

# Cardiovascular Risks in Chronic Kidney Renal Patients

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Chronic kidney disease is well known to be related with high risk of cardiovascular disease and total mortality. Therefore, it is important to assess the role of traditional and nontraditional risk factors for cardiovascular disease.

A common definition for CKD stipulates an eGFR of less than 60 ml/min/1.73 m<sup>2</sup> or the presence of albuminuria, defined as an albumin-to-creatinine ratio greater than 30 mg/gm on a spot urine sample. Although with normative aging (age 20 to 80), the eGFR declines from about 130 to 60 ml/min/1.73 m<sup>2</sup>, a variety of pathobiological processes appear to begin when the eGFR drops below 60 ml/min/1.73 m<sup>2</sup>. Most studies of cardiovascular outcomes have found that a break point for the development of contrast-induced nephropathy (CIN), restenosis after percutaneous coronary intervention (PCI), recurrent myocardial infarction (MI), diastolic/systolic congestive heart failure (CHF), arrhythmias, and cardiovascular death occurs below an eGFR of 60 ml/min/1.73 m<sup>2</sup>, which roughly corresponds to a serum creatinine (Cr) greater than 1.5 mg/dl in the general population. In addition, microalbuminuria at any level of eGFR is considered to represent CKD and has been considered as an independent CVD risk factor.

Although renal dysfunction alone is an independent cardiovascular risk factor, it is worthwhile to review the variety of abnormalities commonly observed in those with chronic kidney disease that enhance the overall risk of cardiovascular disease. Certainly, the traditional cardiovascular risk factors such as hypertension (which may be accompanied by left ventricular hypertrophy), smoking history, diabetes, dyslipidemia, and older age, are highly prevalent in CKD populations. Patients with chronic renal dysfunction are also more likely to have the metabolic syndrome, which could explain part of the increase in cardiovascular risk. This syndrome is defined as some combination of insulin resistance, dyslipidemia, elevated serum glucose, abdominal obesity, and hypertension. In addition, increasing arterial stiffness and arterial enlargement are noted in patients with chronic renal insufficiency and end-stage renal disease, and are possible risk factors for increased cardiovascular mortality. There are additional possible risk factors that are relatively unique to patients with moderate to severe renal dysfunction. These include decreased excretion of uremic toxins, anemia, increased calcium intake, abnormalities in bone mineral metabolism, hyperhomocysteinemia, proteinuria, and/or an "increased inflammatory-poor nutrition" state.