

# Pre-dialysis AVF Planning

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# Pre-dialysis AVF planning

- The challenge.
- The reality.
- Some thoughts on issues and improvements.

# Pre-dialysis AVF Planning

- A lot of people involved!
- Time consuming.
- Good communication essential.
- Shared goals / consistent messages.

# The Challenge

- CVCs bad, AVFs good.
  - 2-3x increased risk of death.
  - 5-10x risk of serious infection such as osteomyelitis, septic arthritis, endocarditis.
  - Decreased dialysis adequacy.
  - Increased vascular procedures with failure rates 52-91% in first year.
    - >5yrs AVF.
  - Increased cost (USRDS 2010).
    - US \$79,364 vs \$60,000 per person per year.

Rehman et al. cJASN. 2009;4(2):456-460

# The Challenge

- Goal = increase AVF incidence + prevalence.
- Fistula First.
  - 66% AVF prevalence.
- BCPRA.
  - 50% incidence / 80% prevalence AVFs.

# The Reality

- USA / Fistula First.
  - 50-60% prevalence.
  - 13.7% incidence.
- British Columbia.
  - 50% prevalence.
  - 20-30% incidence.

# The Reality

- Targets achievable.
  - Some European countries / individual centers: 80-90% prevalence.
- Small centers.
  - Success often linked to an enthusiastic individual (usually a vascular surgeon).
- Large centers.
  - Integrated multidisciplinary approach.
  - 'Vascular access champion' (often a nephrologist).

# A Few 'Issues'

- Late nephrology referral.
- Late referral for access creation.
- Targeted patient education and modality selection.
- Vein preservation / mapping.
- Patient refusal / the very elderly / palliation.

# Late Nephrology Referral

- What is late referral - definitions vary.
  - At least 3-6 months.
  - Clinical reality increasing recognized to be at least a year prior to dialysis.
- Up to 50% referred late.
- At VGH 42% started HD with <6 months nephrology follow-up.
  - 67% of these <1 month follow-up.

# Early Nephrology Referral

- eGFR reporting.
- Guidelines for referral.
- On-going involvement of primary care physicians and subspecialties.
  - Assistance in managing CKD.

# Late Referral for Creation

# Late Referral for Creation

- USA and BC.
  - 50-60% of patients known to nephrology.
  - 10-30% incidence AVFs.
- Issues.
  - Difficulty of accurately predicting dialysis start.
  - Delay in modality selection.
  - Healthcare provider biases.

# When to Refer for Creation?

- Guidelines.
  - Estimated time to dialysis.
    - Within 1 yr of anticipated need for HD (KDOQI 2000).
    - Within 6 m of HD (KDOQI 2006).
  - Estimated GFR.
    - <25 in KDOQI 2000, <15 in 2006.
    - <15-20 in CSN guidelines 2006.
- NB. Probably need a year.
  - 20-30% primary AVF failure rate.
  - Surgical wait times.
  - Minimum 6-12 weeks maturation time.

# When to refer patients with chronic kidney disease for vascular access surgery: Should age be a consideration?

O'Hare et al. KI. 2007; 71: 555-561

- 11,290 patients with eGFR <25.

Percentage Initiating HD			
	6m	1yr	2yrs
<b>All</b>	15%	25%	40%
<b>18-44 yo</b>	32%	47%	<b>67%</b>
<b>85-100 yo</b>	8%	11%	<b>17%</b>

# When to refer patients with chronic kidney disease for vascular access surgery: Should age be a consideration?

O'Hare et al. KI. 2007; 71: 555-561

Younger patients have a faster decline in renal function.

<b>Age Group (Yrs)</b>	<b>Median Annual Change in eGFR</b>
18-44	-3.4
45-54	-3.6
55-64	-3.2
65-74	-2.2
75-84	-1.9
85-100	-1.3

## When to refer patients with chronic kidney disease for vascular access surgery: Should age be a consideration?

O'Hare et al. KI. 2007; 71: 555-561

- All with eGFR <25 referred, unnecessary : necessary AVFs at 2 yrs
  - 5:1 for those aged 85-100.
    - Referral at eGFR <15 ratio 1.5:1.
  - 0.5:1 for those aged 18-44.

