odds of renal disease as contributing cause

Note: Case-case comparison. Cardiovascular and renal disease were dominant primary causes in both groups. No major shift in primary underlying causes suggests mortality differences reflect timing of deaths rather than new mechanisms.

4 CONCLUSIONS & CLINICAL IMPLICATIONS

TRANSITION DIRECTION MATTERS

Mortality after modality switch varies by direction. PD-to-HD switching was associated with lower long-term mortality; HD-to-PD with a tendency toward higher mortality.

TIMING IS CRITICAL

Late PD-to-HD transitions (>180 days) confer the greatest survival benefit (HR 0.421). Early HD-to-PD transitions appear to carry elevated risk, consistent with reactive instability.

CAUSAL INFERENCE LIMITS

Observational design; residual confounding and survivor bias possible. Findings describe patient trajectories — not causal effects of switching itself.



Key message: A late PD-to-HD transition was associated with significantly lower long-term mortality (HR 0.421 at 2 years). These trajectory-dependent patterns may inform clinical surveillance and transition planning. **Further studies** with granular clinical data on residual renal function, dialysis adequacy, vascular access, and transition planning are needed to clarify the underlying mechanisms.