Benefits and Risks of Dialysis in the Very Elderly

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CASE 1

- The patient is a 90 year old female who developed acute on chronic kidney disease. She was in fulminant congestive heart failure with worsening electrolyte abnormalities.
- A decision was made to start dialysis using a temporary Internal Jugular vein catheter.
- She showed incremental improvement and was discharged to home for outpatient HD.
- She successfully received an AVF.
- She lived for 4 years with her husband and family and eventually died from complications of an inoperable sarcoma.
CASE 2

- The patient is a 79 year old male who developed ESRD.
- He has a daughter who can help him if needed and he chose to initiate Peritoneal Dialysis (PD).
- He has had some complications with the PD catheter which had to be replaced.
- He is doing well and appreciates the freedom and independence provided by PD.
The patient is an 82 year old female with significant history of DM 2, Hypertension, and Systolic HF resulting in advanced CKD.
She was declared ESRD at the request of her daughters and against her prior wishes not to go on dialysis. An access was placed but was found to be dysfunctional on admission to the HDU.
During the course of the following month she was admitted 3 times to the hospital and was sent to the access center at least 3 times for clotted AVG.
After a month in which she received only 2 full treatments in the outpatient dialysis unit and multiple admissions to the hospital she finally passed away.
One of her haunting last words to the attending doctor was, “You promised me you would not put me on dialysis!”
Dialysis as an Entitlement

• In 1972, after a month of deliberation, with the support of the medical community, Congress launched the nation's most ambitious experiment in universal health care: a change to the Social Security Act that would grant comprehensive coverage under Medicare to virtually anyone diagnosed with kidney failure, regardless of age or income.
Definitions

- End-Stage Renal Disease (ESRD): individuals with CKD Stage 5 = estimated glomerular filtration rate (eGFR) of less than 15 mL/min/1.73 m².

- Elderly is defined by age > 65.

- Very Elderly people > 80 years of age.
ESRD is becoming a geriatric condition.

Patients older than age 75 years outnumber those age 65–74 years.

>75 year old age group has the highest incident growth rate.

The US Renal Data System (USRDS) numbers: dialysis initiation rates are reported at 1744 per million population for those aged >75 years.

The Question?

- Does dialysis in the elderly provide benefits in terms of life expectancy and improved functional ability at the end of life?
Table 4. Percentage of remaining life expectancy for each age group with ESRD compared to the age-matched general population

<table>
<thead>
<tr>
<th>Age Group (yr)</th>
<th>Life Expectancy Compared with Age-Matched General Population (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65–69</td>
<td>22.4</td>
</tr>
<tr>
<td>70–74</td>
<td>23.7</td>
</tr>
<tr>
<td>75–79</td>
<td>25.7</td>
</tr>
<tr>
<td>80–84</td>
<td>28.8</td>
</tr>
<tr>
<td>≥85</td>
<td>44.2</td>
</tr>
</tbody>
</table>

USRDS data

Mean reported survival for patients aged 65 years or older (unless indicated otherwise) with and without renal replacement therapy (RRT).

There are many challenges encountered by the elderly that complicate their ESRD care.

- Initiation of renal replacement therapy (RRT) vs Conservative approach, Dialysis modality, Vascular access and Palliative care–Hospice are the aspects to be considered.

- The decision to initiate RRT in the elderly is complex.
Survival Rates in the Elderly

- Carson and colleagues reported survival rates vary from several months to years in elderly patients initiated on dialysis.

- In Canada the mean life expectancy after dialysis initiation is estimated at 3.2 years for those aged between 75 and 79 years at the start of dialysis.

- US survival rates are lower than in Canada and Europe.
Geriatric Assessment

- Frailty
- Falls
- Functional Impairment
Geriatric Assessment

- Consider:
  - Geriatric syndromes: frailty, falls, and functional impairment.
  - Aspects that predispose patients to increased morbidity and mortality.
  - Cognitive impairment and uremia may accentuate these issues in elderly patients with advanced CKD and ESRD.
Geriatric Assessment

- Frailty and CKD are associated with increased mortality.