## When to refer patients with chronic kidney disease for vascular access surgery: Should age be a consideration?

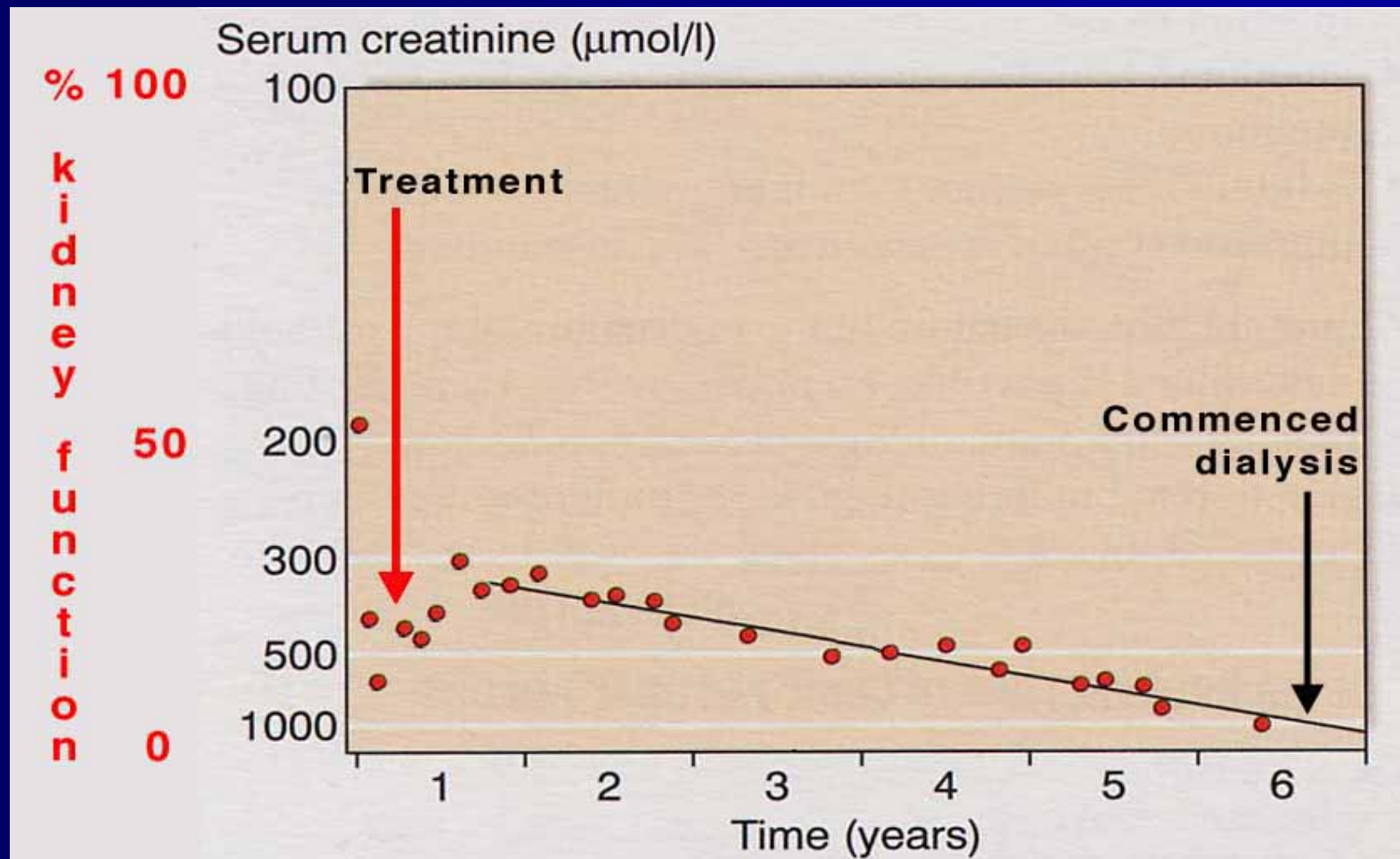
O'Hare et al. *KI*. 2007; 71: 555-561

- Probably.
- Younger patients.
  - Will almost certainly end up on dialysis.
  - Reasonable to refer at eGFR <25.
- Older patients.
  - Consider different threshold, e.g. <15.
  - Plus possible other criteria such as proteinuria, rate of change, etc.
  - Much more likely than younger patients to have an acute decline in renal function; therefore, essential to have a 'contingency plan' for those who start via CVC.

