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## It is not polite to ask a dialysis patient his age!

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So-called “seniors”, i.e., those older than 65 years, constitute the fastest growing population group in United States. According to the 2008 United States census bureau report, the number of elders grew from 29.6 million in 1990 to 36.8 million in 2008, representing a 20% incremental growth (<http://www.census.gov>). Consequent to the absolute increase in elderly individuals in the population pyramid, the prevalence and incidence of chronic disease states, such as hypertension, diabetes mellitus, coronary

artery disease, heart failure, and chronic kidney disease (CKD), have also risen in the overall population [1–3]. In particular, CKD including the end-stage renal disease (ESRD) has reached pandemic dimensions and is quite common in the elderly [4]. Currently, over 50% of dialysis patients in United States and Canada are older than 60 years [5]. There is an ongoing discussion as to whether the clinical outcomes of renal replacement therapy including dialysis treatment and kidney transplantation justify these expensive therapy modalities in the elderly. Three important clinical outcomes of interest include mortality, hospitalization, and health-related quality of life (HRQoL).

In this current study by Sun et al. [6], the outcome of hospitalization in the elderly on dialysis was nicely highlighted. The results of the study by Sun et al. may be summarized as follows: incident hemodialysis patients (over a 15 year period) who had follow up for at least 6 months were analyzed for the number of hospitalizations per person year. They were divided into 3 groups: those over 70 (group A), those less than 70 for the entire study period (group B), and those less than 70 at the beginning of the study period but over 70 at the end of the HD period (group C). No differences were found between younger and older dialysis patients in the overall number of hospitalizations. A total of 412 patients were analyzed, 44 of whom were over the age of 80. Of note, group A contained a lower percent of diabetics; they were 20 years older on average and had a lower

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compliance with their HD schedule (defined as missing 2 or more of HD days monthly). There were a higher number of hospitalizations for surgery and trauma in group A compared to group B. For vascular access issues, advanced age at onset of dialysis became significant with logarithmic transformation of the data for admission rate and number of hospital days. With linear but not logarithmic interpretation of the data, advanced age at the start of dialysis was a predictor for non-vascular related hospitalization rates and number of days [6]. Thus, the outcome of hospitalization rate is not a distinguishing factor between the elderly and those not on dialysis.

The elderly do have a higher degree of morbidity and mortality in many health conditions [7]. Previous studies by Tzamloukas et al. have demonstrated age to be an independent risk factor for death during hospitalization [8]. Hospitalization rates are part of the assessment of HRQoL and morbidity and as such the rate of hospitalization is an important factor to be considered in decisions made whether or not to dialyze patients. The RPA/ASN guidelines state that it is “appropriate to say ‘no’” to dialyzing patients who have an extremely poor prognosis. The populations the guidelines address include those with low albumins, low functional status, and comorbid conditions [9]. The Charlson Comorbidity Index, which was designed to predict mortality during hospitalization, is a commonly used tool to quantify comorbidity; it includes age (for each decade above 40, a score of one is added) [10]. Thus, advancing age is an inherent issue in the current view of assessment for suitability for dialysis. Recent papers have addressed the futility in placing accesses in those with advanced age with multiple comorbidities [11] and have given credence to the option of conservative management in select cases [55]. In our attempt to contain health care costs and to maximize benefits of the care we do provide, the elderly have become a vulnerable population. Age is an objective and easily quantified factor. Unfortunately, it does not encompass a large part of what it means to live well, and so to use it as an independent factor in not offering therapy may lead to a slippery slope.

Mortality is an inescapable issue in this debate. Data from the United States Renal Data System (USRDS) indicate that patients aged 65 or older undergoing dialysis have a median life expectancy of approximately 4 years, which is markedly lower than

that of a patient of the same age without ESRD [12]. In a Canadian study of ESRD patients older than 75 years, survival at 1, 3, and 5 years was 69%, 37%, and 20% respectively [13, 14]. Nevertheless, some observational studies have found significantly greater survival of those elderly ESRD patients who initiated dialysis versus those treated conservatively [15–17]. It is not clear, however, which dialysis modality is better for elderly patients. In one study, the relative risk for death was higher among elderly diabetics undergoing peritoneal dialysis (PD) than those on hemodialysis [18], whereas several other studies found no difference between the two modalities [19, 20] including among elderly diabetics [19]. Notwithstanding such inconsistent data, PD still appears to be an appropriate dialysis option for elderly ESRD patients [7, 21].

