



Brigham and Women's Hospital
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Geriatric Nephrology

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- Clinical focus: Geriatric Nephrology and Palliative Care
- Research focus: Serious Illness Conversations, Integrated Renal-Palliative Care models

Disclosures

I have no relevant financial relationships with ineligible companies.



Outline

Geriatrics for Nephrologists
CKD and Pre-ESRD care in the Aging Patient
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):
 - ≥ 10 lb 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 0.1m/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?



Case Thread

Mr Z. is an 82 year-old male 79 year old male in assisted living (there mainly due to his spouse's limitations) who is referred for CKD management
He now has CKD stage 4, hypertension, and osteoarthritis
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

Treatment strategy to prevent bacteremia	65–69 years			70–74 years			75–79 years			80–84 years			85–89 years			≥90 years		
	Quartiles of life expectancy																	
	75th	50th	25th	75th	50th	25th	75th	50th	25th	75th	50th	25th	75th	50th	25th	75th	50th	25th
AVF vs. AVG Model 1	9	17	48	10	20	62	11	25	82	14	33	110	18	47	167	24	67	219
AVF vs. AVG Model 2	27	—	—	35	—	—	62	—	—	—	—	—	—	—	—	—	—	—
AVG vs. CVC Model 1	<1	1	4	<1	1	5	<1	2	6	1	2	8	1	4	12	2	5	16
AVG vs. CVC Model 3	<1	1	4	<1	2	5	<1	2	7	1	3	9	1	4	15	2	5	21

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.

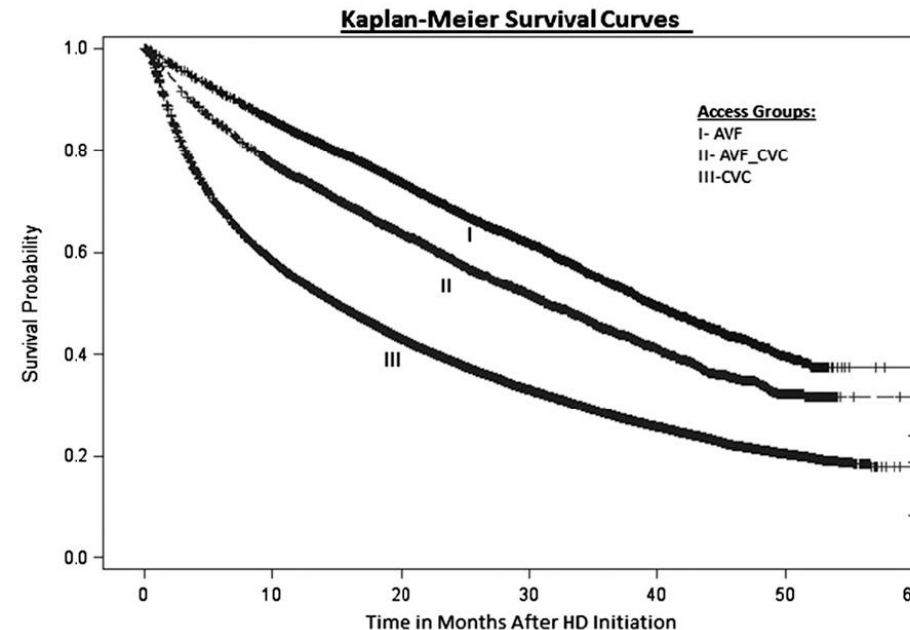
Model 3: Assumes patients with AVG dialyze via CVC for 0.5 months until the AVG is ready for use.