# Early Referral for AVF Creation

- No 'one-size-fits-all'.
  - Need to take account of renal function, rate of change, proteinuria, etc particular in the elderly.
  - Individual patient approach.
    - Graph of eGFR: useful to predict likely dialysis start and useful to educate patients.
  - System approach / computer modeling: eGFR priority report.

# Early Referral for AVF Creation



# Patient Education

# Patient Dialysis Knowledge Is Associated with Permanent Arteriovenous Access Use in Chronic Hemodialysis

Cavanaugh et al. cJASN. 2009; 4:950-956

- Incident HD pts from May 2002 – Nov 2005 followed for 6m.
- Chronic Hemodialysis Knowledge Survey (CHeKS).

- 23 MCQs.

You are ordering food from a restaurant menu.

1. Which item below is best for you to avoid to control your potassium?
  - Steamed rice
  - Corn
  - Baked potato
  - Noodles
2. The preferred dialysis access that has the least chance of problems is a:
  - Fistula
  - Graft
  - Tubule
  - Catheter

- Access at baseline, 3 and 6 months

## Patient Dialysis Knowledge Is Associated with Permanent Arteriovenous Access Use in Chronic Hemodialysis

Cavanaugh et al. *cJASN*. 2009; 4:950-956

- Patients who scored 20 percentage points higher on the CHeKS were 25% more likely to use an AVF / AVG at initiation.
  - Adjusted for age, sex, race, education, and diabetes mellitus.
  - Persisted at 6 months.

# **Patient Education: Modality Selection**

# We need to be more paternalistic / maternalistic

- Patient choice is important...
  - For those patients who can and want to make the decision re modality.
  - BUT... many patients cannot / do not want to make that choice or have unrealistic expectations.
- Remember...
  - We as healthcare professionals are meant to be experts trained to weigh up risk vs benefit.
  - Most patients expect us to advise them on what we think is best and, for those who cannot make the decision, trust us to make that decision for them in their best interests.

**Peritoneal dialysis as a predialysis modality choice: impact on unexpected hemodialysis starts and predictors of commencing PD vs HD**

Jennifer Hanco, Alexandra Romann, Monica Beaulieu

# Education: Modality Choice

- Education of predialysis patients encourages them to consider independent RRT options such as PD first.
  - PD is documented 1<sup>st</sup> choice in 50%.
  - PD prevalence rates about 25%.
- Many patients who chose PD start and remain on HD, potentially leading to more suboptimal HD starts and lower AVF incidence rates in these patients.

# Education

- Methods.
  - Retrospective cohort study.
  - Inclusion criteria.
    - Patients starting dialysis between Dec 31, 2006 and Dec 31, 2008.
    - Minimum 3 months predialysis follow-up.
    - Minimum 1 predialysis RRT education session.
  - Data was abstracted from PROMIS.

# Education

- Results.
  - 508 patients included.
    - 25% chose HD.
    - 22% chose PD.
    - 3% chose pre-emptive transplant.
    - 1% conservative management.
    - 49% no documented decision.

# Results: predialysis choice vs actual start modality

Predialysis Choice	Actual RRT Modality	
	HD	PD
HD	120 (94%)	7 (6%)
PD	41 (36%)	73 (64%)
Tx	5 (38%)	8 (62%)
Conservative	5 (100%)	
Undecided	170 (68%)	79 (32%)

# Education: AVF creation before RRT start

- AVF creation.
  - Chose HD and started HD.
    - AVF creation in 79% (95 of 120).
  - Chose PD but started HD.
    - AVF 41% (17 of 41).
  - Undecided but started HD.
    - AVF 50% (85 of 170).
  - Chose PD and started PD.
    - AVF 7% (5 of 73).

