Time-Dependent Survival is Not Impacted by Dialyzer Reuse with Peracetic Acid

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INTRODUCTION

Numerous studies have demonstrated the benefits of dialyzer reprocessing, including superior biocompatibility and decreased medical waste generation, without increased risk of mortality.

A recent study reported that abandoning dialyzer reprocessing was associated with decreased patient survival. However, it did not control for sources of potential confounding.[1]

This issue has important patient, environmental, and financial implications.

METHODOLOGY

- Data for prevalent (>120 days) patients on hemodialysis (HD) over two years (July 1, 2008 through June 30, 2010) were analyzed.
- Baseline exposure data was established during the 3 months prior to the observation period.
- Deaths that occurred within 30 days of the last treatment were included.
- Two time-dependent survival analyses, in which each day was defined as a new exposure period, were performed to test two competing hypotheses.

METHODOLOGY (cont.)

- Hypothesis 1: Reuse has a cumulative effect on patient mortality.
  - Exposure was defined as the cumulative percentage of sessions over the observation period in which the patient dialyzed with a previously-used filter.
  - Example: a patient who received a new filter every 10 sessions would have an exposure level that varied over time but did not exceed 90%.
- Hypothesis 2: Reuse has an acute effect on patient mortality.
  - Exposure was defined by the most recently used filter.
  - Example: a first-use filter was assigned a value of 0 and a filter reused 27 times before was assigned a value of 27.
  - Because exposure level could change suddenly (when a new filter was used) this exposure was tested with no lag and with a lag of 7 days.
- Both hypotheses were tested via generalized models in SAS 9.2 with adjustments for patient characteristics at baseline.

RESULTS

Table 1. 2-year Time Dependent Survival Analysis of Reuse vs Non-reuse *

	Cumulative Effect	Acute Effect
Hypothesis	The greater the percent of sessions utilizing a reused dialyzer, the greater the risk.	The greater the number of times a dialyzer is used, the greater the risk.
Results	Odds ratio for mortality decreased as percent of reuse sessions increased.	Odds ratio for mortality decreased as the number of reuses increased.
Adjusted Odds Ratio	0.993 95% CI (0.992,0.995)	0.995 95% CI (0.994,0.996)

* Models were adjusted for patient characteristics at baseline: age, vintage, race, gender, primary cause of ESRD, primary insurance type, and comorbidities

Table 2. Medical Waste Reduction with Reuse

Medical Waste Reduction	
Dialyzers Saved by Reuse	13.8 million filters
Reduction in Medical Waste	22 million pounds or 10 metric tons

SUMMARY OF RESULTS

- In this test for any indication of poorer survival outcomes, dialyzer reuse was not associated with mortality.
- Both percentage of reuse sessions and number of dialyzer reuses were marginally associated with improved survival. However, confidence intervals were very small due to short exposure periods and residual confounding may remain.
- Over the 2-year period, 13.8 million dialyzers were saved due to reuse, avoiding 10,000 metric tons of medical waste.

KEY LEARNINGS

- ✓ Hemodialysis filter reuse significantly decreases medical waste without impacting patient mortality.
- ✓ This study used contemporary outcomes data and rigorous analytical techniques, however as a retrospective study the potential for confounding exists.

[1] Lacson Jr., E, Wang W, Mooney A, et al. Abandoning Peracetic Acid-Based Dialyzer Reuse Is Associated with Improved Survival. *Clin J Am Soc Nephrol*, 2011;6(2):297-302.

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