

CHRONIC KIDNEY DISEASE

Chronic Kidney Disease (CKD) is a major public health problem nationwide. Currently, more than 350,000 people receive renal replacement therapies (RRT). According to the United States Renal Data System (USRDS), the CKD population, especially the elderly, has exceedingly high mortality and morbidity rates. Medicare payments average over \$12 billion per year, constituting a major percentage of the ENTIRE MEDICARE BUDGET.

It is estimated that there is a rising incidence and prevalence of kidney failure affecting more than 20 million Americans, or about 5-10% of the general population. Therefore, increased attention to CKD will yield enormous benefits.

EARLY REFERRAL IS THE KEY

Evidence suggests that early referral (ER) to a Nephrologist significantly improves outcomes. Late referral (LR) is defined as occurring less than 6 months prior to the need for RRT. Khan and colleagues found that survival at 2 years was 59% for ER versus 25% for those LR. The outcomes for LR patients reveal a higher incidence of malnourishment, inferior blood pressure control, higher incidence of cardiovascular complications, and more frequent and severe biochemical perturbations.

In a study by Campbell, the number of hospital days for patients in the ER group averaged 9.07 days per patient, compared with the LR group with 30.24 average days per patient. A higher mortality rate (13%) was noted in the LR group compared with only 4% in the ER group. In addition, the readmission rate was 90% for the LR group compared to only 9% in the ER patient group. Several factors appear to account for the late referral of CKD patients to Nephrologists:

- Patient's advanced age
- Presence of co-morbid conditions
- Late presentation of patients to their PCPs
- Lack of communication between PCP's and nephrologists

NEW KIDNEY FOUNDATION GUIDELINES

In an effort to improve outcomes the National Kidney Foundation has launched the Dialysis Outcomes Quality Initiatives (DOQI). This workgroup has redefined progression of CKD and developed a series of guidelines for the management of patients with the disease. As part of the work done by the group, the term Chronic Kidney Disease has been recommended in order to be more understandable to patients and all concerned and is defined as follows:

1. Either structural or functional renal abnormalities exist for greater than 3 months.
2. Glomerular Filtration rate (GFR) is less than 60 ml/min/1.73m².

SERUM CREATININE UNDER DIAGNOSES CKD

The overuse of serum creatinine (SCr) as a screening tool for CKD leads to a portion of the late referrals. Unfortunately, SCr levels are highly variable. They are dependent on total muscle mass and protein intake. Drugs can also alter SCr by 10 to 30%, further reducing the accuracy of the test. On the other hand, it cannot be overemphasized, that due to the curvilinear relationship between SCr and glomerular filtration rate (GFR), patients with declining renal function demonstrate only small absolute increases in the level of SCr, as they lose large amounts of renal function. Roughly by the time SCr rises to 2 mg/dl the GFR has already decreased about 50%. Consequently, the correlation between CKD and GFR levels is much stronger compared to SCr.

It is no longer recommended to use SCr alone to assess the level of renal function. The GFR should be measured either directly via isotopic methods or indirectly via prediction equations, such as Cockcroft and Gault formulas and the MDRD study.

COCKROFT AND GAULT FORMULA

$$\text{GFR ml/min} = [140 - \text{Age}] \times [\text{body weight (kg)}] \times \text{SCr and } 0.72 \text{ for males, } 0.85 \text{ for females.}$$

Among patients with CKD, the stage of the disease should be assigned based on the level of kidney function, irrespective of diagnosis, according to the revised K/DOQI classification in Table I.

Stage	Degree of Damage	GFR Level ml/min
1	Normal or High	>90
2	Mild	60-89
3	Moderate	30-59
4	Severe	15-29
5	End Stage Kidney Disease	<15

RECOMMENDED ACTION

For each stage of disease, implementing the recommendations below may lead to best outcomes for CKD patients. Note that if protein calorie malnutrition develops and persists despite attempts to optimize protein and energy intake, initiation of dialysis is recommended.

Stage 1: GFR > 90 ml/min:

Patients should be referred to a nephrologist for diagnosis and assessment of risk of loss of kidney function. A clinical plan will be developed together with the PCP for blood pressure control, early use of ACE inhibitors and ARB's, treatment of diabetes and hyperlipidemia. The patient will be educated on life style modifications to slow the progression of his/her disease. Generally, annual or bi-annual follow-up is recommended.

Stage 2 and 3: GFR 30 – 89 ml/min:

Patients in this category should be evaluated by Nephrology for etiologic diagnosis, assessment of severity of the disease, complications related to kidney function, estimation of progression of disease and risk of cardiovascular disease. Specialist and PCP will work together to achieve prevention of complications and to slow down the progression of disease.

One of the complications that can develop relatively early in the course of the disease is Anemia. It has been redefined as hematocrit (Hct) <33% for pre-menopausal women and <37% in males and postmenopausal women. Anemia has been associated with poor quality of life and development of left ventricular hypertrophy (LVH), which is an independent risk factor for death.

It will require an initial work-up, treatment with Erythropoietin at a dose of 80 - 120 U/kg /week and intravenous iron to maintain transferrin saturation > 20%.

During all follow-up visits, patients will have review of their medications in order to properly adjust the doses, prevent side effects on kidney function, and avoid drug interactions.

Patients will be instructed that the veins in their non-dominant arm should not be used for venipunctures so they remain healthy for a potential vascular access.

Consideration to the treatment of renal osteodystrophy will be given to prevent all the consequences of secondary hyperparathyroidism.

Patient and family should receive education on dietary restrictions and renal replacement therapy options.

QUARTERLY FOLLOW UP VISITS ARE RECOMMENDED

Stage 4: GFR < 30 ml/min:

The care of this patient should be transferred to a nephrologist to initiate preparation for RRT and/or transplantation. Patient will continue with close monitoring of Hct, as well other electrolytes. Patients will have a comprehensive review of the different options for dialysis, as well as transplantation.

Patients will be referred to our Ambulatory Surgery Center (ASC) where a vascular surgeon will determine suitability of access type. If hemodialysis is the preferred modality, an arterio-venous fistula will be placed in anticipation of RRT.

Stage 5: < 15 ml/min:

Renal replacement therapy (RRT) will be initiated. If patients have a late presentation, they will be referred to our ASC for a long-term catheter to initiate hemodialysis or for insertion of a peritoneal dialysis catheter.

In summary, improved communication between nephrologists and PCP's will result in improved patient management in the care of kidney disease. Recognizing the issue, early referrals, updated diagnostics, and adherence to DOQI guidelines will allow PCP's and nephrologists to work together to defeat one of the most common public health problems.