# Education: Results Summary

- 94% of those who chose HD started HD.
  - 79% had AVF creation.
- 36% of those who chose PD started HD.
  - 41% (vs 7%) had AVF creation.
- 68% of undecided pts started HD.
  - 50% had AVF creation.
  
- What predialysis factors predict modality choice and failure to commence PD?

## Univariate analysis: predicting PD choosers (n = 114) who start HD (n = 41)

- Gender, race, DM, BMI, eGFR (number of measurements and slope) had no predictive value.

Variable	Odds Ratio	95% CI	p-value
CVD	2.36	1.07-5.22	0.03
Age	1.03	0.99-1.06	0.06
Albumin	0.92	0.86-0.98	0.01

# Results: predictors of HD start in PD choosers

- Multivariate analysis.
  - Presence of CVD and serum albumin levels remained predictive of HD start.
    - CVD OR 2.36 (1.02-5.43),  $p = 0.04$ .
    - Albumin OR 0.92 (0.86-0.98),  $p = 0.01$ .

# Improving Education

- Patients who chose PD but started HD likely to be older, have a history of CVD and lower serum albumin levels.
- No difference in eGFR decline in preceding year; therefore, unlikely that HD patients declined precipitously requiring urgent start.

# Improving Education - Recommendations

- Recommendations.
  - Regular discussion of RRT choice.
  - Ensure decision made and recorded.
  - Particular attention to older patients with CVD and those who remain undecided – consider AVF creation.
  - Tell older patients with CVD, those who cannot decide, or are unclear in their motivation for PD choice that there is a 30-40% chance they will start hemodialysis, recommend AVF creation as well and refer to vascular access clinic.

# Education – Suboptimal Starts

# Suboptimal Starts

- 1563 patients in 1997-97.
- Access at day 0 and day 60.
- KDQOL-SF based questionnaire.
  - Patients with early, persistent use of an AVF were significantly more likely to report better quality of life; fewer symptoms; less impact on daily life; and better quality of sleep.
  - Patient satisfaction with care signif lower among patients who initiate dialysis with a CVC and later convert to a permanent access.

Wasse et al. cJASN. 2007;2:708-714

# Suboptimal Starts

- Education by Renal Triage Nurse (RTN).
  - Study at VGH of 176 patients.
    - 78 patients started HD suboptimally.
    - 98 patients started RRT via the predialysis clinic.
  - 38 suboptimal starts were educated by the RTN.
    - 3.75 times more likely to switch to an independent RRT at 6 months (mostly PD).
- PD is a vascular access preserving modality.

# Suboptimal Starts

- Urgent surgical consult.
- Vein mapping before calling surgeon personally, indicating recommended timing and site for access.
- If poor distal veins and expected short life span, upper arm AVF preferable.
- Tunneled line or PD tube in interim.

Nguyen. Nephrology News & Issues. 2003;54-57

# Vein Preservation

# Vein Preservation

- Currently, protection non-dominant arm.
- Province-wide guidelines in progress.
  - Guidelines and education to all re patients with eGFR <30.
  - Education to access teams esp re avoidance of central and PICC lines.
  - Education to patients (MedAlert bracelets).

# Vein Preservation

- Vein mapping during first office visit.
- Instruction about vein preservation at 1<sup>st</sup> visit.
- Arm with best veins protected.
- Advise needlesticks primarily to hand veins and posterior or forearm basilic veins.
- Prescription written for each patient to present to phlebotomist.

Nguyen. Nephrology News & Issues. 2003;54-57

## Vein Preservation – Mapping / VAC

- Consider earlier mapping to guide vein sites for preservation + to guide modality choice.
- Excellent opportunity for education.
  - Addressing misconceptions.
    - E.g. many patients believe that they have to start dialysis as soon as their AVF is mature.
  - A 'second' opinion.
- Experienced nurse / nephrologist either at the clinic or working very closely with surgical team.

