Health Insurance and the Use of Peritoneal Dialysis in the United States

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Background: Many patients in the United States have limited or no health insurance at the time they develop end-stage renal disease (ESRD). We examined whether health insurance limitations affected the likelihood of peritoneal dialysis (PD) use.

Study Design: Retrospective cohort analysis of patients from the US Renal Data System initiating dialysis therapy in 2006 through 2012.

Setting & Participants: We identified socioeconomically similar groups of patients to examine the association between health insurance and PD use. Patients aged 60 to 64 years with "limited insurance" (defined as having Medicaid or no insurance) at ESRD onset were compared with patients aged 66 to 70 years who were dually eligible for Medicare and Medicaid at ESRD onset.

Predictor: Type of insurance coverage at ESRD onset.

Outcomes: The likelihoods of receiving PD before dialysis month 4, when all patients qualified for Medicare due to ESRD, and of switching to PD therapy following receipt of Medicare.

Results: After adjusting for observable patient and geographic differences, patients with limited insurance had an absolute 2.4% (95% CI, 1.1%-3.7%) lower probability of PD use by dialysis month 4 compared with patients with Medicare at ESRD onset. The association between insurance and PD use reversed when patients became Medicare eligible; patients with limited insurance had a 3-fold higher rate of switching to PD therapy between months 4 and 12 of dialysis (HR, 2.9; 95% CI, 1.8-4.6) compared with patients with Medicare at ESRD onset.

Limitations: Because this study was observational, there is a potential for bias from unmeasured patient-level factors.

Conclusions: Despite Medicare's policy of covering patients in the month that they initiate PD therapy, insurance limitations remain a barrier to PD use for many patients. Educating providers about Medicare reimbursement policy and expanding access to pre-ESRD education and training may help overcome these barriers.

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Am J Kidney Dis. XX(XX): 1-9. Published online Month X, 2017.

doi: 10.1053/j.ajkd.2017.09.024

Approximately 60,000 adults younger than 65 years in the United States develop end-stage renal disease (ESRD) each year and are treated with dialysis or kidney transplantation.[1] Many of these patients are uninsured or only have state-sponsored Medicaid at the onset of ESRD.[2] Although patients who are uninsured or who have Medicaid can experience limited access to health care,[3-5] access to dialysis care is generally not a problem. Because federal law grants Medicare coverage to patients with ESRD regardless of their age, nearly all patients qualify for Medicare by their fourth month of dialysis therapy.[6] Dialysis facilities generally accept patients after confirming that they will soon qualify for Medicare.

The majority of patients who require renal replacement therapy do not have a kidney donor available and therefore must initiate either in-center hemodialysis (HD) or peritoneal dialysis (PD) therapy. Home HD is a third option available through some centers. Although evidence does not definitively indicate a survival benefit from one dialysis modality over another,[7] dialysis modality can have a profound effect on a patient's day-to-day life and satisfaction with the care received.[8] For younger patients with limited health insurance, PD may be particularly attractive. Instead of traveling to an HD center 3 or more times per week to receive therapy, patients administer PD at home, oftentimes at night. PD is less costly than in-center HD, and patients receiving PD are more likely to remain employed, perhaps due to greater flexibility over when and where to administer dialysis.[9,10] However, only 8% of dialysis patients in the United States use PD compared to >20% in many other countries.[1,11] Barriers to PD use include inadequate patient education, unfamiliarity with the therapy among some providers, and financial disincentives.[12-17] Patients must also undergo surgical placement of a PD catheter before they can initiate PD therapy, which may prove difficult in patients who are uninsured or only have Medicaid.

It is unknown whether the type of health insurance that patients have at the onset of ESRD influences their likelihood of receiving PD. Although patients younger than 65 years receiving in-center HD must wait 3 months to become eligible for Medicare, patients become eligible for Medicare on the first day of the calendar month that they initiate PD therapy. Expedited Medicare coverage for patients initiating PD therapy could mitigate insurance-related barriers. Enactment of the ESRD Prospective Payment System (PPS) in 2011 created a new economic incentive for some providers to offer PD, leading to increased use of PD therapy[18,19] and potentially mitigating insurance-related barriers. However, much of the decision making and preparation for PD therapy must occur before the initiation of dialysis therapy and before patients qualify for Medicare based on having ESRD. Before the initiation of dialysis therapy, patients may still face insurance-related

limitations in access to health care. In this study, we examine whether health insurance coverage affects the use of PD therapy early in dialysis and whether the effect of health insurance coverage changed after enactment of the ESRD PPS.

