

CKD in the Elderly

Continued from page 11

guidelines suggesting preemptive fistula creation in patients planning for hemodialysis do not differentiate between the 40-year-old and 80-year-old patient with stage 4/5 CKD. However, older patients are at higher than normal risk of fistula failure-to-mature; death prior to dialysis-need; and only have modest survival rates after dialysis initiation.

In the recently published ASN geriatric nephrology curriculum Seth Wright and John Danzinger discuss in detail the benefits, and risks, of fis-

tula creation and advocate caution and careful consideration prior to referral for surgery. One option is to consider delaying fistula creation for three to six months while the older patient is established onto dialysis and adjusts to their new lifestyle.

The use of the CGA helps clinicians appreciate that the detection and management of CKD in elderly individuals requires ongoing collaboration with allied health and palliative care teams, geriatricians, as well as the family and patient. An appreciation of the impact that renal disease has on diet, lifestyle and well-being is necessary. To this point, it is humbling and insightful to

take a few minutes to hear the patient's perspective (<http://www.youtube.com/watch?v=EOciMaCyJW4>). ●

Suggested reading

1. American Society of Nephrology Geriatric Nephrology Curriculum http://www.asn-online.org/education_and_meetings/geriatrics/ accessed 31 Dec 2010.
2. NephSAP 2011, volume 10 Geriatric Nephrology, January 2011.
3. Coresh J, Selvin E, Stevens LA, et al. Prevalence of chronic kidney disease in the United States. *J Am Med Assoc* 2007; 298:2038–2047.
4. Shlipak MG, Katz R, B. Kesten-

baum, et al. Rapid decline of kidney function increases cardiovascular risk in the elderly. *J Am Soc Nephrol* 2009.

5. Anderson S, Halter JB, Hazzard WR, et al. Prediction, progression, and outcomes of chronic kidney disease in older adults. *J Am Soc Nephrol* 2009; 20:1199–1209.
6. S. V. Jassal and D. Watson. Doc, don't procrastinate...Rehabilitate, palliate, and advocate. *Am J Kidney Dis*. 2010; 55:209-212, 2010.

Vanita Jassal is a staff nephrologist at the University Health Network and associate professor at the University of Toronto.

Special Considerations for Dialysis in the Elderly

By Yi-Wen Chiu and Rajnish Mehrotra

In the United States, as in many other developed countries, the incidence of treated end stage renal disease (ESRD) increases with advancing age; the highest rates are observed in individuals between the ages of 75 and 79 (Figure 1) (1). There is concern, however, that the functional rehabilitation of elderly dialysis patients is often unsatisfactory and the gain in life expectancy with renal replacement therapy is rather modest. This should not be surprising, because elderly patients with ESRD have a significantly greater burden of coexisting illnesses and are more likely to be frail.

Unique psychosocial issues that interplay with medical conditions must be factored in when planning for renal replacement therapy for the elderly. Consequently, nephrologists grapple with several important issues when dealing with an elderly patient with advanced chronic kidney disease (CKD): Is dialysis planning appropriate for all elderly CKD patients? Does dialysis therapy improve the functional status and increase the life expectancy of the frail elderly, and is there a role for maximum conservative therapy? Does dialysis increase the risk of death in elderly patients if started at a higher level of estimated glomerular filtration rate (eGFR)? Is one dialysis modality better than the other for elderly patients with ESRD?

Dialysis planning for the elderly: for whom, and when?

One of the areas in the field of nephrology with the greatest opportunity to improve the management of patients is the time of dialysis initiation. To improve the early outcomes of ESRD patients, it is often recommended that dialysis planning begin when the eGFR decreases to <30 mL/min/1.73 m². However, several epidemiologic studies from unselected populations have shown that in patients with advanced CKD, the risk for death is higher than the future need for dialysis; this is

the case for the elderly, in particular (2). Therefore, dialysis planning can be futile if it is to begin for every elderly patient with eGFR <30 mL/min/1.73 m².

Recent studies suggest that individuals with significant proteinuria, or an underlying primary renal disease, or with declining trajectory of renal function are more likely to need dialysis. If these issues, along with the patient's functional status, are factored in when deciding which elderly patients with low eGFR should begin preparing for dialysis, the potential futility of the process could be reduced.