# **Two Cases Illustrating Benefits of Vessel Mapping**

## Earlier Mapping – Better Vein Preservation – Case 2

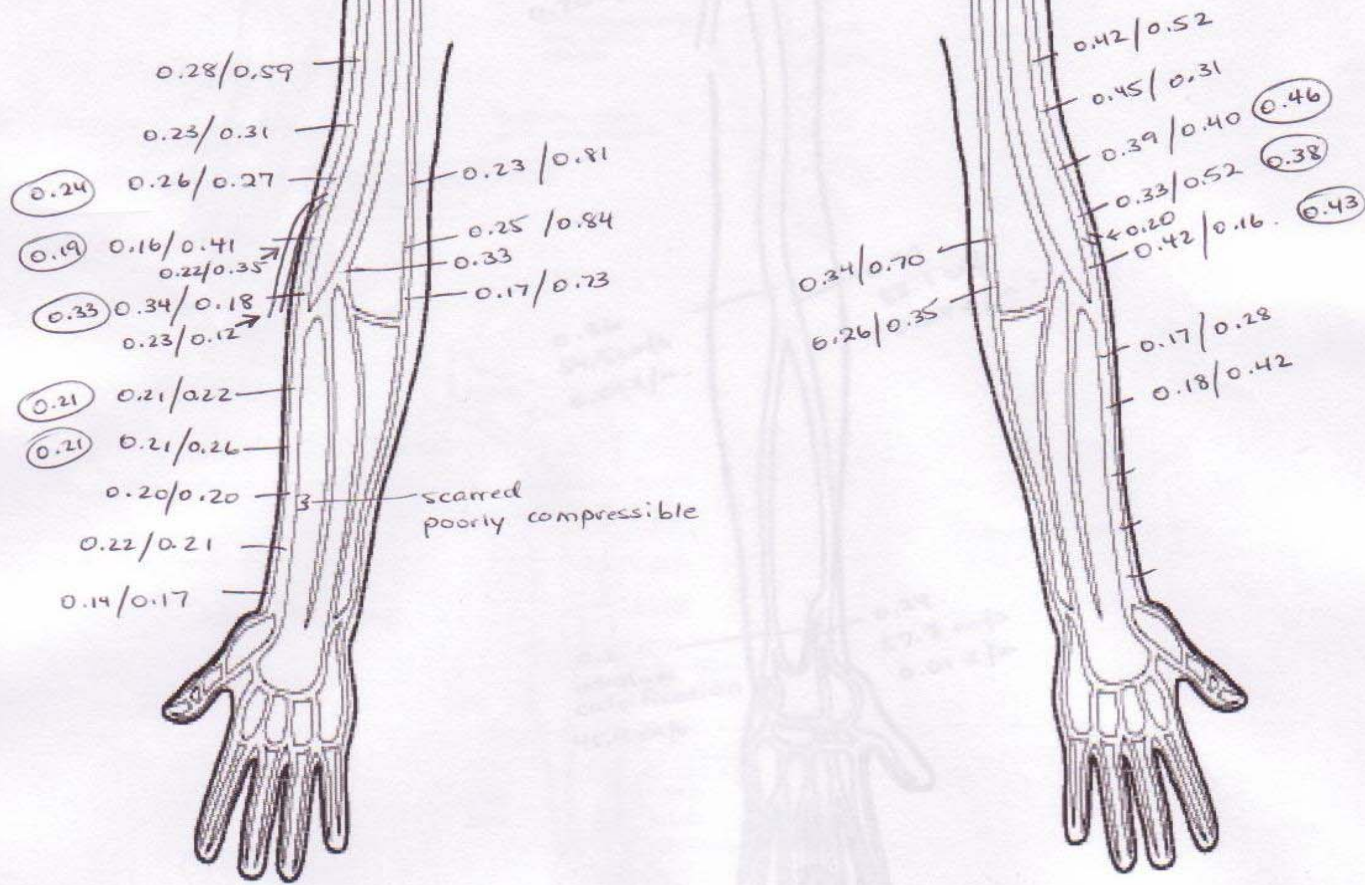
- Elderly gentleman known to nephrology who deteriorated acutely and started HD via a CVC.
- Vessel mapping next slide.
  - Best vessels on his dominant arm.
  - Earlier mapping potentially might have allowed preservation of left forearm vessel.