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



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

Table 4. Cost-effectiveness of AVF compared with CVC and AVG options by life expectancy quartile and age						
Age, yr	AVF Options Versus CVC Options			AVF Options Versus AVG Options		
	75th Percentile	50th Percentile	25th Percentile	75th Percentile	50th Percentile	25th Percentile
65–69	Cost saving ^a	Cost saving	Cost saving	Cost saving	Cost saving	Cost saving
70–74	Cost saving	Cost saving	Cost saving	Cost saving	Cost saving	\$3924/QALM
75–79	Cost saving	Cost saving	Cost saving	Cost saving	\$2645/QALM	\$2380/QALM
80–84	Cost saving	Cost saving	Cost saving	\$2294/QALM	\$2828/QALM	Cost saving
85–89	Cost saving	Cost saving	\$14,042/QALM	\$3860/QALM	Cost saving	\$13,253/QALM
AVF, arteriovenous fistula; CVC, central venous catheter; AVG, arteriovenous graft; QALM, quality-adjusted life-month. Data shown are incremental cost-effectiveness ratios defined as difference in costs divided by difference in effectiveness (QALM). The incremental cost-effectiveness ratio represents the cost required to gain one additional QALM.						
^a Cost-savings is defined as a treatment option that has lower costs and greater effectiveness than the alternative treatment.						



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



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/1.73m²), 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?
- Variouslly 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?

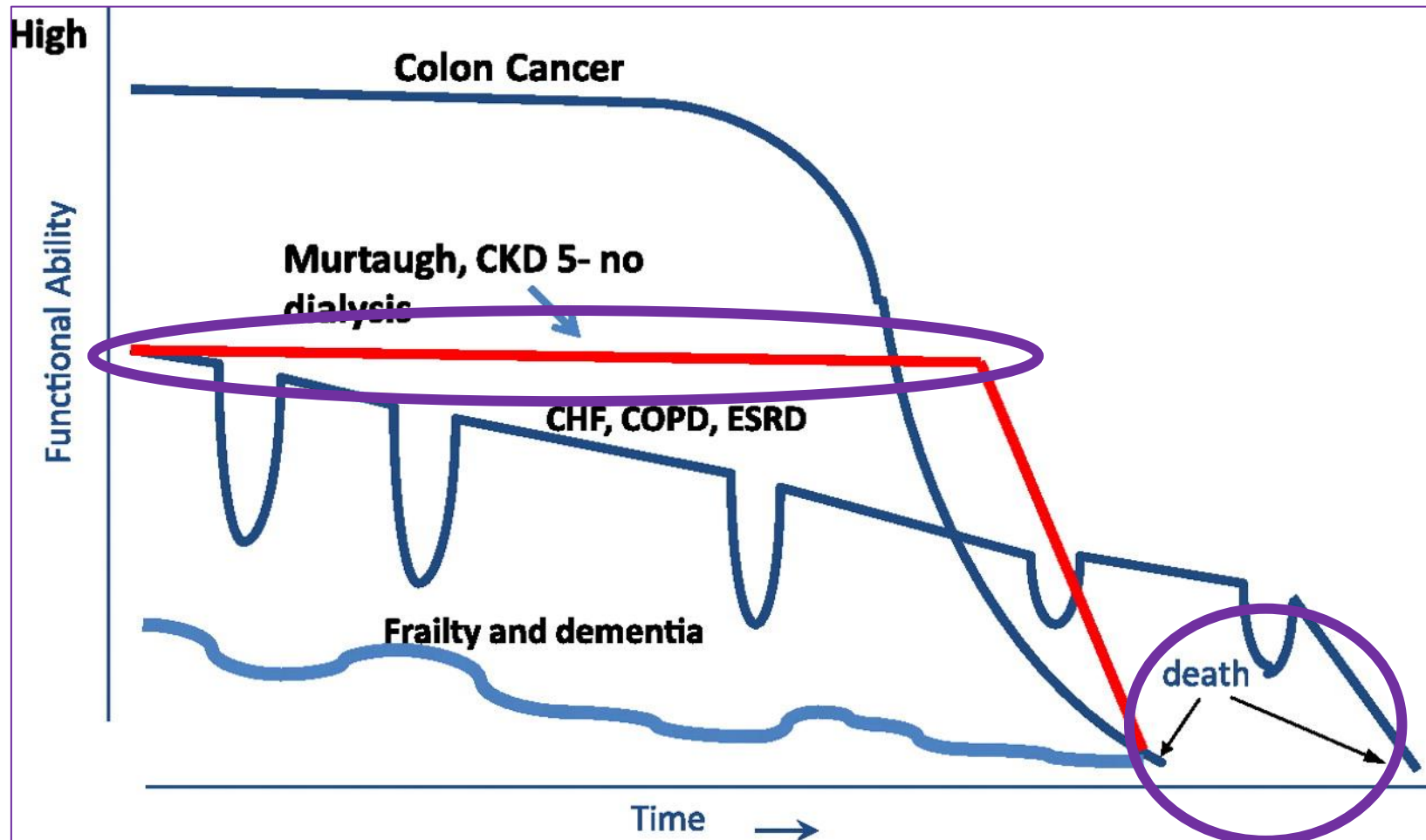
CM includes management of:

