Geriatric Nephrology

Ernest I. Mandel, MD, MS
Associate Physician, Renal Division, Brigham and Women’s Hospital
Instructor in Medicine, Harvard Medical School
Ernest Mandel, MD, MSc

• Yale University School of Medicine
• Medicine Residency/Chief Residency @Yale-New Haven
• Nephrology Fellowship @BWH-MGH
• Instructor in Medicine@ HMS
  • Clinical focus: Geriatric Nephrology and Palliative Care
  • Research focus: Serious Illness Conversations, Integrated Renal-Palliative Care models
  • Program Director, BWH-MGH Joint Nephrology Fellowship
Disclosures

• Employment, Hebrew SeniorLife
• Editor, Scientific American Nephrology Dialysis and Transplantation Weekly Curriculum
• Spouse’s law firm counts Fresenius, DaVita, and DCI among clients
Outline

• Geriatrics for Nephrologists
• CKD care in the Elderly
• Pre-ESRD care in the Elderly
• Conservative Management
Geriatric Assessment for the Nephrologist

• Multi-disciplinary assessment
  • Cognitive
  • Mobility/gait/balance
  • Functional dependence/independence
  • Symptoms – Pain, Depression, Continence
  • Family, social, financial, other support structures
  • Goals of Care and Advance Directive
Frailty

• Definition
  • Conceptual: decreased functional reserve
  • Fried definition (3 of 5):
    • ≥10lb weight loss/1 yr
    • Self-reported exhaustion
    • Grip strength weakness
    • Slow gait
    • Low physical activity

• Relevance
  • Highly prevalent in CKD (across age groups)
  • Associated with outcomes in HD patients
  • Not just an aging phenomenon in HD patients
Practical Application?

• Gait Speed
  • Associated with 5-year survival (Studenski JAMA 2011)
    • Consistent across speeds for every 0.1 m/s
  • Associated with developing functional dependence (Van Kan JHNA 2009)
    • <1.0 m/s

• Waiting Room to Exam Room? (Fritz J Ger Phys Ther 2009)
• Time the “steady-state” walk
  • 20 ft; time the middle 10 ft
• Cutoff would be roughly 10 ft in 3 seconds
Polypharmacy

• Definition can be variable
  • ≥5-10 medications
• Increased risk of side effects
• Increased risk drug-drug interactions
• Falls and other risks
The Four Questions: Geriatrics Approach

• Interpreting evidence/guidelines
  • Who – applicable/generalizable to my patient? multi-morbidity?
  • What – outcome of interest to my patient?
  • When - relevant time horizon?
  • Risks – what are the attendant risks?
Mr. Z is a 79 year old male in assisted living (there mainly due to his spouse’s limitations) who is referred for CKD management. He has a history of CKD stage 3B, hypertension, and osteoarthritis.
• Medications include amlodipine, metoprolol, furosemide.
• Laboratory Values
  • Creatinine 1.9 mg/dL
  • eGFR 33 ml/min/1.73m²
  • albumin 3.4 mg/dL
  • Hgb 9.3 mg/dL
  • ACR 121 mg/g
Geriatric Nephrology: CKD

• Lack of age-specific evidence for Anemia, MBD
• Similar to usual care
  • But with geriatric considerations (fall/fracture risk, polypharmacy)
• BP targets?
BP Targets for Elderly

• Controversial

• SHEP, HYVET enrolled SBP>160, excluded CKD, treatment arm achieved 140’s, decreased stroke risk
  • Drove JNC 8 recs for 150/90

• SPRINT treated to 120, reduced risk of composite cardiovascular outcome BUT
  • Community dwelling
  • No DM or CHF or proteinuria >1g/day
  • No decrease in CKD progression among those with CKD though stopped early
Question

• Which one of the following statements is correct regarding blood pressure (BP) management for this patient?