Methods

Patient Selection and Data Sources

From the US Renal Data System (USRDS) registry, we selected patients with incident ESRD who initiated in-center HD or PD as their first dialysis modality in 2006 through 2012. In all analyses, we excluded patients who died, recovered kidney function, or received a kidney transplant in the first 90 days of dialysis therapy. Information about dialysis modality is reported in the USRDS database and comes from a variety of sources, including the Medical Evidence Report (Centers for Medicare & Medicaid Services [CMS] form 2728), which nephrologists complete for all patients at the onset of ESRD, Medicare claims, and information collected by the ESRD Networks.

To examine the association between health insurance and PD use, we selected patients based on insurance criteria and age at dialysis therapy initiation. We compared patients who had "limited insurance" (defined as being uninsured or having Medicaid only) with patients with Medicare at the onset of ESRD. We applied several restrictions to identify a study cohort that was as homogeneous as possible. We included only patients with limited insurance who were aged 60 to 64 years and who entered Medicare's "90-day waiting period" at the onset of ESRD. Patients in the 90-day waiting period become eligible for Medicare coverage after 3 calendar months of ESRD. We included only patients with Medicare at the onset of ESRD who were aged 66 to 70 years. Selecting patients who were of similar ages minimized the magnitude of underlying health differences between the 2 populations; the primary difference between our comparison groups was that one group had Medicare when they developed ESRD because they were older than 65 years, while the slightly younger group with limited insurance had to wait 3 months after the onset of ESRD (or until initiating home dialysis therapy) before qualifying for Medicare. We also required that patients who were 66 to 70 years old with Medicare also had Medicaid ("dually eligible") to ensure that the cohort was similar socioeconomically (Item S1).

Study Exposures

The study exposure was whether patients had limited insurance (Medicaid only or uninsured) or Medicare at dialysis therapy initiation. We used the Medical Evidence Report and Medicare enrollment data to ascertain information about patients' insurance coverage at dialysis therapy initiation and excluded instances in which the 2 sources conflicted.

Study Outcomes

We examined the following 2 study outcomes: (1) receipt of PD by the start of a patient's fourth dialysis month, and (2) switching from in-center HD to PD therapy between the fourth dialysis month and the end of the first year of dialysis therapy. When examining the latter outcome, we restricted our analyses to patients receiving in-center HD on the first day of their fourth dialysis month. We selected these 2 outcomes to assess the potential effect of insurance coverage on PD use before and following the receipt of Medicare coverage at the start of the fourth dialysis month.

Covariates

Patient and dialysis facility information came from the USRDS. We obtained several patient comorbid conditions, frailty indicators, laboratory measurements, and body mass index from the CMS Medical Evidence Report. In our primary analyses, we did not include pre-ESRD nephrology care as a covariate because it may mediate the association between insurance coverage and PD use. We examined the sensitivity of our findings to this exclusion. We merged data on patients' residential zip codes to census-based Rural-Urban Commuting Area codes and census income data.[20] Due to large population sizes, we used standardized differences to compare baseline characteristics between groups.[21]

Statistical Analysis and Study Design

We created 2 primary statistical models. The first was a multivariable logistic regression model examining the association between insurance category and PD use by the fourth dialysis month. We report odds ratios (ORs) and the predicted marginal effect of insurance category on the absolute probability of receiving PD. We also used multivariable Cox regression to examine associations between insurance category and the rate of switching to PD therapy. In the Cox model, we followed up patients from the fourth dialysis month through their first year after the initiation of dialysis therapy and censored patients if they recovered kidney function, received a kidney transplant, or died. We used multiple imputation to account for any missing data for albumin, hemoglobin, and body mass index.[22] In all analyses, we adjusted for patient and geographic characteristics listed in Table 1 and the calendar year of ESRD onset represented by dummy variables. We controlled for dialysis facility characteristics when examining switches to PD therapy, but not when examining the likelihood of receiving PD by the fourth dialysis month because a patient may be assigned to a specific type of dialysis facility at the onset of ESRD as a consequence of his or her dialysis modality assignment.

Additional Analyses

We conducted several additional analyses. First, we examined whether observed associations between type of insurance and PD use differed following enactment of the ESRD PPS. This was done by including in our regression