- 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.



Holley J L CJASN 2012;7:1033-1038



Survival with CM

Challenging to study

RCT not practical

- Patients choose RRT vs CM
- When to enroll/when does clock start
- New causal inference methodologies?



Survival with CM

Da Silva-Gane CJASN 2012

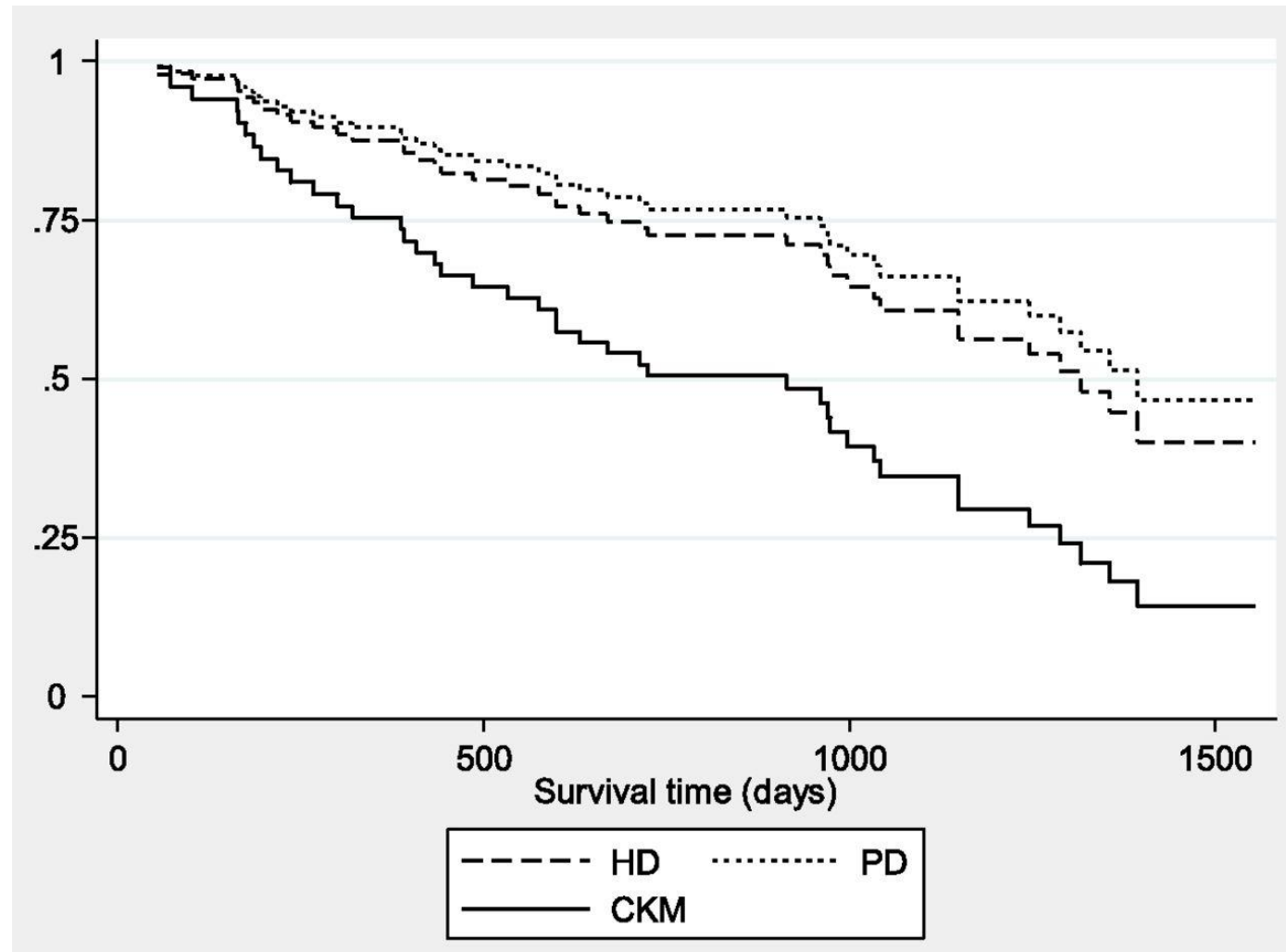
- “Low clearance clinic” – in practice meant eGFR was $<15 \text{ ml/min/1.73m}^2$
- Patients choose modality or CKM, reassessed/recommit at regular intervals
- Propensity score to control for selection bias in analyses

