

Supplemental Material

Methods

Dialysis Prescription

The type of home HD prescription a patient received was decided jointly between the patient and the medical team, and was influenced predominantly by lifestyle factors as identified by the patient. Conventional HD prescriptions were defined as treatments lasting <5 hours on 3 days per week, frequent conventional HD was defined as treatments lasting <5 hours on 4-7 days per week, and long HD treatments lasted >5 hours on 3-5 nights per week. No patient in our unit performed short daily HD during the timeframe of this audit. All home HD patients performed their dialysis using conventional HD equipment modified for the home (Formula Domus; Bellco). Typical dialysate composition included sodium 137 mEq/L, potassium 2-3 mEq/L, calcium 1.5 mmol/L, and bicarbonate 35 mEq/L. Blood and dialysate flows tended to be 200-300 ml/min and 300 ml/min, respectively, for treatments longer than 5 hours; and 300-400 ml/min and 500 ml/min, respectively, for treatments lasting <5 hours. Patients routinely used systemic heparin anticoagulation during dialysis, and central venous catheters were locked with citrate.

Patient Training and Follow Up

Patients were trained on 4 days per week during which they simultaneously received HD treatments. The training period generally lasted 6 weeks and patients were paired with a training nurse in a 1:1 ratio. The training curriculum covered all aspects of machine setup and takedown, equipment maintenance and disinfection, water quality, blood sampling,

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access cannulation, and troubleshooting alarms. All patients were administered an open-book written examination prior to graduation. The training nurse and a dialysis technologist were present in the patient's home during the first self-administered home HD treatment. Follow up in the home HD clinic typically occurred after 1 month with routine follow up at 3 month intervals thereafter. Patients were encouraged to call the training unit with any concerns and one of our training nurses was on-call overnight on 7 days a week to address urgent dialysis-related problems for patients performing nocturnal HD. There was no specific patient training recertification, though technique audits were performed at the discretion of the nursing staff.

Discussion

A secondary goal of our quality assurance audit was to use our experience to explicitly delineate minimum requirements to perform home HD and develop a menu of options to assist programs to maintain patients at home for as long as possible. The characteristics outlined in Supplemental Table 2 are intended to be explicit minimum criteria for any patient to remain on home HD. While some subjectivity remains, in the absence of a care partner, each criterion has a definite point at which home HD is no longer possible and the number of respite treatments may approach or exceed the number of treatments a patient actually receives at home. Usually these circumstances evolve over time and are well recognized by the care team who may already have implemented some of the strategies to maintain patients at home that are listed in Supplemental Table 3. Many of these steps are automatically integrated into the routine workflow of home HD programs (example: technique audits, multidisciplinary team discussions and care plans), while other steps may

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be limited by a program's resources or jurisdictional legality (example: respite dialysis, training paid caregivers, providing end-of-life care in the home setting). As many of these interventions as possible should be implemented before transfer to facility-based dialysis is initiated. Death and technique failure ought to be subject to continuous quality assurance evaluation to ensure ongoing improvement in care.

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Supplemental Tables

Supplemental Table 1 – Causes of death

Death during cohort period N=11	Death during 90-day follow up period after modality conversion N=6
Patient 1 – sudden cardiac death	Patient 1 – ischemic bowel (palliative care)
Patient 2 – myocardial infarction	Patient 2 – withdrawal from HD (palliative care)
Patient 3 – septic shock	Patient 3 – withdrawal from HD (palliative care)
Patient 4 – sudden cardiac death	Patient 4 – upper GI bleed
Patient 5 – myocardial infarction	Patient 5 – severe aortic stenosis (palliative care)
Patient 6 – diffuse ischemic bowel	Patient 6 – withdrawal from HD (palliative care)
Patient 7 – malignancy (palliative care)	
Patient 8 – multiple comorbidities (palliative care)	
Patient 9 – cardiogenic shock	
Patient 10 – unknown	
Patient 11 – sudden cardiac death	

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Supplemental Table 2 – Proposed minimum criteria to maintain patients at home

Criterion	
1	Patient remains competent to understand risks, benefits, and alternatives to therapy
2	Patient retains the physical dexterity to perform all the manual tasks needed for therapy
3	Patient retains the necessary visual acuity to inspect all tubing and view screens
4	Patient must have stable hemodynamics free of symptomatic hypotension or extreme hypertension
5	<u>In the absence of any of the above</u> , patient must have a trained care partner
6	Patient must have a reliable vascular access not needing frequent interventions

Supplemental Table 3 – Proposed strategies to maintain home HD patients at home

Foundational Interventions ¹
Goals of Care Discussion: to be had or reviewed when patient first joins the home HD program
Managing Expectation Starting at Training: to teach patients the minimum criteria for home HD, the strategies to maintain them at home, and the possible eventuality of a planned transition
Communication: the more fragile a patient is, the more critical it is that patient-to-team communication is frequent and honest
Identifying/Flagging At-Risk Patients: to identify patients with greater need for surveillance and direct appropriate resources to mitigate risk of failure/exit
Individualized Care Plan: to institute appropriate support measures in the event of evolving comorbidities
Multidisciplinary Team Review: to leverage the experience and observations of all team members to identify and address issues of patient safety and wellness
Mandatory Post-Hospitalization Assessment: to assure that patients discharged from hospital are safe to conduct independent dialysis at home
CME/CNE Among Colleagues: to ensure colleagues are aware of the requirements to dialyze at home and to reinforce that patients discharged from hospital may not be well enough to dialyze independently yet – additional support may temporarily be indicated
End-of-Life Care: to provide palliation in the home if a patient has exhausted all avenues of support and does not wish to transition to facility-based care
Situational Interventions ²
Technique Audit: to identify and address procedural lapse that may compromise patient safety
Occupational Therapy Referral: to assess physical/cognitive function of patient or care-partner
Training a Care Partner: to assist or completely manage home HD when a patient cannot
Modifying the Dialysis Prescription: to reduce the workload of home HD
Facility-Based Respite Treatments: to provide temporary patient or care partner relief

¹ Foundational interventions are those that may be implemented as part of routine clinical care for all patients at a programmatic level

² Situational interventions are those that are implemented for individual patients as result of a specific patient level concern