There’s No Place Like Home

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• We have no conflict of interest.
Objectives

• Introduction: Choosing a Treatment Option
• Home Hemodialysis Overview
• Pros and Cons
• Expectations
  • Patient
  • Staff
Objectives Continued

• Special Considerations
  • Experience the Difference
  • Solo
  • Nocturnal
  • Pediatrics

• Psychosocial Considerations: Plan for Success

• Conclusion: Patient Testimonials

• Questions
Introduction: Choosing a Treatment Option
My Life, My Dialysis Choice©

• Choosing personal patient values
  • Lifestyle
  • Health
  • Partner and family
• Rating these values
• Interpretation of results

(Medical Education Institute, 2019)
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## Personal Patient Values

### Health Values
- I want to be able to sleep as well as I can at night
- I want the best chance for a kidney transplant
- I want to avoid taking pills as much as I can
- I want to protect my bones, joints, and nerves
- I want to protect my heart
- I want to stay out of the hospital
- I want to live as long as I can

### Lifestyle Values
- I need to be able to work or go to school
- I need to be able to travel
- I want to be able to eat and drink what I like
- I love to swim and/or take tub baths
- I will NOT give up my pets
- I want to feel well from one day to the next
- I worry about how much dialysis will cost
- I need to feel in control of my time and my life
- I don’t want a dialysis machine in my home
- I’m terrified of needles
- I want professionals to take care of me

### Partner & Family Values
- My sex life is important to me
- I want to have (or father) a child
- I take care of a child or a disabled or elderly person
- I don’t have a care partner to help me
- I want to spend as much time as I can with my family
- I don’t want to be a burden on my family

(Medical Education Institute, 2019)
Used with permission from Dori Schatell, MEI
Rating Personal Patient Values

Example: Rating the importance of being able to work and go to school among each dialysis modality.

(Medical Education Institute, 2019)
Used with permission from Dori Schatell, MEI
Interpretation of Results

Example: Total rating of each personal patient value among dialysis modalities.

(Medical Education Institute, 2019)
Used with permission from Dori Schatell, MEI
Home Hemodialysis Overview

- **Who**
  - Match-D: Method to Assess Treatment Choices for Home Dialysis

- **What**

- **When**

- **Where**

- **How**

1. (Mayo Clinic, 2020)
2. (Medical Education Institute, 2019)

Used with permission from Dori Schatell, MEI
Pros of Home Hemodialysis

• Improved post-dialysis recovery time \(^1, 2\)
• Better mental and physical health \(^1\)
• Increased energy level \(^1, 2, 3\)
• Improved sleep quality \(^1\)
• Improved sexual satisfaction \(^1\)

1. (NxStage, 2019)
2. (Mayo Clinic, 2020)
3. (Fresenius, 2020)
Recovery Time

**RECOVERY TIME**

- **CONVENTIONAL HD**
  - 8 Hours

- **MORE FREQUENT HD**
  - 1 Hour
  - Improvement in time to recovery from conventional to more frequent

- **NOCTURNAL HD**
  - Minutes
  - Improvement in time to recovery from conventional to nocturnal

**WHY DOES IT MATTER?**

Chronic, prolonged recovery times associated with increased risk of death.

**EACH HOUR = 5% increased risk of death**

<table>
<thead>
<tr>
<th>Recovery time</th>
<th>Risk of death</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 HOURS</td>
<td>↑ 48%</td>
</tr>
<tr>
<td>4 HOURS</td>
<td>↑ 22%</td>
</tr>
<tr>
<td>1 HOUR</td>
<td>↑ 5%</td>
</tr>
</tbody>
</table>

(Used with Permission from Advancing Dialysis, 2020)
Pros of Home Hemodialysis

• More independence & involvement in healthcare \(^1,\ 3\)
• Fewer access complications \(^2,\ 3\)
• Less stress on the heart \(^1\)
  • Reduced left ventricular hypertrophy
  • Less myocardial stunning
  • Better blood pressure control

1. (NxStage, 2019)
2. (Mayo Clinic, 2020)
3. (Fresenius, 2020)
Fluid Overload

Fluid Overload

Uncontrolled Hypertension → Left Ventricular Hypertrophy → Heart Failure → Hospitalization and Death

Driven by **intradialytic volume issues**

- High Ultrafiltration Rate
- Intradialytic Hypotension
- Cramping, Dizziness, Nausea, etc.