- Studies suggest that >45% of elderly patients undergoing dialysis have one or more falls per year.

- In HD patients (mean age, 75 years), mortality increased with at least one fall.

- Elderly dialysis patients experience significant functional impairment.
<table>
<thead>
<tr>
<th>Criteria for frailty</th>
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<tbody>
<tr>
<td>Unintentional weight loss</td>
</tr>
<tr>
<td>Slow walking speed</td>
</tr>
<tr>
<td>Weakness</td>
</tr>
<tr>
<td>Exhaustion</td>
</tr>
<tr>
<td>Low physical activity</td>
</tr>
</tbody>
</table>

### Activities of daily living and instrumental activities of daily living

<table>
<thead>
<tr>
<th>Activities of Daily Living</th>
<th>Instrumental Activities of Daily Living</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating</td>
<td>Medication management</td>
</tr>
<tr>
<td>Dressing</td>
<td>Maintaining personal finances</td>
</tr>
<tr>
<td>Toileting</td>
<td>Cooking</td>
</tr>
<tr>
<td>Maintaining personal hygiene</td>
<td>Driving</td>
</tr>
<tr>
<td>Transferring</td>
<td>Shopping</td>
</tr>
<tr>
<td>Bed mobility</td>
<td>Telephone use</td>
</tr>
<tr>
<td>Walking</td>
<td>Care of pets</td>
</tr>
</tbody>
</table>

Manjula Kurella Tamura et al. reported marked decline in functional status in 371 nursing home patients (mean age, 73.4 years) 3 months before initiation of maintenance dialysis.

Only 39% maintained baseline function 3 months after initiation, and only 13% did so by 12 months.

12-month mortality was 58% after initiation.
Several studies have suggested that dialysis initiation may exacerbate, or cause, functional and/or cognitive decline.

Early functional decline is reflected in the high rates of functional disability and frailty seen in prevalent dialysis patients.

The cause of the increased burden of functional decline is unclear.

The decision to initiate RRT in the elderly is much more complicated than in younger patients.

Elderly patients, in addition to geriatric syndromes, are more likely to have social issues including limited transportation, family support, and income.

It is well known that elderly patients have more cardiovascular and overall comorbid conditions and reduced life expectancy compared to younger patients.
The IDEAL Study

- The IDEAL (Initiating Dialysis Early and Late) study found no benefit for early initiation of dialysis in the Elderly (CKD5, >75y/o).

- Couchoud et al. validated a 6-month prognostic tool for incident elderly dialysis patients using clinical factors.
<table>
<thead>
<tr>
<th>Variables in the prognostic model to predict 6-month survival for patients undergoing maintenance hemodialysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Surprise&quot; question(^a) (yes or no)</td>
</tr>
<tr>
<td>Dementia (yes or no)</td>
</tr>
<tr>
<td>Peripheral vascular disease (yes or no)</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Serum albumin</td>
</tr>
</tbody>
</table>

Data obtained from reference 32. The model is available as an online calculator: [http://www.qxmd.com/apps/calculate-by-qxmd](http://www.qxmd.com/apps/calculate-by-qxmd).

\(^a\) "Would I be surprised if this patient died in the next year?"
Prognostic Model to predict 6-month Survival for ESRD Patients >75 years who Initiated Dialysis

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total dependence for transfers</td>
<td>3</td>
</tr>
<tr>
<td>BMI &lt;18.5 kg/m²</td>
<td>2</td>
</tr>
<tr>
<td>Peripheral vascular disease stage 3 or 4</td>
<td>2</td>
</tr>
<tr>
<td>Congestive heart failure stage 3 or 4</td>
<td>2</td>
</tr>
<tr>
<td>Severe behavioral disorder</td>
<td>2</td>
</tr>
<tr>
<td>Unplanned dialysis initiation</td>
<td>2</td>
</tr>
<tr>
<td>Active malignancy</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1</td>
</tr>
<tr>
<td>Dysrhythmia</td>
<td>1</td>
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<table>
<thead>
<tr>
<th>Total Score</th>
<th>6-Month Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8%</td>
</tr>
<tr>
<td>1</td>
<td>8-10%</td>
</tr>
<tr>
<td>2</td>
<td>14-17%</td>
</tr>
<tr>
<td>3-4</td>
<td>21-26%</td>
</tr>
<tr>
<td>5-6</td>
<td>33-35%</td>
</tr>
<tr>
<td>7-8</td>
<td>50-51%</td>
</tr>
<tr>
<td>≥9</td>
<td>62-70%</td>
</tr>
</tbody>
</table>

Does Dialysis Provide a Survival Advantage?