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.)



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

Verberne CJASN 2016

- Retrospective, single center
- Choose at enrollment – eGFR somewhat variable but generally $<20\text{ml/min/1.73m}^2$

Overall, survival from time of decision for age >70 was 3.1 years for RRT vs 1.5 years for CM

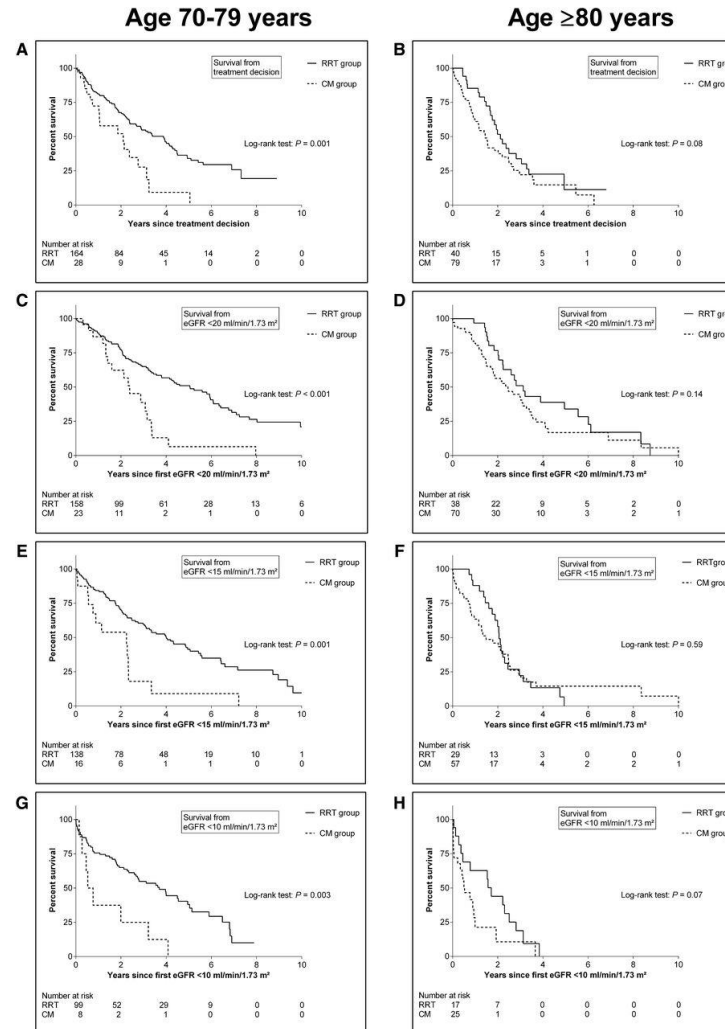
Intention to treat (ITT)?