Arrow points to

- Limits Use of Cardioprotective Medicines
- Cardiac & organ system Stunning
- Long Post-Dialysis Recovery Time
- Early Sign-Offs and No-Shows
- Poor HRQoL

(Used with Permission from Advancing Dialysis, 2020)
Pros of Home Hemodialysis

- Fewer hospitalizations $^{1, \ 2, \ 4}$
- Increased likelihood of transplantation $^{1, \ 2, \ 4}$
- Improved patient survival $^{1, \ 2, \ 4}$
- Long term treatment option $^{1, \ 2, \ 3}$

1. (NxStage, 2019)
2. (Mayo Clinic, 2020)
3. (Fresenius, 2020)
4. (Medical Education Institute, 2019)
Pros of Home Hemodialysis

- Flexibility with your diet and improved appetite \(^1, \, 2, \, 3\)
- Better middle to large molecule clearance \(^2\)
  - Better phosphorus control
- Fewer medications \(^2\)

1. (NxStage, 2019)
2. (Mayo Clinic, 2020)
3. (Fresenius, 2020)
Pros of Home Hemodialysis

- Ability to stay home/fewer trips to the clinic ₁, ₂, ₃
- Ability to work and go to school ₁, ₂
- Increased ability to travel ₁, ₂
- Portable equipment ₁, ₂
- Easy to set up ₁, ₂
- Customizable treatment schedule ₁, ₂, ₃

1. (NxStage, 2019)
2. (Mayo Clinic, 2020)
3. (Fresenius, 2020)
Customizable Treatment Schedule: Frequency

**5+ DAYS PER WEEK**

- More Frequent During Waking Hours
  - Improved blood pressure (BP) control & survival\(^{1-6}\)
  - Reduced left ventricular hypertrophy & cardiovascular hospitalizations\(^{2,5,6,7}\)
  - Reduced ultrafiltration rate (UFR), recovery time and hypotensive episodes\(^{5,7,8-13}\)
  - Improved sleep quality, restless leg syndrome & health-related quality of life\(^{3,14-16}\)

- More Frequent During Waking Hours
  - Benefits from 5+ days per week (above) plus:
    - Improved sleep and obstructive sleep apnea\(^{12,15,17}\)
    - Best dialytic phosphorus control\(^{2,10,19}\)
    - Increased reduction in post-dialysis recovery time\(^{13}\)

**EVERY OTHER DAY**

- Mitigates the 2-day gap\(^{20}\)
- May enable decreased ultrafiltration rate (UFR) by:\(^{2,6}\)
  - Increasing time per treatment
  - Increasing number of treatments per week

**3 DAYS PER WEEK**

- Presents room for improvement
- Longer duration treatments (example: nocturnal) has improved mortality in observational studies\(^{1}\)

(Used with Permission from NxStage, 2019)
Customizable Treatment Schedule: Treatment Time

To calculate the total treatment hours per week, start with the patient’s weekly fluid gain in a given week, divided by the patient’s weight.

Divide the weekly fluid needing to be removed by the ultrafiltration rate to calculate the total treatment time per week.

Total treatment time per week divided by the number of treatments per week is the number of hours per treatment.

Literature suggests a UFR of 6-8 mL/kg/hour, 5-6 treatments per week and a total of at least 12 hours of treatment per week. 15 hours of treatment per week is typical.¹⁻²²

Example: If a 80kg patient is putting on 9,600 mL of fluid per week, that must be removed. With a desired UF rate of 8mL/kg/h, the result is a treatment time of 15 hours per week.

(Used with Permission from NxStage, 2019)
Customizable Treatment Schedule: Dialysate Volume

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>6 days / week</th>
<th>5 days / week</th>
<th>4 days / week</th>
<th>3.5 days / week</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60 kg</td>
<td>20</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>80 kg</td>
<td>20</td>
<td>25</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>100 kg</td>
<td>25</td>
<td>30</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>120 kg</td>
<td>30</td>
<td>40</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>140 kg</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

Allows for UF of <1.5 L/day
Minimum of 20L of dialysate per treatment.

(Used with Permission from NxStage, 2019)
Cons of Home Hemodialysis

- Increased responsibility 1, 2, 3
- Patient and/or caregiver must perform all tasks independently 1, 2, 3
- Training takes place over several weeks 2, 3
- Can be stressful on the patient/caregiver 1, 2, 3
- Medicare and insurance does not pay for an in-home helper 2, 3

References:
1. (NxStage, 2019)
2. (Mayo Clinic, 2020)
3. (Fresenius, 2020)
Cons of Home Hemodialysis

- Appropriate storage of supplies ₁, ₂, ₃
- Water hook up, if applicable ₁, ₃
  - Increased water usage
- Permission from landlords ₁
  - Rental insurance
- Increased amount of waste products ₁

1. (NxStage, 2019)
2. (Mayo Clinic, 2020)
3. (Fresenius, 2020)
Storage Tips

5 expert ideas for storing HD supplies

1. **Consider stacking up, not out.** Based on your space, you may have the option to stack some supplies vertically as long as they’re stable. This could use less floor space.

2. **Maximize unused storage space.** Try sliding supplies under beds or stacking them in closets, out of sight.

3. **Store small supplies in stackable storage drawers.** Using drawers on wheels will let you move supplies out of the way when not in use.

4. **Order fewer supplies at a time.** It’s best to have 6 weeks of supplies at home. If you have storage issues, you may be able to order a smaller amount more frequently.

5. **Unpack supplies from boxes.** This can cut down on volume. Note that some supplies should remain in boxes if there’s a chance you’ll return them later.