Kidney transplantation is another renal replacement therapy in lieu of dialysis and is believed to improve HRQoL and survival in ESRD patients [22]. Factors associated with mortality, such as residual renal function, previous time on dialysis, sleep disorders or bone and mineral metabolism disorders [23–26], might be also associated with HRQoL in kidney transplanted patients [23]. Moreover, HRQoL is an important predictor of outcomes in kidney transplanted patients [27]. Kidney transplantation is the treatment of choice for most ESRD patients independent of age [28–30]. However, the generalizability of the studies comparing survival after renal transplantation with dialysis therapy is compromised by such methodological flaws as selection bias [31, 32]. Studies with fewer methodological limitations indicate a survival advantage with transplantation among the elderly including recipients of “extended criteria donor” kidneys, when compared to dialyzed elderly patients [29, 33–37]. Wolfe et al. [29] compared the survival of primary deceased donor transplant recipients with other dialysis patients and found that among renal transplant recipients patients aged 60–74 years, the cumulative survival rate improved after the first year post-transplantation. More recent studies indicate that in elderly ESRD patients, survival at 1, 5, and 10 years is approximately 80% to 90%, 70%, and 50% respectively [38–46]. In the United States there are currently over 16,000 ESRD patients older than 65 years waiting for a kidney transplantation, representing 18% of all listed candidates [1]. Some studies have attempted to

identify factors that would predict outcomes in elderly kidney transplanted recipients. Most recently, Heldal et al. [47] found that acute rejection in the first 90 days, and donor age  $\geq 60$  years predicted lower patient survival; whereas delayed graft function, donors aged 60 years or older, and HLA antibodies were associated with increased death-censored graft loss. Gill et al. [48] found that elderly recipients of transplanted kidneys from living donors aged  $>55$  years had inferior 3-year graft survival (86%) but similar 3-year patient survival rates (88%) when compared to their transplanted counterparts with living donors  $\leq 55$  years.

The greater goal of medicine is to improve the lives of our patients. Placing hospitalization rates and mortality in this context is pragmatic. The World Health Organization defines the *quality of life* (QoL) as an “individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns”. The term health-related QoL pertains to both physical and psychological factors that are related to health status [49]. The Institute of Medicine defines the *quality of care* as the degree to which health care services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge [50]. The challenge for nephrologists is to provide high quality of care that also improves HRQoL in a cost-effective manner. Given the rising size of the ESRD population, the growing burden of ESRD demands that quality of care meet its cost. In 1994, the Institute of Medicine held a workshop to generate a guide to assess quality of care in dialysis patients and to include HRQoL measures [51]. The workshop highlighted the need to include functional status, patient satisfaction, well-being, and health status independently. Attention to details beyond short-term clinical outcomes and survival has been commonly dismissed. Patient experience needs to be central to quality of care measurements and health decisions. This broad approach to evaluating health care is also needed for the elderly on dialysis, as well as for any individuals with a chronic disease state.

The elderly with kidney disease are a very special population. The HRQoL in the elderly has been shown to be affected by functional status, nutritional status, and a sense of independence, among other

clinical parameters [52]. Issues that are important for the general population of the elderly are important in ESRD as well. Dementia has been shown to have a similar prevalence in the elderly with ESRD relative to the population [53]. Nutrition is part of daily life, and impaired nutrition does decrease HRQoL [54–56]. This is not unique to the ESRD population, but nephrologists may be uniquely capable of addressing this issue in CKD patients [57]. In the study by Sun et al. [6], the HRQoL was not measured directly. Hospitalization rates, as an important determinant of HRQoL, were examined and not increased in the elderly on dialysis. These results are supported by previous studies including those by Lamping et al. [58], who found that in a group of incident elderly patients on dialysis, a comorbidity assessment was a better independent predictor of mortality than age alone. In the latter study, 30 percent of patients over age 70 did not require hospitalization in a 1-year span. More importantly, measures of mental quality of life in their elderly dialysis patients were similar to those in elderly people in the general population [58]. In both studies, age did not decrease QoL by increasing hospitalizations.

The study by Sun et al. [6] is both a demonstration of how our view toward the elderly on dialysis should shift, and a reminder of the gaps in our evaluation of quality of care in the elderly on dialysis. Those elderly that are well enough to survive CKD to reach ESRD may be a naturally selected population capable of doing well on renal replacement therapy. Since age is part of our scoring for comorbidities, we might give it over-importance and ration health care away from those who may benefit from it. And, as we tend to focus on easily measurable, clinically focused items (i.e. age and hospitalization rates), we exclude the importance of the patient experience, which may be independent of age. Choosing whom “to say ‘no’ to,” will likely not be well defined by a simple number, but will need a comprehensive assessment of the patient’s goals and abilities, as well as the capabilities of our current therapies to serve them.

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