A role for maximum conservative management?

The life expectancy of patients starting dialysis therapy in the United States is about one-quarter of age- and sex-matched individuals without kidney disease, and elderly patients starting dialysis are no exception (1). The median life expectancy of dialysis patients between the ages of 75 and 79 is 2.9 years, compared with 10.8 years for individuals in the general population (3).

A recent study has focused on the dismal outcomes of frail elderly nursing home residents. An overwhelming majority of such patients experienced continued functional decline and/or death within 12 months of starting dialysis (4). Studies such as this suggest that in frail individuals with advanced CKD, starting dialysis may not necessarily improve their functional status and/or increase their life expectancy. These observations have also spurred interest in considering maximum conservative care as one of the therapeutic options for frail elderly patients with advanced CKD in lieu of preparation for dialysis, including anemia correction with erythropoietin, loop diuretics to prevent volume overload, phosphate-binders to manage itching, and potassium restriction as the only dietary intervention (5).

Choosing between maximum conserv-

ative management and renal replacement therapy requires shared decision-making that should involve the nephrologist, the patient, and the patient's family. A time-limited trial of dialysis may facilitate decision-making for some patients. Patients who choose maximum conservative management or withdraw from dialysis after a time-limited trial may also be appropriate candidates for hospice care at some stage of their disease.

What is the optimal time to begin dialysis therapy?

In the United States, patients are starting dialysis therapy at progressively higher levels of eGFR; the higher the age, the greater the proportion of individuals who begin dialysis at an eGFR >10 mL/min/1.73 m² (1, 6). Several observational studies have shown an inverse relationship between eGFR at the start of renal replacement therapy and the subsequent risk for death, leading some to argue that it is the dialysis treatment itself that is at least partly responsible for the higher mortality in patients who start dialysis early (7). However, the same studies indicate that patients who begin dialysis at higher levels of eGFR are much more likely to be men, elderly, diabetic, and with greater cardiovascular comorbidity (7).

Given the lack of detail about the clinical status of individual patients in national registries such as the U.S. Renal Data System, it is unlikely that statistical adjustments will account for the greater disease burden of patients who begin dialysis at higher levels of renal function. Furthermore, the results of the recently published IDEAL study indicate that starting dialysis at higher levels of eGFR does not itself increase the risk for death (8). These considerations suggest that in symptomatic individuals, it is safe to start dialysis even if the eGFR is >10 mL/min/1.73 m². Conversely, dialysis may be safely withheld in otherwise asymp-

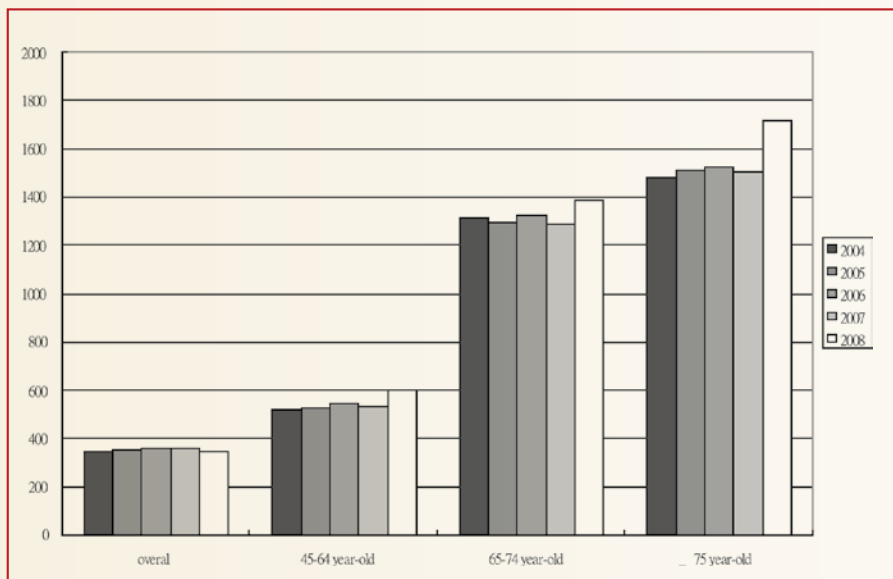
tomatic individuals with lower eGFR. However, the results of the IDEAL study suggest that many elderly CKD patients with declining renal function are likely to require dialysis at higher levels of renal function (8).