- Do older adult patients with CKD stage 5 have survival advantage when treated with dialysis compared with conservative management?
Complex decision planning process for elderly patients with ESRD.

Abbreviation: ESRD, end-stage renal disease.

Elderly patients with CKD—dilemmas in dialysis therapy and vascular access Tushar J. Vachharajani, Louise M. Moist, Marc H. Glickman, Miguel A. Vazquez, Kevan R. Polkinghorne, Charmaine E. Lok and Timmy C. Lee

Conservative Management of CKD5

- Conservative management focuses on optimizing quality of life including:
  - advance care planning
  - provision of symptomatic care
  - pain management
  - coordinated end of life care
  - timely hospice care
  - psychologic and bereavement support
  - multidisciplinary approach

Raghavan et al. indicate that dialysis may not offer a survival advantage or an improvement in functional status and better quality of life among older patients with stage 5 CKD, especially those living with a high burden of comorbidities, functional impairment, or chronic malnutrition.

- Dialysis was associated with increased hospitalizations

- Dialysis reduces likelihood of dying at home or in a hospice, compared with conservative management.
Verberne et al. published a retrospective single-center cohort study from the Netherlands that followed patients ages >70 years old over the period of a decade (2004–2014).

The study included 204 patients who were treated with dialysis (although four people underwent renal transplantation, three of which had a transplant after dialysis) and 107 patients who were treated with conservative management.
They found a higher overall median survival for patients treated with dialysis compared with those treated with conservative management, regardless of the starting point at the patients.

This survival advantage observed from the dialysis group was substantially reduced in patients with cardiovascular comorbidity and those with higher comorbidity in general.
Figure 4. Kaplan–Meier survival curves for both treatment groups ages ≥70 years old with stratification of comorbidity. (A) No and intermediate comorbidity are taken together and correspond to Davies comorbidity scores of 0–2. (B) Severe comorbidity corresponds to Davies comorbidity scores of ≥3. Only survival calculated from time of modality choice is shown. Similar results were observed using the other starting points. CM, conservative management.
A statistically significant survival advantage was no longer observed between the treatment groups when focusing on patients who were ages >80 years old, regardless of the starting point.
Kaplan–Meier survival curves comparing both treatment groups with stratification of age using different starting points in survival calculation. (A and B) Time of treatment decision. (C and D) Time of first eGFR < 20 ml/min per 1.73 m². (E and F) Time of first eGFR < 15 ml/min per 1.73 m². (G and H) Time of first eGFR < 10 ml/min per 1.73 m². CM, conservative management.
Many of the other papers published comparing survival between dialysis and conservative management using observational data were not able to adjust for many of the other potential confounders such as: treatment selection bias and level of functional impairment and frailty.

There are no United States outcomes data for nondialytic conservative management.
Types of Renal Replacement Therapies Used In Elderly ESRD Patients

Dialytic care (renal replacement therapy)

- In-center HD
- PD, typically offered as a home dialysis modality
- Home HD
In the USA, the initial modalities of renal replacement therapy in patients aged >65 years with ESRD are:

- In-centre hemodialysis (93–98%)
- Peritoneal dialysis (2–5%)
- Preemptive kidney transplantation (0–2%), and
- Home hemodialysis (<1%)

Types of Renal Replacement: Hemodialysis

- HD is most commonly used in older patients because it does not require the patient to be actively involved in the therapy.

- An important disadvantage is travel restriction.

- One of the most significant disadvantages of HD is the need to travel to the dialysis center.