• A. A target systolic BP of 120 may prevent CKD progression
• B. Controlling BP to <150/80 may reduce risk of stroke
• C. BP should be controlled to <130/80 due to proteinuria
• D. There is insufficient evidence to determine appropriate BP goals for this patient
Answer

D: Insufficient evidence

• Which one of the following statements is correct regarding blood pressure (BP) management for this patient?
  • A. No change in CKD progression with SPRINT
  • B. HYVET excluded SCr > 1.7 mg/dl
  • C. AASK and MDRD excluded his age (both 18-70)
  • D. Sad but true
Case Thread Revisited

- Mr Z. is now 82 years old. His past few years have been so-so
- His baseline creatinine rose to 2.4mg/dl (eGFR 24 ml/min/1.73m²)
- Associated with some AKI episodes from poor oral intake while he was focused on caring for his wife with Alzheimer’s disease
Geriatric Nephrology: Pre-ESRD

• Main question is access

• Risk/benefit
  • Avoidance of infection
  • Procedural risk and inconvenience
    • Primary vs secondary patency
      • Surgeon/patient dependent
    • Single center study: Over age 80 39% primary patency 92% secondary patency at 12 months

• Competing risk of death
Access for Elderly

- **Who** - Preemptive placement vs. after planned/acute catheter start
- **What** – Prevent infection, mortality?
- **When** – Timeframe to ESKD compared to life expectancy; Most catheter infections in 1st 6 months
- **Risk** – Never used, FTM, procedural complications
Pre-emptive access creation: A Framework

- NNT – Number needed to treat to prevent one access-related BSI
- Input life expectancy and access-specific infection rate to yield lifetime BSI rate for each access type
- Reciprocal of Absolute Risk Reduction (ARR)

Kurella-Tamura KI 2012
NNT for Access

• For individuals over 80 with average life expectancy for preemptive placement
  • AVF vs AVG – NNT 33
  • AVG vs CVC – NNT 2
  • Model 2- if start with CVC, AVF benefit minimal?
  • Model 3 – in those cases maybe AVG better?
• Choosing Wisely?

---

Table 2 | Number needed to treat with preferred access type to prevent one episode of vascular access–related bacteremia due to non-preferred access

<table>
<thead>
<tr>
<th>Treatment strategy to prevent bacteremia</th>
<th>65-69 years</th>
<th>70-74 years</th>
<th>75-79 years</th>
<th>80-84 years</th>
<th>85-89 years</th>
<th>≥90 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVF vs. AVG Model 1</td>
<td>9 17 48 10 20 62 11 25 82 14</td>
<td>33</td>
<td>110</td>
<td>18</td>
<td>47</td>
<td>167</td>
</tr>
<tr>
<td>AVF vs. AVG Model 2</td>
<td>27 35 62</td>
<td>33</td>
<td>110</td>
<td>18</td>
<td>47</td>
<td>167</td>
</tr>
<tr>
<td>AVG vs. CVC Model 1</td>
<td>&lt;1 1 4 1 5 8 2 6 1 2</td>
<td>2</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>AVG vs. CVC Model 3</td>
<td>&lt;1 1 4 1 2 5 1 2 7 1 3 9 1 4 15 2 5 21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: AVF, arteriovenous fistula; AVG, arteriovenous graft; CVC, central venous catheter.

‘<’—’<’ indicates life expectancy is shorter than time required to achieve benefit from intervention.

Model 1: Assumes both access types are functional at the start of dialysis.
Model 2: Assumes patients with AVF dialyze via CVC for 3 months while AVF matures and that patients with an AVG dialyze for 0.5 months with a CVC until the AVG is ready for use.
Model 3: Assumes patients with AVG dialyze via CVC for 0.5 months until the AVG is ready for use.

Kurella-Tamura KI 2012
Fistula First, Catheter Last: Benefit of Pre-ESRD Care?

• Large proportion of the AVF vs catheter benefit may be due to patient characteristics that lead to AVF placement in the first place
  • AVF-start mortality < Catheter-start due to immature/failed AVF <<< Catheter-start alone

Brown et al JASN 2016
Concurrent initiation and access creation: Cost Effective?