Is one dialysis modality better than the other for elderly patients with ESRD?

The overwhelming majority of ESRD patients in the United States are treated with in-center hemodialysis; peritoneal dialysis remains the dominant home dialysis modality (1). Numerous observational studies have compared the outcomes of patients treated with in-center hemodialysis and peritoneal dialysis. These studies suggest that elderly patients treated with peritoneal dialysis, particularly those with diabetes mellitus and/or coexisting illnesses, have a somewhat shorter survival than those treated with in-center hemodialysis (9). However, over the past decade in the United States, improvements in the outcomes of peritoneal dialysis patients have outpaced those seen with in-center hemodialysis patients (10). Thus, in the most recent cohorts, the differences in survival seen in patients treated with either dialysis modality have substantially narrowed and are probably not clinically meaningful (11).

These findings suggest that the survival studies should have little if any bearing when assisting elderly patients and/or their families in selecting an appropriate dialysis modality. On one hand, the burden of coexisting diseases, frailty, and social isolation may make in-center hemodialysis a particularly attractive therapeutic option for many elderly ESRD patients. On the other hand, the ability to undergo dialysis at home may be perceived by some elderly patients as the best method for them to maintain their independence and dignity. Peritoneal dialysis has been successfully performed by octogenarians and nonagenarians, and this

Figure 1. Incidence of treated end stage renal disease in the United States



may be further facilitated by identifying family members or other support services that may provide assistance to patients to undergo home dialysis (12). Success of this concept of assisted home peritoneal dialysis has been reported from Canada, Denmark, and France, and should be considered for appropriate individuals. It follows, then, that the best dialysis modality for a patient is the one that best fits into their lifestyle and their expectations and goals for their care. Hence, all patients and/or

their families should be offered the choice of all dialysis modalities whenever feasible under the oversight and encouragement offered by the health care team.

In conclusion, there are many unique challenges in the care of elderly ESRD patients. These challenges begin from the time of preparation for dialysis therapy to initiation and subsequently the maintenance of dialysis therapy. It is important to focus not only on longevity but also on quality of life and quality of death. ●

Yi-Wen Chiu is affiliated with Kaohsiung Medical University. Rajnish Mehrotra is affiliated with Los Angeles Biomedical Research Institute at Harbor-UCLA and David Geffen School of Medicine at UCLA. Rajnish Mehrotra has received grant support and honoraria from Baxter Health Care.

References

1. US Renal Data System. *UADRAoCK-DaE-SRDitUS*, Bethesda, MD, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 2010.
2. Keith DS, et al. Longitudinal follow-up and outcomes among a population with chronic kidney disease in a large managed care organization. *Arch Intern Med* 2004; 164:659–663.
3. US Renal Data System. *UADRAoCK-DaE-SRDitUS*, Bethesda, MD, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 2009.
4. Kurella Tamura M, et al. Functional status of elderly adults before and after initiation of dialysis. *N Engl J Med* 2009; 361:1539–1547.
5. Carson RC, et al. Is maximum conservative management an equivalent treatment option to dialysis for elderly patients with significant comorbid
6. Rosansky SJ, et al. Initiation of dialysis at higher GFRs: is the apparent rising tide of early dialysis harmful or helpful? *Kidney Int* 2009; 76:257–261.
7. Kazmi WH, et al. Effect of comorbidity on the increased mortality associated with early initiation of dialysis. *Am J Kidney Dis* 2005; 46:887–896.
8. Cooper BA, et al. A randomized, controlled trial of early versus late initiation of dialysis. *N Engl J Med* 2010; 363:609–619.
9. Jiwakanon S, et al. Peritoneal dialysis: an underutilized modality. *Curr Opin Nephrol Hypertens* 2010; 19:573–577.
10. Mehrotra R, et al. Chronic peritoneal dialysis in the United States: declining utilization despite improving outcomes. *J Am Soc Nephrol* 2007; 18:2781–2788.
11. Mehrotra R, et al. Similar outcomes with hemodialysis and peritoneal dialysis in patients with end-stage renal disease. *Arch Intern Med* 2010.
12. Dimkovic NB, et al. Chronic peritoneal dialysis in octogenarians. *Nephrol Dial Transplant* 2001; 16:2034–2040.