- Many in both groups died before reached $\text{eGFR} <10\text{ml/min/1.73m}^2$ or never reached – power?
- studying theoretical decision more than the actual modality/outcome
- perhaps studying conservative management vs “usual” CKD Stage 5 care?

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



Survival with CM

Monez-Rath Annals of IM 2024

- “Targeted Trial” – like a simulated RCT using observational data
- Starting dialysis within 30 days of eGFR $<12\text{ml/min/1.73m}^2$ vs “medical management”
- ITT and Per protocol analysis

No difference in survival for ITT

- Nearly half of medical management crossed over to dialysis
- Studying whether dialysis initiated at first eGFR <12 vs any actual decision

Per Protocol analysis longer survival and less time at home with dialysis

For those 80 years of age and older, survival longer and time at home shorter with dialysis in both analyses



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)

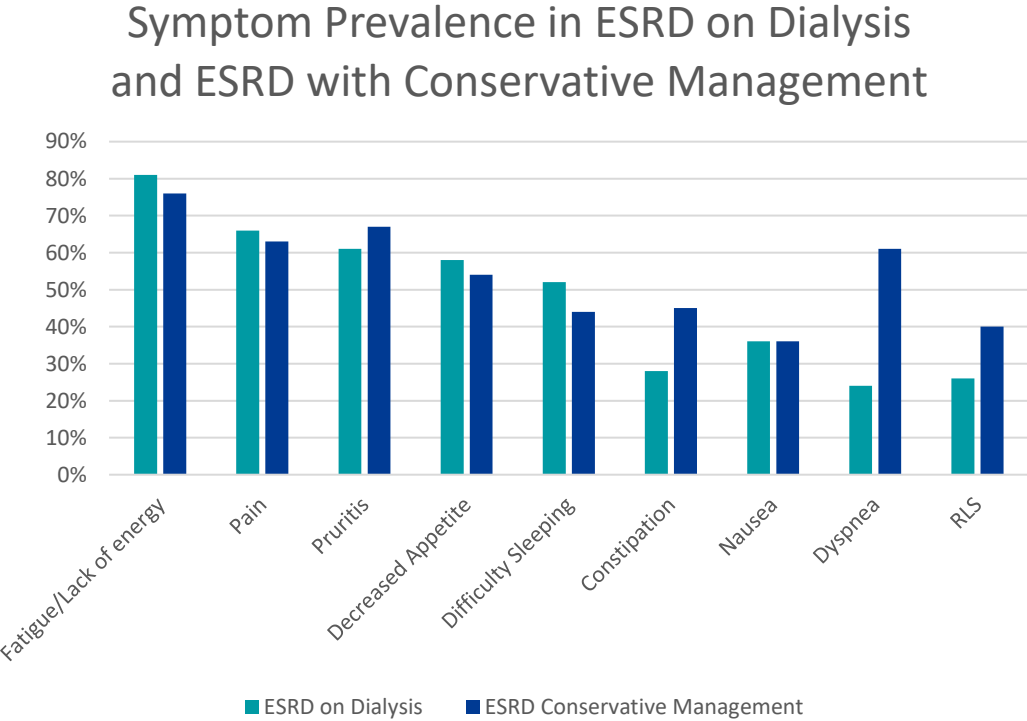
With conservative therapy, possibly preserved QOL compared to dialysis

- Da Silva-Gane: preserved Satisfaction with Life Score with CM

Symptoms?