- Start dialysis with CVC; cost-effectiveness analysis of continue CVC alone, place AVF or AVG within 30 days
- AVF more cost effective than CVC for all except age 85-89 in lowest quartile of life expectancy
  - If life expectancy >2 years, AVF cost saving
  - If life expectancy <6 months, AVF and AVG not cost effective
- Many limitations, more nuanced
Predictive Tools

- Prognosis for survival with advanced CKD
  - Weiss (JAGS 2015)
    - Age, Sex, BMI, Co-Morbid Conditions (CHF, CAD, HTN), Antihypertensive use, Statin use, Smoking, Non-disease specific (falls, admissions, weight loss)
    - 2-year and 6-month mortality
    - Cumbersome to use
      - Mr. Z – 2 year survival 80%
  - Bansal (CJASN 2015)
    - Age, Sex, race, eGFR, ACR, smoking, diabetes mellitus, and history of heart failure and stroke
    - Cardiovascular Health Study – community dwelling, functional, not frail
    - 5-year survival
    - Somewhat less cumbersome
      - Mr Z – 5-year survival 20%

- Prognosis for Progression to ESRD
  - Tangri Score (JAMA 2011)
    - Age, Sex, eGFR, ACR, location
    - www.kidneyfailurerisk.com or at qxmd
      - Mr Z – 2-yr ESRD risk 7%; 5-yr risk 20%
      - Framingham Risk for CAD would recommend BP, lipids, lifestyle modification

- Prognosis on maintenance dialysis
  - Cohen, Wick
Other Considerations

- Not just about infections, ESRD risk, and death
- QoL
  - Bathing
  - Pain of needle insertion
- Behavior
  - Pulling out catheter
  - Restless at HD with danger of needle dislodgement
Conclusion?

• Patient-centered, individualized decision

• Take into account:
  • Infection risk
  • life expectancy
  • likelihood of success of AVF
  • QoL
  • Behavioral and other issues
Transplant for Elderly

• Who – Able to tolerate procedure, medications – medically, cognitively, social structure
• What – Mortality benefit, QoL (avoid dialysis)
• When – Time to listing vs time to transplant, survival after transplant
• Risk – transplant evaluation, procedural, post-transplant complications

Wolfe RA NEJM 1999
Case Thread Revisited

• Mr Z. is now 84 years old and has had a tough year. His wife passed away from Alzheimer’s in April and in December he suffered a prolonged hospitalization for the flu that ultimately led him to be placed in a nursing home.

• He sees you for follow-up of CKD. He has lost 10lbs in past year. His creatinine is 2.9 mg/dl (eGFR 19 ml/min/1.73m$^2$), Alb 2.9 mg/dl.

• Na 138, Cl 96, Bicarb 17 (AG 25?).

• Medications metoprolol, amlodipine, furosemide, acetaminophen

• You decide to address his acidosis
Clinical Pearl

• Which of the following is the most appropriate next step in management?
  • A. Prescribe sodium bicarbonate 1300mg TID
  • B. No change in management
  • C. Add midodrine for BP support
  • D. Discontinue acetaminophen
Clinical Pearl Continued

• D. Discontinue acetaminophen

• This is AGMA from pyroglutamate or 5-oxoproline
• Depletion of glutathione from chronic acetaminophen use leads to accumulation of 5-oxoproline
• Associated with CKD and malnutrition
• Standing acetaminophen use becoming more common practice in nursing home setting for proactive pain management
• Patient-centered – maybe switch to prn?
Case Thread

- Mr Z. seems to be in a new steady-state and you decide it is a good time to talk about his thoughts regarding ESRD management
- You present dialysis and conservative management as viable options
- He asks what the difference in survival and quality of life might be
Conservative Management in ESRD

- Emerging interest in conservative management
  - Non-dialytic therapy
  - Is it more than just not dialysis?
  - Variously termed
    - Conservative Kidney Management (CKM)
    - Maximal Conservative Management (MCM)
What is Conservative Management?

• Disease Management/Prevention of Progression
• Symptom Management
• Advance Care Planning/Communication
What is Conservative Management?

• CM includes management of:
  • Volume – diuretics, oxygen, other
  • Potassium – medication review, diet, other
  • Phosphate – diet, binders
  • Anemia – ESAs, Fe infusion (fatigue)
  • Pruritis – emollients, anti-histamines, dietary
  • Nausea – anti-emetics
  • Pain – taking into account renal clearance (APAP, hydromorphone, fentanyl; avoiding morphine, codeine)
  • RLS, muscle cramps - benzodiazepines

• All recommendations and decisions in context of patient goals and wishes
Illness trajectories.

