CLINICAL MANAGEMENT OF HOME HEMODIALYSIS PATIENTS, ADC 2016

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CONFESSIONS

* I am a paid speaker for NxStage
* I am a consultant for DCI, a not-for-profit dialysis provider
* I own mutual funds and ETF’s that invest in health care companies
Dialyzing at home overnight while sleeping
6 nights weekly
DFR 100 ml/min (48 liters/8 hr treatment)
BFR 200 ml/min
Remotely monitored over the Internet
Improved HTN, nutrition, Q of L, Phosph. control

DNHD, Pierratos 1997
* 1997 visit to Toronto to Dr. Pierratos program
* 1998 first pt trained (March), transplanted May
* 2nd pt trained May, transplanted July
* Wanted to advertise “Train to Home Hemodialysis – Get a Transplant”
HOME HEMODIALYSIS AT DCI RUBIN

* MARCH 1998 – First patient sent home on DNHD on Fresenius H machines with RO’s
* 2002 – Began participation in NIH Frequent Hemodialysis Network (FHN) trial
* 2004 - Started NxStage machine b/o ease of training and ease of use for patients
* 2006 – Dropped out of FHN trial b/o inability to recruit patients
* 2012 – Largest NxStage program in the US
If you were going on dialysis, what would be the best kind of dialysis to keep you healthiest and with the best quality of life until you got a transplant?

- Home dialysis
- More frequent or longer duration hemodialysis with slower ultrafiltration
- Home hemodialysis with fewer meds, less fluid restriction, and a more liberal diet
When we dialyzed patients 6-8 hours, 5-6 nights weekly with BFR 300-400, DFR 400, with single pass Fresenius H machines with RO’s:

- BP’s normalized with fewer or no meds
  - Sometimes we had to decrease the amount of dialysis b/o hypotension
- Phosphorus was normal w/o dietary restrictions or binders
  - Sometimes we had to add phosphorus to the dialysate
- Patients felt much better (“normal”) and had their daytimes free.
# DCI Rubin Home HD Experience

<table>
<thead>
<tr>
<th>YEAR</th>
<th>MACHINE &amp; MODALITY</th>
<th>TOTAL PATIENTS TRAINED</th>
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<th>FEMALE</th>
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<td>FRESENIUS NHHD</td>
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<td>TOTAL</td>
<td>NHHD&amp;SDHD</td>
<td>323</td>
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<td>98</td>
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THE IDEAL HOME DIALYSIS PROGRAM

* Offers all modalities:
  * CAPD, APD, SDHD, DNHD.
* Finds the modality that best fits the particular patient.
* Is an integrated part of the Center’s team:
  * In-center nurses help find home patients and may start self-care training before formal home training.
* Home nurses cross-train and cross-cover.
* The Home Team builds up its collective experience over time.
Patients on home hemodialysis  80
  * Nocturnal  25
  * Patients on PD  25
  * 6 nurses training and supervising in 4 sites
    * 1 PD
    * 1 PD/HHD
    * 4 Home Hemo
ECONOMIC BENEFITS OF HOME HD TO DIALYSIS PROVIDERS.

* Of 465 patients in the DCI Rubin and DCI Albany Centers, 105 (23%) were at home in August 2015. We would need an entire new unit if these patients were incenter.

* In 2013, our costs/month for nursing for each incenter patient was approx. $1000. For each home patient, approx. 1/3 of that.
INFRASTRUCTURE

* Integrated with the in-center program in the same building, but separate space.
* Commitment of our Board, administration, all of our nursing and support staff to the principle that being home is better than being in-center, whenever possible.
* Commitment of physicians-
  * Inexperience, risk-aversion, loss of income, reluctance to change.
* Home HD and PD are underutilized by MD’s, and dialysis providers.
* There is unmet demand by patients.
* Fewer than 50% of units in US have PD training in the unit, <15% home hemodialysis.
PREVALENT PATIENTS ON HOME HD %

2013 USRDS ADR, vol2, reference table 12.7 12.c
PHASES OF CLINICAL MANAGEMENT

- Before Training
- Training
- First 3 months at home
- The long haul
Monthly **pre-dialysis** education sessions:

- Include home dialysis staff.
- Discuss all modalities. “One size does not fit all.”
- Transitions, not death sentences.
  - CKD
  - ESRD
  - Transplantation
Conditions of Coverage: Patients must be informed of all modalities.