Symptoms



Based on Almutary J Renal Care 2013

Table 2. Prevalence of symptoms^a

Symptom	ESRD (n = 90)	CKD (n = 87)	P value ^b
Feeling tired or lack of energy	71 (79)	68 (78)	1.0
Worrying	42 (47)	52 (59)	0.1
Dry skin	42 (47)	46 (53)	0.5
Itching	46 (51)	38 (44)	0.4
Trouble staying asleep	50 (56)	38 (44)	0.1
Trouble falling asleep	54 (60)	38 (44)	0.04
Feeling sad	30 (33)	37 (43)	0.2
Feeling irritable	33 (37)	37 (43)	0.5
Difficulty becoming sexually aroused	42 (47)	35 (40)	0.5
Bone or joint pain	30 (33)	34 (39)	0.4
Muscle cramps	45 (50)	33 (38)	0.1
Feeling anxious	28 (31)	33 (38)	0.3
Decreased interest in sex	39 (43)	31 (36)	0.4
Dry mouth	45 (50)	30 (34)	0.05
Constipation	23 (26)	30 (33)	0.3
Swelling in legs	22 (24)	28 (32)	0.3
Restless legs	35 (39)	28 (32)	0.4
Feeling nervous	26 (29)	27 (31)	0.9
Headache	23 (26)	26 (30)	0.6
Diarrhea	25 (28)	22 (25)	0.7
Decreased appetite	29 (32)	22 (25)	0.3
Cough	28 (31)	21 (24)	0.3
Muscle soreness	30 (33)	21 (24)	0.2
Nausea	24 (27)	21 (24)	0.7
Lightheadedness or dizziness	35 (39)	20 (23)	0.02
Shortness of breath	21 (23)	19 (22)	0.9
Difficulty concentrating	25 (28)	19 (22)	0.4
Numbness or tingling in feet	27 (30)	18 (21)	0.2
Vomiting	12 (13)	10 (11)	0.8
Chest pain	7 (8)	7 (8)	1.0

^aData reported as n (%).

^bAll P values are pre-Bonferroni correction.

Abdel-Kader CJASN 2009

Symptom assessment at any moment – possibly relieved by dialysis?



QoL with dialysis initiation

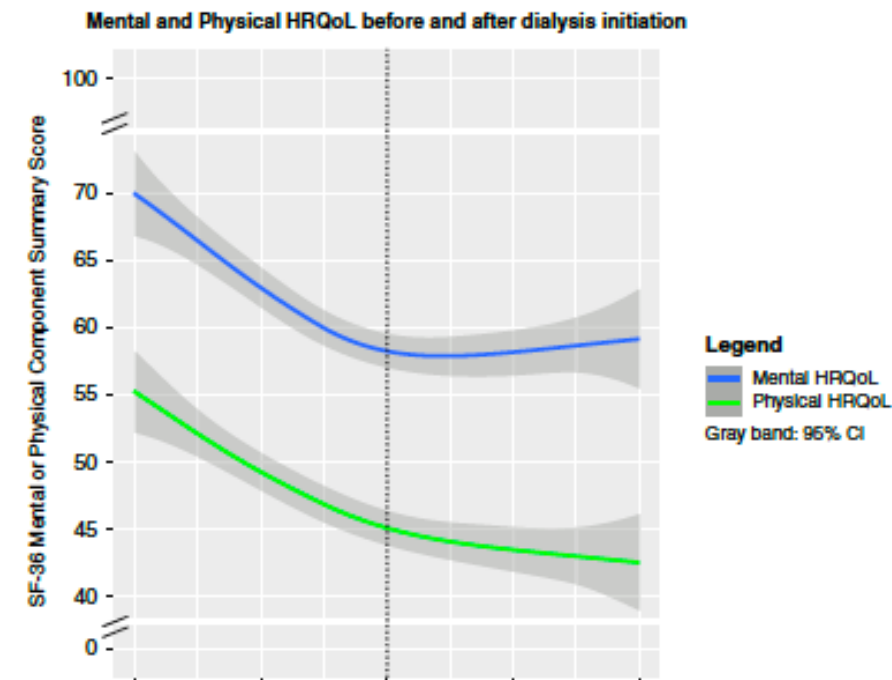
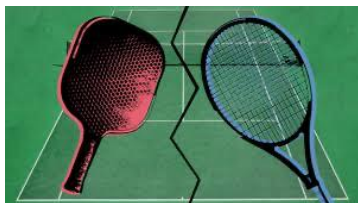
De Rooij CJASN 2022

- SF36 to assess QoL 1 year before and 6 months after initiation of dialysis, various sensitivity analyses