(Fresenius, 2020)
Expectations

Patient

• Participate in training program

• Monthly clinic visits
  • In-person
  • Virtual

• Treatment logs documented and submitted monthly

• Monthly blood tests

• Quarterly and annual water samples, if applicable

• Routine equipment maintenance

• Order monthly supplies

Staff

• Provide training and reeducation as needed

• Initial home assessment and post-training home visit

• Review laboratory data and Kt/V with patient

• Review treatment logs with patient

• Review medications with patient

• Availability of nephrologist, nurse practitioner or physician's assistant, nurse, social worker, dietitian, dialysis technician

1. (Mayo Clinic, 2020)
2. (Fresenius, 2020)
Special Considerations

• Experience the Difference
• Nocturnal Home Hemodialysis
• Solo Home Hemodialysis
• Pediatric Patients
Experience the Difference

• Patients who are currently on in-center HD can trial the procedures, set up, and treatment regimen for 1 week on the home HD machine \(1, 2\)

• Care partners are encouraged to come \(1, 2\)

• Patient can then decide if they want to pursue home HD or not \(1, 2\)

1. (NxStage, 2019)
2. (Mayo Clinic, 2020)
Nocturnal Home Hemodialysis

- Performed overnight while the patient is asleep \(^1, 2, 3\)
  - Slower
  - Longer
- Care partner is required \(^1, 2\)
- Requires additional training \(^1, 2\)
- Additional devices \(^1, 2\)
  - Heparin pump
  - Enuresis device
  - Extended cycler base, if applicable
  - Cartridge holder, if applicable
- Pros and cons \(^1, 2, 3\)

1. (NxStage, 2019)
2. (Mayo Clinic, 2020)
3. (Fresenius, 2020)
Solo Home Hemodialysis

• FDA approved in August 2017 ¹, ², ³
• Tips and tricks ¹
  • Set up
  • During treatment
• Additional devices ¹, ²

¹ (NxStage, 2019)
² (Mayo Clinic, 2020)
³ (Fresenius, 2020)
Pediatric Patients

• Parents and caregivers are trained
• Same pros and cons highlighted before apply to pediatric patients

(Mayo Clinic, 2020)
Psychosocial Considerations: Plan for Success

- Set goals and create an action plan
- Caregiver burden
  - Divide tasks
  - Organization
  - Respite
- Schedule
  - Personal life
  - Dialysis
- Financial constraints
- Mental health/patient mood
- Routine check-ins
Conclusion

Cardiovascular Decline
74yo Taiwanese female. Experiencing cognitive decline and Recurrent Heart Failure. Not happy with QoL and declining. Does not speak English, but their care partner does.

Prior Therapies / Symptoms
- Frequent symptomatic episodes of severe intradialytic hypotension requiring IVF and d/c UF
- Pre-dialysis BP frequently >200/110
- Post-dialysis hypotension

Sample prescription
- Initiated HHD @ 6x/week for 2 hrs/tx
- 15L of dialysate per treatment
- Transitioned to 5x/week for 2.5 hrs/tx to decrease burden of therapy
- 20L of dialysate per treatment

Outcomes
- Normotensive BP
- No left ventricular hypertrophy
- No depressive symptoms
- Traveled to Taiwan twice

Unhappy With In-center HD Outcomes
43yo white male with medullary cystic kidney disease.

Prior Therapies / Symptoms
- Started ICHD in 1997
- Left Ventricular Hypertrophy (LVH)
- Intermittent AFib
- Severe RLS
- Post-dialysis fatigue
- Reduced muscle mass
- Severe hypertension controlled with 4 medications
- Forced into retirement
- Kidney washed, but clotted venous return and pulmonary emboli
- Transplant not placed, but IVC filter was

Sample prescription
- Initiated nocturnal HHD 5x/week for 8hrs/tx
- 30L of dialysate per treatment

Outcomes
- No edema or fluid overload
- No LVH
- BP controlled without medication
- Activity remarkably improved and travels as desired

PD No Longer Adequate
37yo African American male. Crashed into dialysis with CKD5, presumed from hypertension.

Prior Therapies / Symptoms
- Initially prescribed in-center HD with tunneled dialysis catheter
- Cardiac ischemia and hypertensive during dialysis
- Severe post HD fatigue
- Poor BP control
- Unable to work
- Noncompliant
- Transitioned to PD
- 3.5 years after initiating PD, RRF abruptly declined
- 2 peritonitis episodes within 6 months

Sample prescription
- Initiated HHD @ 5x/week
- 30L of dialysate per treatment
- Transitioned to solo HHD due to loss of care partner

Outcomes
- Arib resolved
- Weight increased from 65kg to 90kg
- Improved activity, sleep, anorexia, and cognitive function
Any Questions?

Contact us at:

Ph: 507-266-3737
rstdialysishomeprogram@mayo.edu
References


NxStage (2019). *Being on Dialysis Doesn’t Mean Giving up all the Things that you Love*. Retrieved from https://www.nxstage.com/patients/