But NOT when they are new to dialysis, uremic, and anxious; and NOT by staff who have no experience with home modalities.

Discuss home dialysis options repeatedly, every 2-3 months, and positively but realistically. By nurses, social workers, doctors
Humans dislike change, the unknown, and risk. Do you avoid recommending home hemo because:

- you don’t have much experience with it,
- you aren’t sure it is safe,
- you doubt that your patients can do it,
- you don’t want to lose income,
- your unit doesn’t offer it and doesn’t want to lose patients,
- you’re too busy to learn something new?
WHOM TO RECRUIT

* The sickest people in your unit.
* Patients who are not tolerating incenter hemo, with hypotension, cramps, prolonged post dialysis sx.
* Patients with CHF, noncompliance with fluid and dietary restriction, valvular heart disease, low EF’s.
* People who are failing PD.
* People with failing transplants.
WHOM TO RECRUIT

* People who have to travel long distances.
* People who want to work, study, care for families.
* There is almost no medical comorbidity that precludes being trained for home hemodialysis.
* Age and educational background do not predict outcome of training.
SELECTION CRITERIA

- MOTIVATION, MOTIVATION, MOTIVATION
- “Reasonable”
  - Vision
  - Hearing
  - Manual dexterity
  - Memory
- Social service evaluation
- Insurance review
- Technical evaluation of home
**HOW TO RECRUIT**

* Listen to why the patient is dissatisfied.
* Address the potential *benefits* of more frequent and more intense home hemodialysis for that patient:
  * Diet, Fluids, CHF control, BP control, life style, independence.
* Encourage interested patients to talk to patients already doing short daily or nocturnal.
* Have partners talk to the partners of people doing home hemodialysis.
HOW TO RECRUIT

* Dialyze skeptical patients 5 times a week for a week or 2, and let them feel the difference.
* Set up a home dialysis machine in the waiting room of the dialysis unit, and have a staff member and, if possible, a patient answer questions and explain the process.
DAILY NOCTURNAL HEMODIALYSIS – RISKS

* Power outages
* Blood and dialysate leaks
* More frequent usage of fistulas
* Decannulation of needles
* Marital stress
SPECIFIC ISSUES – PARTNER BURNOUT

* In our experience, one of the most frequent reasons for home modality failure is partner burnout.

* Therefore, whenever possible, the patient should do his/her own treatments.

* Home dialysis does not usually improve already rocky marital relations.
PARTNER BURNOUT

- Offer opportunities for the partner to meet with the social worker alone before, during, and after training.
- Support groups for caregivers can be very helpful.
- Offer in-center respite so partners can go on vacations, have surgery, take a break.
Discuss the responsibilities of the home hemo patient and partner:

- Training is like going back to school.
- They do the work at home, and it is a lot of work. Up to 24 hours/week on daily and 48 hours on nocturnal.
- We have the patient (and partner) sign a contract agreeing not to quit for at least 6 weeks after going home.
Start the patient’s training ASAP after they opt for home.

- The longer the wait, the more isolated the patient becomes from their former life, and the more their life is the dialysis unit.
- The longer the wait, the more comfortable the patient becomes with being a passive recipient of an entitlement.

Encourage the floor nurses to start training the patient to set up their machine (even though it’s different).
We assume that for the first week of training every patient is uremic and anxious.
- Esp with people new to dialysis
- Even with people coming from in-center HD
- Everyone feels overwhelmed by all the details and technology.

- We train 4 days weekly, or 5 whenever possible, dialyzing every day.
- We focus on training the patient, not the partner.
We train for as long as is necessary:

- Range is usually from 3-8 weeks.
- Education, age, dialysis vintage, and gender do not correlate with ability to learn to do home hemo.

