

Does Rescheduling a Missed In-Center Hemodialysis Treatment Improve Clinical Outcomes?

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Rates of end-stage renal disease (ESRD) are increasing worldwide, with more patients than ever receiving dialysis. In 2016, ~90% of patients with ESRD in the United States were receiving conventional thrice-weekly

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in-center hemodialysis (HD).¹ Conventional HD has been associated with less favorable clinical outcomes and has a high burden on quality of life. Missed HD treatments are common, appear higher in the United States as compared with other developed countries, and are increasing over the past couple of decades.^{2,3} According to the most recent update from the US Renal Data System 2018 annual report, although rates of hospitalization for patients with ESRD have declined during the last decade, the rates of emergency department (ED) visits have increased during the same time.¹ Multiple prior studies have shown an association between nonadherence to outpatient dialysis treatments and increased rates of mortality and hospitalizations and overall less favorable outcomes.³⁻⁶ In some instances, patients miss a scheduled treatment but make up the HD the very next day. Is there a consequence to this?

In this issue of *Kidney Medicine*, Cohen et al⁷ investigated whether missing and then attending HD treatment the very next day had an effect on clinical outcomes. The study used an observational design with retrospective evaluation of maintenance HD patients from a single national large dialysis organization treated with a Monday/Wednesday/Friday schedule. The authors' primary outcomes were hospitalization, ED visit, and mortality, with secondary outcomes including systolic blood pressure, hemoglobin levels, and erythropoiesis-stimulating agent use rate during the following 7- and 30-day intervals postexposure (missed HD treatment). Patients were categorized based on their attendance status (attended, missed, and rescheduled). The authors opted to perform parallel analyses of 2 separately propensity score–matched cohorts; patients who missed dialysis without rescheduling or who rescheduled HD treatment on the index day were each matched with patients who attended the treatment as scheduled.

Not surprisingly, the authors noted that compared to attending the scheduled HD treatment, a missed session was associated with a significantly higher rate of hospitalization and ED visits during the subsequent 7- and 30-day intervals. Interestingly, although a rescheduled treatment the following day (compared with attending the scheduled session) also showed higher hospitalization and ED visit

rates, the magnitude of difference was lower in the rescheduled group as opposed to the missed-treatment group. There were no noted differences in mortality rates at 30 days between the groups; this was not evaluated at the 7-day mark due to a low event rate. These results suggest that attending a rescheduled treatment reduces but does not fully eliminate the adverse effects of a missed session. The authors bring to attention the known risks associated with missing dialysis. Their novel finding relates to the persistence of hospitalization and ED visit risks in those who reschedule and attend a make-up dialysis treatment the following day, and that this higher risk appears to persist throughout the month.

Readers may query whether patient risks associated with missing and rescheduling a dialysis treatment differ by which day of the week was missed. A missed Wednesday or Friday HD treatment made up the following day results in a 2-day interdialytic gap. However, a missed Monday dialysis that is rescheduled to Tuesday now results in 3 days without dialysis, essentially increasing the “killer gap” by an additional day while still maintaining a thrice weekly HD regimen. Notably, mortality was not found to be significantly greater in either the missed or missed and rescheduled cohorts. Nonetheless, one wonders whether the increased 7-day hospitalization and ED visit event rates were driven by missed Monday treatments. This question was not addressed and perhaps could not be answered by the study design.

Additionally, the reasons for missing scheduled HD treatments could not be determined given the study design, but they may have significant bearing on the observed differences in outcomes. Patients receiving maintenance HD miss treatments for a variety of reasons, including distance from their dialysis facility, transportation challenges, inclement weather, as well as physical and psychosocial issues including depression, psychiatric illness, pain, gastrointestinal symptoms, and perceived lack of social support.^{3,8,9} Moreover, patient variables such as depression, perceptions of social support, and well-being appear to be independently associated with poor outcomes in patients with ESRD receiving HD.¹⁰⁻¹³ Thus, patients who miss but reschedule a dialysis treatment the very next day may have an ongoing higher risk for hospitalization and ED visits, even 30 days later, not necessarily because of residual biochemical, volume, or other physiologic derangements caused by this off-schedule HD, but due to the underlying reason that dialysis was missed in the first place. These factors for missing dialysis are always difficult to identify and match in any retrospective study.

As providers of dialysis, we routinely attempt to reschedule a missed HD session for our patients. Unfortunately, only ~10% of missed treatments are rescheduled and attended the next day despite our best efforts.⁸ Patient lack of understanding and motivation to attend dialysis are parts of the problem.¹⁴ However, even when patients agree to make up a missed dialysis session, availability of a vacant chair in dialysis clinics at maximum capacity and transportation issues are frequent logistical hurdles in making the rescheduled HD actually take place. In a survey study of in-center HD patients and social workers, 62% of patient respondents reported using a Medicaid-funded transportation source, and 39% stated that they had missed a treatment due to a mistake by their transportation provider. Social workers reported that an average of 4.5 missed treatments each month were due to transportation provider issues.¹⁵ Thus, obtaining last-minute transportation for off-schedule HD is oftentimes a major challenge for our patients.

The present study by Cohen et al provides new information about the issue of missed in-center HD treatments. Although residual confounders may partly explain the association of higher adverse risk ratios even with attending a make-up HD treatment, we should certainly continue to do our best to assist our patients in getting into a dialysis chair the next day. However, we must also realize that simply “pencil in” a patient to an open slot and providing a date and time may not suffice. We cannot ignore the root causes of missing HD treatments. It will require a team effort that involves nephrologists, dialysis nurses, social workers, and even front desk personnel to overcome issues of transportation, education, and self-perception that form some of the complex barriers to HD attendance.

ARTICLE INFORMATION

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