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Costs And Consequences Of Dialysis Related Infections: Implications For The Bundled Payments For Care Improvement Initiative

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Introduction

Dialysis related infections are a major source of morbidity and mortality for End Stage Renal Disease (ESRD) patients and a significant financial burden on the healthcare system (1, 2, 4). Infection is the second leading cause of death among dialysis patients, accounting for 33 deaths per 1000 patient years. Despite this, the impact of dialysis modality on the rate and type of infection has not been well studied (3, 4). Hospitalization due to dialysis-related infections is an important consideration when choosing or recommending a dialysis modality because it can provide information on healthcare resource allocation and the cost of caring for ESRD patients (5). The dialysis bundled payments system promotes healthcare interventions that improve patient health outcomes at a lower cost. It is therefore necessary to identify interventions in ESRD that can simultaneously improve patient health outcomes and reduce treatment costs.

Objective

The objective of this study was to evaluate the clinical and cost effectiveness of Peritoneal Dialysis (PD) in the prevention of dialysis-related infections, compared to Hemodialysis (HD).

Materials and Methods

The study assumed a payer (Medicare) perspective. The study population was therefore restricted to incident HD and PD patients who were hospitalized with a principal diagnosis code of 'dialysis-related infection' in 2011. The outcome of interest was cost per hospitalization averted. Infections were classified as catheter infections (exit site) or tunnel infections for both HD and PD. Treatment costs and hospitalization rates were obtained from the 2013 USRDS registry. Infection probabilities for HD and PD patients were obtained from a study by Aslam et al, (2006). Using TreeAge Pro 2014 software, a decision tree model (Fig. 1) was developed to estimate the ICER. A probabilistic sensitivity analysis (PSA) with 1000 iterations at a willingness to pay (WTP) threshold of $50,000 was done to assess the robustness of the results.

Results and Discussion

Based on the ICER, substituting PD for HD would result in a cost saving of $171.46 per hospitalization averted (Table 1). The PSA indicates that PD is predicted to be more effective and less costly since the majority of ICER combinations lie in the SE quadrant below the WTP curve and within the 95% CI (Fig. 2). This is supported by the strategy selection plot and CEAC indicating PD to be more cost effective in approximately 62 percent of the iterations, given a WTP threshold of $50,000 (Figs. 3 and 4) respectively.

Conclusion

PD was predicted to be more cost effective than HD in the prevention of dialysis-related infections. Using PD as a dialysis strategy can lead to cost savings for the Medicare system. Under the Bundled Payments for Care Improvement (BPCI) this reduction translates directly into savings for dialysis providers. Considering the "payment for results" nature of the BPCI, PD has a high likelihood of adoption as a cost saving intervention in ESRD.

References

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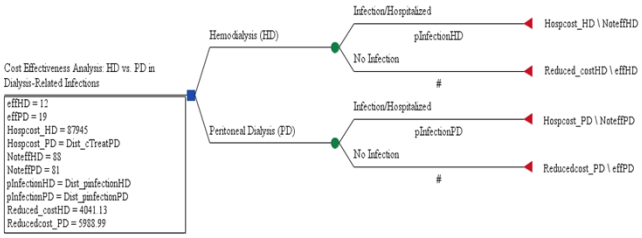

Fig. 1 Model Framework. Variables and Distributions are defined at the root node

Table. 1 Summary of Cost Effectiveness Results For Hemodialysis and Peritoneal Dialysis

Cost-Effectiveness Rankings

subset	Strategy	Eff	IncrEff	Cost	IncrCost	IC/IE	Dominance	Avg CE
all								
	Peritoneal Dialysis (PD)	40.08	0	28306.9334	0	0		706.26081
	Hemodialysis (HD)	34.8	-5.28	29212.291	905.3576	-171.46924	(Dominated)	839.43365
undominated								
	Peritoneal Dialysis (PD)	40.08	0	28306.9334	0	0		706.26081
abs. dominated								
	Hemodialysis (HD)	34.8	-5.28	29212.291	905.3576	-171.46924	(Dominated)	839.43365

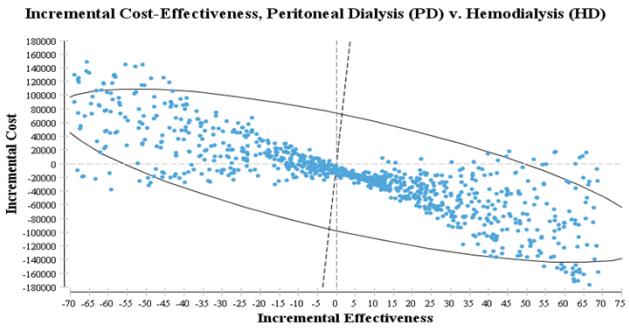

Fig. 2. Incremental Cost Effectiveness Scatterplot for PD vs. HD

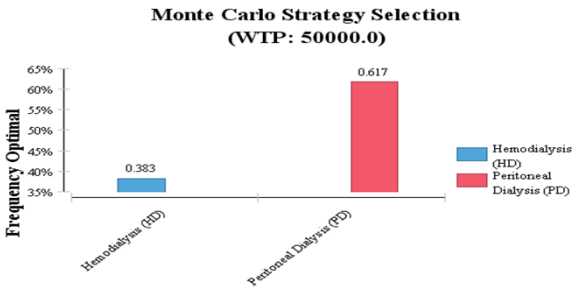

Fig. 3. Strategy Selection Plot: PD vs. HD

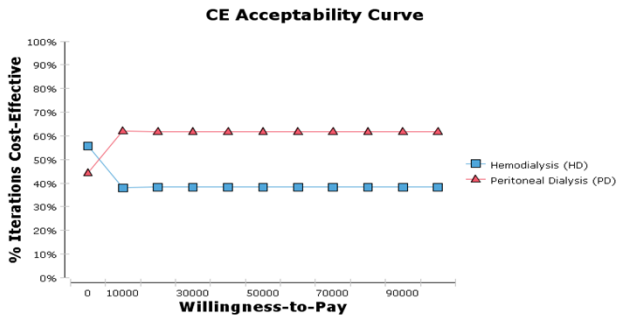

Fig. 4. Cost Effectiveness Acceptability Curve: PD vs. HD