We stop training and send the patient in-center if they skip training sessions or are always late.
Teaching the patient and/or partner to cannulate a fistula often takes longer than training them to safely set-up and run a dialysis machine.

Phobias, anxiety, too much to handle all at once.

Sometimes it is better to put a catheter in, get the patient home, and bring them back after 1-2 months and reteach cannulation.

Reluctant partners become much more enthusiastic once they see how much better the patient is feeling, and they are more comfortable HHD is safe and practical.
Not every trainer is ideal for every patient.

- Sometimes you have to change trainers, and it’s nobody’s fault.

- Sometimes you fail to successfully train a patient and get them home.

- Accept the inevitability of occasional failure.
Increase frequency, dialysate volume, and/or time to increase clearance.

Max UF rate for short daily HD should not exceed **10 ml/kg/hr**, to decrease hypotension and myocardial stunning.

Max fluid removal for home nocturnal HD **5 mg/kg/hr**.

Minimum 3.5 treatments per week to avoid “Killer gap”
1) Nobody goes home until the trainers, patients, and partners agree they are safe and well trained.

2) A Home Nurse is on call for any alarms not fixed quickly.

3) Redsense or Moisture detectors detect blood and dialysate leaks.

4) Very specific prep protocols for buttonhole use to reduce risk of infection.
Detecting blood leaks from AV fistula and graft needles by using the following:

- **Redsense** blood detectors
- **Single needle**
- **Moisture detectors** (Enuresis detectors). None are FDA approved but they have worked well.
- **Taping technique**
Needle Taping Technique With HHD

1. Needle in buttonhole
2. Tape over needle
3. Start crisscross dressing
Needle Taping Technique With HHD

4. Continue crisscross dressing

5. Complete crisscross dressing

6. Tape over crisscross dressing
Needle Taping Technique With HHD

7. Place mesh over arm, secure exit of dialysis tubing at the level of the shoulder and start dialysis
FIRST 3 MONTHS HOME

* First week:
  * Poor sleep, esp. if nocturnal.
  * Multiple alarms
  * Difficulty cannulating
  * Supplies are in different places at home than they were in training.
  * Steps get left out.
  * “I think I made a mistake doing this.”
* Remind them of the “contract” to stick it out for 6 weeks.
FIRST 3 MONTHS HOME

* REPETITION, REPETITION, REPETITION.
* The more frequently they dialyze, the sooner they will be comfortable with the machine, alarms, cannulation.
  * By the end of 3 months, our nocturnal patients average < 1 alarm /night.
* You must have a nurse on-call to field calls and troubleshoot problems.
* Pay close attention to the well-being of the partner.
We recommend daily contact with the patient.
Whenever possible, be sure the partner is not doing everything.
  There are a lot of spoiled men out there.
Review buttonhole prep at each monthly clinic visit for the first 3 months.
Don’t hesitate to bring the patient back for remedial training if there are possible problems.
After 3 months, although we encourage them to continue to do as much dialysis as possible, we let them balance the cost to them against the benefit they are experiencing.

- You have to be flexible.
- They have to dialyze at least as much as they would get in center.
One size does not fit all

Current Home HD prescriptions:
- Every other day for 4-5 hours
- Short daily HD 2-4 hours 5-6 days/week
- Nocturnal HD for 6-8 hours 3-6 nights/week
- A mix of daytime and overnight HD

“Dialysis on your schedule, not ours.”
The biggest problem for any home hemo program is retention:
* Large up-front investment (more than PD) in training and equipment.
* Takes at least a year at home to recoup.
* The most common reason for patients coming back in-center is partner burnout.
  * Pay attention to the well-being of the partner
  * Offer respite in-center so partner can vacation or take a break.
Frequent contact is essential.
- Circumstances change.
- Problems develop.
- Early intervention prevents later failure.
- Be flexible.
- Monthly clinic with the Home Team
  - Monitor for skipped treatments, worsening labs, skipping safety steps, sloppy access preps, and other signs of noncompliance.
- Retraining if necessary for recurrent problems.
HOME - AFTER 3 MONTHS