- Another aspect of HD that differs by age is the method of vascular access used.
Box 1 | Permanent vascular access planning in ESRD

Factors to consider in the elderly
- Predicted life expectancy
- Degree of independence in activities of daily living
- Vascular biology
- Probability of successful access maturation
- Potential for complications
- Need for interventions
- Avoidance or limitation of the use of a central venous catheter for haemodialysis
- The opinions of the patient’s family and friends
- The potential impact of access choice on the quality of life of the patient’s main caregivers

Abbreviation: ESRD, end-stage renal disease.

Elderly patients with CKD—dilemmas in dialysis therapy and vascular access Tushar J. Vachharajani, Louise M. Moist, Marc H. Glickman, Miguel A. Vazquez, Kevan R. Polkinghorne, Charmaine E. Lok and Timmy C. Lee

Vachharajani and colleagues, argue that access creation be offered only to those patients with a life expectancy greater than 180 days.

Moist and colleagues, argue that fistula creation be limited, among older patients, to those with few comorbidities and a life expectancy on dialysis of longer than 1 to 2 years.
Elderly patients have both increased comorbidities and decreased survival.

They also have higher rates of adverse events related to the procedure (i.e. revisions and interventions).

Elderly patients might die even before using vascular access.
Choice of Dialysis Access

- These investigators recommend graft use in those with an intermediate life expectancy.

- Insertion of a semipermanent tunneled line should be considered for those with limited life expectancy starting dialysis therapy.
Home Dialysis Encompasses both Home HD and PD

- Age is not a contraindication for home HD or PD.
- The absolute survival advantage from HD over PD is clinically insignificant.
- For patients choosing PD, the main advantage is quality of life, integrating their own dialysis treatment schedule into their own lifestyle, allowing them more freedom to pursue personal activities and interests.
Home Dialysis

- The 2 most common challenges are the need for increased support to manage their own care and the risk of infection.
- Recent larger studies have suggested that the rate of peritonitis is not age dependent.
- Nocturnal dialysis has not been studied in the elderly.
- Given available data, dialysis modality choice in elderly patients should be individualized, with consideration of comorbid conditions, cognitive function, social support, and functional status.
A single-center study of patients who initiated dialysis between 2000 and 2005 and were 80 years or older found that more than 30% of patients experienced functional loss within 6 months.

In those starting peritoneal dialysis, 32.5% required either professional caregiver support or transfer to a nursing home.

Similarly, elderly nursing home patients experienced a sharp permanent decline in functional status over a 3-month period after starting chronic dialysis therapy.
Health Issues in the Dialysis Patient

Fig. 3. Effect of dialysis initiation on a variety of health issues. Collectively these may accentuate worsening of geriatric morbidity. MIA, malnutrition, inflammation, and atherosclerosis.
Table 5. Rates of withdrawal from dialysis by age group among prevalent patients

<table>
<thead>
<tr>
<th>Age Group (yr)</th>
<th>Percentage Withdrawing from Dialysis (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–44</td>
<td>12</td>
</tr>
<tr>
<td>45–64</td>
<td>16</td>
</tr>
<tr>
<td>65–74</td>
<td>23</td>
</tr>
<tr>
<td>75–84</td>
<td>30</td>
</tr>
<tr>
<td>≥85</td>
<td>35</td>
</tr>
</tbody>
</table>


Conclusions and Future Directions

- RRT decision-making in the elderly requires consideration of factors more common in this population, including functional and cognitive impairment and cardiovascular disease.

- If severe impairment exists, nondialytic management, including palliative care and hospice, may be appropriate.

- In those with less impairment but severe comorbidity, conservative management (in conjunction with palliative care) is an alternative.
Conclusions and Future Directions

- Transplantation is an option in those with less comorbidity.
- PD and HD are acceptable RRT modalities. Individual preferences and social support must be considered.
- After initiation, patients should be monitored for functional or cognitive decline.
Conclusions and Future Directions

- If such decline is present, RRT withdrawal and palliative or hospice services may be reasonable.

- Underuse of PD presents a potential area for growth.
Thanks