- Colon Cancer
- Murtaugh, CKD 5- no dialysis
- CHF, COPD, ESRD
- Frailty and dementia
- Death

Holley J L CJASN 2012;7:1033-1038

©2012 by American Society of Nephrology
Survival with CM

• Challenging to study
• RCT not practical, patients choose RRT vs CM
• When to enroll/when does clock start
  • statistical vs clinical significance
Survival with CM

- Da Silva-Gane CJASN 2012
  - “Low clearance clinic” – in practice meant eGFR was <15 ml/min/1.73m²
  - Patients choose modality or CKM, reassessed/recommit at regular intervals
  - Propensity score to control for selection bias in analyses
Adjusted Cox survival functions for patients receiving hemodialysis (HD), peritoneal dialysis (PD), and conservative kidney management (CKM).

Da Silva-Gane M et al. CJASN 2012;7:2002-2009
Survival with CM

• Da Silva-Gane CJASN 2012

• Shorter survival than with dialysis?
  • Median survival 30 months vs 43 months (difference of 404 days)
  • BUT, those choosing dialysis were dialyzed a median of 326 days of those 43 months
    • i.e. on average 80% of the survival benefit days “spent” undergoing dialysis (does not include hospitalizations, procedures etc.)
Survival with CM

- Verberne CJASN 2016
  - Retrospective, single center
  - Choose at enrollment – eGFR somewhat variable but generally <20ml/min/1.73m²
- Overall, survival from time of decision for age >70 was 3.1 years for RRT vs 1.5 years for CM
- For those 80 years of age and older, survival may be the same with dialysis or CM
Kaplan–Meier survival curves comparing both treatment groups with stratification of age using different starting points in survival calculation.

Wouter R. Verberne et al. CJASN
doi:10.2215/CJN.07510715

©2016 by American Society of Nephrology
Survival with CM

• Verberne CJASN 2016

• Many in both groups died before reached eGFR <10ml/min/1.73m² or never reached – power?

• Intention to treat?
  • studying theoretical decision more than the actual modality/outcome
  • perhaps studying conservative management vs “usual” CKD Stage 5 care?
Quality of Life with CM

• Initiation of dialysis associated with decline in functional status and QoL
  • Functional decline in institutionalized patients (Kurella-Tamura NEJM 2009)
  • May also extend to community dwelling elders (reported >30% increase in dependence after initiating HD) (Jassal NEJM 2009)

• With conservative therapy, possibly preserved QOL compared to dialysis
  • Da Silva-Gane: preserved Satisfaction with Life Score with CM

• Symptoms?
Symptom assessment at any moment – possibly relieved by dialysis?
Question

• Which one of the following statements about conservative management (CM) is correct?
  • A. quality of life with CM and dialysis are equivalent
  • B. survival with CM is equivalent to dialysis for patients under 65
  • C. survival with CM may be similar to dialysis for some patients
  • D. survival with dialysis is higher than with CM for all patients
C: Survival may be similar

• A. DaSilva-Gane demonstrated less decline in one QoL measure with CKM
• B. Survival on dialysis better for age <65 (and possibly age <80)
• C. Over 80 (Verberne), co-morbidities (various)
• D. May not be
Which of the following is true with respect to outcomes after dialysis initiation for this patient?

A. His quality of life will improve
B. He will need to be in a nursing home
C. He will require fewer hospitalizations
D. He may become more functionally dependent
Answer

D: May become more functionally dependent

• A. Quality of life is reported to decline after initiation of dialysis
• B. Need for institutionalization is very individualized
• C. Hospitalizations and readmissions are a common experience for dialysis patients
• D. In patients over age 80, functional dependence has been reported to develop in the 6 months after dialysis initiation (Jassal NEJM 2012)
Conservative Management Summary

• More than just no dialysis?
• Survival – equipoise?
• Quality of Life – maybe preserved?
• Symptom Control?
• Future Directions:
  • Conservative Management – define care pathway?
Summary

• Geriatric Nephrology – an approach, not just old kidneys
• CKD care individualized
• Access considerations – fistula first?
• Conservative Management – enough for equipoise?