- Patient satisfaction rises for about a year, then it levels off and may even fall as they deal with the drudgery of ESRD requiring dialysis.
  - Transplant
  - Encourage them to travel.
    - With their machines
    - incenter
SPECIFIC CLINICAL ISSUES

* Optimum vs. adequate dialysis
* Non compliance with prescribed regimen
* Underdialysis
* CHF, fluid gains
* High phosphorus
* Button holes
* Partner burnout
SPECIFIC ISSUES - NONCOMPLIANCE

* Is home dialysis a right or a privilege?
* Patients who are noncompliant with prescription or safety protocols jeopardize their own health.
* They also potentially jeopardize the survival of your entire program
  * if something untoward happens.
  * With poor quality markers.
* Deal with noncompliance early and often.
* With chronic noncompliance, we have a team meeting with the patient and have them sign an agreement to comply with very specific measures within a specific timeframe, or lose the privilege of dialyzing at home.
SPECIFIC ISSUES - UNDERDIALYSIS

* Home patients should get at least as much dialysis as they would get in-center.
  * Increase liters of dialysate and adjust flow fraction.
  * Increase length of each treatment.
  * Dialyze more frequently.
* Solute clearance does not explain the benefits of home hemodialysis, but we are graded on our ability to provide certain levels of solute clearance.
More frequent dialysis is the most effective way of dealing with chronic fluid overload, severe cardiomyopathies, people who can’t stop drinking.

Avoid the 3 day gap between dialysis. Increased mortality and hospitalizations correlate with the last morning of the 3 day gap.

These patients need to dialyze a minimum of 5 days or 4 nights weekly, preferably more.
Patients often liberalize their diets on home hemo more than their prescription can handle.

- Phosphorus removal seems to be time dependent.
  - We consistently found that patients had to dialyze 35 hours weekly to normalize Phosphorus without binders or dietary restrictions.

- You can increase phosphorus clearance with increased time and/or dialysate.
The Group of 13 CMO’s of dialysis companies has recommended that buttonholes not be used routinely b/o increased hospitalizations and infections.

This is based on an excellent retrospective analysis of the data from multiple studies.

Other countries (Canada, Great Britain, Netherlands, Australia/NZ) continue to use them with updated protocols and reportedly better results.
Figure 2
Cumulative incidence estimates of first (A) all-cause, (B) cardiovascular-related, (C) infection-related, (D) vascular access dysfunction–related, and (E) other cause–related admission in intention-to-treat analysis. Abbreviations: DHHD, daily home hemodialysis; IHD, in-center hemodialysis.
Figure 3
Cumulative incidence estimates of (A) all-cause, (B) cardiovascular-related, (C) infection-related, (D) vascular access dysfunction–related, and (E) other cause–related readmission, given discharge following admission due to the corresponding cause, in intention-to-treat analysis. Abbreviations: DHHD, daily home hemodialysis; IHD, in-center hemodialysis.
Figure 4
Pooled relative hazards of all-cause and cause-specific admission for daily home hemodialysis patients in intention-to-treat and on-treatment analyses (referent: matched thrice-weekly in-center hemodialysis patients). Hazard ratios are represented by filled circles and 95% confidence intervals by solid lines. Abbreviation: VA, vascular access.
Consistency of home hemodialysis training and practice adherence

When aggregating all access cannulation steps surveyed, not a single patient or nurse reported performing all steps in accordance with Generally Accepted Practices.


doi: 10.1111/hdi.12211
Partner burnout is the most frequent reasons for home modality failure.
Therefore, whenever possible, the patient should do his/her own treatments.
Pay careful attention to the well-being of the partner.
Offer respite in the home training space.
Hemodialysis International,
April 2015, 19Suppl 1
An on-line, free set of articles on the creation of a home hemodialysis program, selection of patients, training, dialysis prescriptions, safety protocols, and other practical information from international practitioners.
ANY QUESTIONS?
IN SUMMARY

* Be clear from the beginning about your and the patient’s expectations and responsibilities.
* Retrain often. Repetition, repetition, repetition.
* Pay close attention to the partner.
* Be flexible and persistent. This would be a lot easier if we were dealing with a different species.