131/69

Ris line

patent  
patent  
augment  
resp + pressure

116/69



(R) brachial art very heavily calcified.

(L) handed.

## Mapping - Education / Modality Selection – Case 2

- 34yo F with SLE since childhood.
- Previously stable CKD (eGFR 30-40).
- Moves to Vancouver.
- Rapid deterioration renal function.
  - Overwhelmed.
  - Medication adjustments.
  - Dialysis education.
  - Renal biopsy.

# Mapping - Education / Modality Selection – Case 2

- More than 2 hours later...!
  - Vein mapping revealed only one very borderline left upper arm vein (even basilic veins damaged by PICCs) – even if matured, was likely to start dialysis with CVC given rapid decline.
  - Discussed in detail all dialysis modalities including deceased donor wait times, and potential living donors (she had several).
  - Recently married, new job, possibly wanted children (discussed issues related to fertility)...
  - Agreed that best plan was PD and hopefully living donor transplant.
  - Arranged to have her MMF dose scheduling changed due to nausea.

# Patient Refusal

- A nephrologist tells his patients...
  - 'I don't provide sub-standard care at my dialysis unit, either you have an attempt at AVF construction or you find somewhere else to dialyse.'
- What do you think?

# Patient Refusal

- Although initially shocking to most of us, this is not that different from the recommendation made by the authors of the following paper...

# Patient Refusal

- Ensure systematic education re risks of CVCs.
- Explore reasons for refusal.
- Conscientiously object to long-term TCC use.
  - Might say, "In good conscience, I cannot agree to your continued treatment with a TCC. I will need to refer you to another nephrologist. I will be sorry to lose you as a patient, but using a TCC for long-term dialysis access is poor quality care. I will not do it."

Rehman et al. cJASN. 2009; 4: 456-460

# Patient Refusal

- Consider informed refusal.
  - Printed statement outlining complications of longterm CVC use and recommendation against use.
  - Ask patient to read and sign if they choose to dialyse via CVC.
- At the very least, we should document clearly that the risks vs benefits have been discussed with the patient and they still declined.

# Elderly / Palliation

- For those aged 85-100
  - More likely to survive HD free.
    - 73% vs 11% at 1 year.
    - 42% vs 17% at 2 years.
  - More likely to die than need HD.
    - 17% vs 11% at 1 year.
    - 41% vs 17% at 2 years.

# Elderly / Palliation

- CVCs may be acceptable.
  - For the very elderly with a low chance of needing HD, it may be reasonable to accept that they start on a CVC.
    - In this case, there should be systems in place to expedite AVF creation once on HD.
  - For patients in whom the goals of care have clearly been made palliative.

# Summary

- Early nephrology referral.
- Early referral for AVF creation.
  - One year prior to dialysis start.
  - Better systems to identify these patients.
  - eGFR graphing / eGFR priority reporting (PROMIS).
- Education.
  - Consistent message, esp re risks of CVCs.
  - Ensure modality decision made and recorded (PROMIS).
  - Consider AVF creation in those who are undecided (2/3 will start HD).
  - Consider AVF creation in older pts with CVD who opt for PD.
  - Remember PD 'choice' may be avoidance strategy for access.

# Summary

- Vein preservation.
  - Earlier mapping including those who opt for PD.
  - Province-wide guidelines.
  - Education (patients + staff).
- Patient refusal / suboptimal starts.
  - Provision for 'urgent' AVF placement.
  - Consider signed informed refusal.
- In achieving targets and goals, we cannot lose sight of the fact that many of our patients have short life expectancies and are receiving 'palliative care'; therefore, may not be suitable for repeated attempts at access creation.