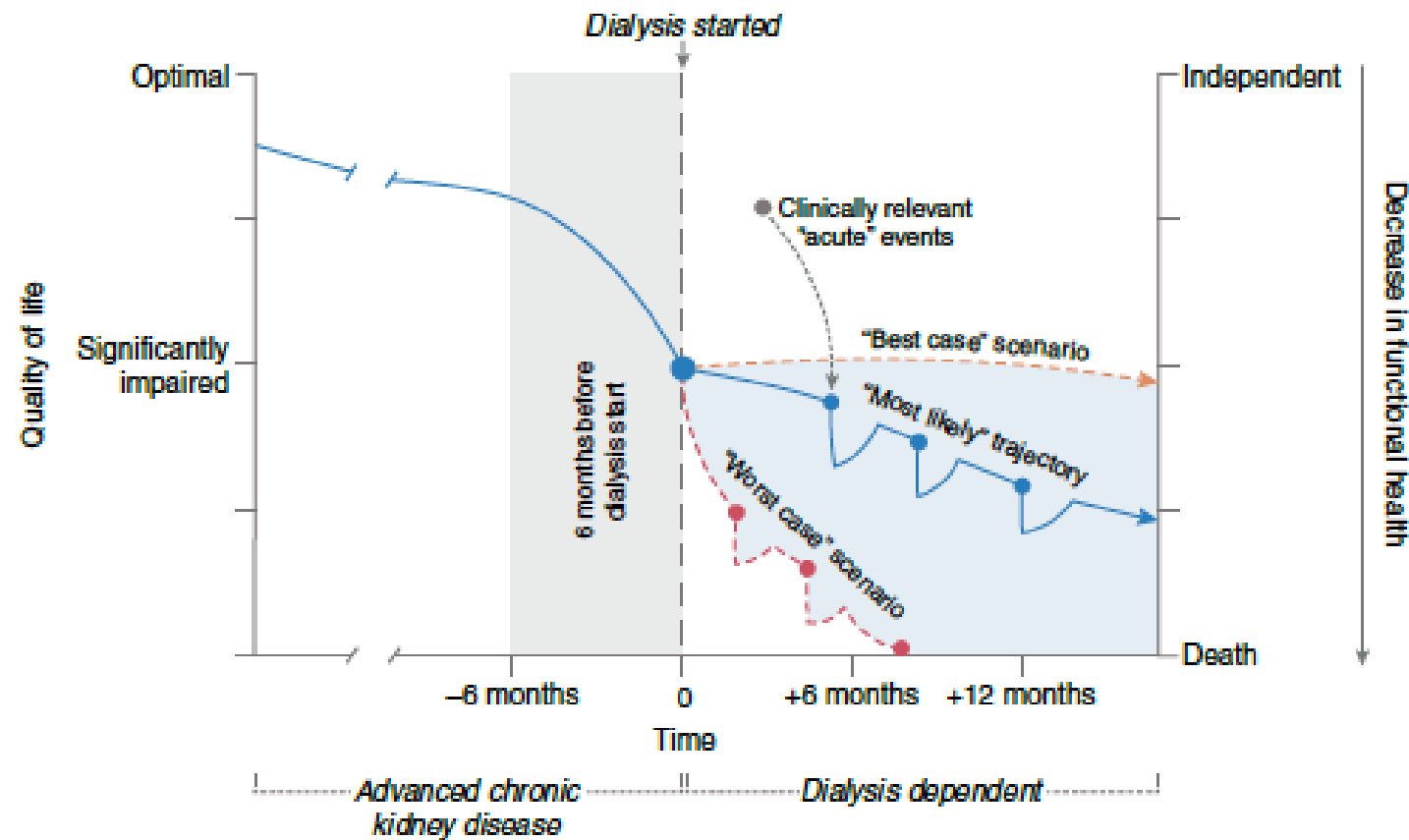
QoL preserved with initiation – a matter of perspective?

Limitations

- Missing data – systematically biased?
- Changing QoL perception
 - Response Shift Theory
 - Recalibration and Reprioritization



Revised construct



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



Answer

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



Question

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?



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