Hypertension in the Elderly: Two Decades Later, What Have We Learned Since the SHEP Trial?

By Madhav Rao and George Bakris

Hypertension is common in people 60 and older. With increasing age, it is more likely that someone will experience hypertension and die of coronary heart disease even in the prehypertension range (1, 2) (Figure 1). According to the National Health and Nutrition Examination Survey (NHANES) 1999 to 2006, approximately 67 percent of adults in the United States 60 and older had hypertension, a 10 percent increase from NHANES 1988 to 2004 (3). African Americans and women had a higher prevalence of hypertension than did white individuals, and in those 70 and older the hypertension was more poorly controlled than in those 60–69 (3) (Figure 2).

Definition and significance of hypertension

The Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7) defines stage 1 hypertension as a systolic BP ≥ 140 mm Hg or a diastolic BP ≥ 90 mm Hg (4). Isolated systolic hypertension is a systolic BP ≥ 140 mm Hg but a diastolic BP of ≤ 90 mm Hg. It affects about two thirds of individuals above age 60 and approximately 75 percent of those over age 75. Among

older individuals, systolic BP is a stronger predictor of cardiovascular disease events and end stage renal disease (5).

Aging and pathophysiology of hypertension

Aging is associated with a reduction in arterial compliance, primarily affecting the aorta and other large blood vessels. Alterations of various collagens in the vessel wall decrease elasticity and increase fibrosis and sclerosis of the blood vessels. As a result, arterial stiffness increases, and distensibility of the larger arteries decreases, resulting in widened pulse pressure. The Framingham Heart Study suggested that both systolic and diastolic BP increase in parallel until the age of 50. Thereafter, systolic BP continues to rise and diastolic BP drops, resulting in a widened pulse pressure (6).

Salt sensitivity is defined as an increase in systolic pressure of >10 mm Hg over a few hours after the intake of a fixed amount of salt. Salt sensitivity plays an important role in the pathophysiology of hypertension in the elderly. Older individuals are relatively more salt sensitive than are people under age 50 because of a variety of factors, including reduced nitric oxide from the endothelium in response

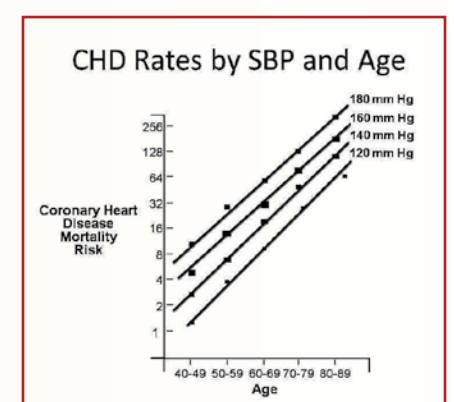
to various stimuli, loss of integrity of various collagen subfractions, and altered handling of sodium by the kidney. Some contributing factors in the kidney include reduced generation of prostaglandins and dopamine in response to vasoconstrictor stimuli, and increased oxidant stress directly mediated by high sodium intake (7, 8). Age-associated decline in the activity of membrane sodium/potassium-ATPase may increase intracellular sodium and reduce sodium-calcium exchange. This increases intracellular calcium and vascular resistance. Reductions in cellular calcium efflux due to reduced calcium-ATPase activity may have a similar effect (9).

BP goal in the elderly

The JNC 7 guidelines suggest a goal BP of $<140/90$ mm Hg in all patients, including the elderly. However, we have learned from the Systolic Hypertension in Elderly Program (SHEP) that among patients with isolated systemic hypertension, reduction of diastolic BP below 60–65 mm Hg after the initiation of antihypertensive therapy is associated with higher cardiovascular event rates. Since the SHEP, several retrospective studies have supported this contention (10–12). The results of these

analyses suggest that optimal reduction in diastolic BP in the elderly should not exceed 60–65 mm Hg during attempts to reduce the systolic BP below 140 mm Hg. The key exception to this recommendation is a history of angina; patients so affected should maintain a diastolic pressure >80 mm Hg.

Figure 1. Coronary heart disease risk in the context of age and level of BP. Data adapted from Lewington et al. (1) and Weber (2).



Continued on page 14