Underwriting Chronic Renal Failure

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The progression of chronic renal failure is quite variable. Equations to estimate the level of function are provided.

The presence of an elevated blood urea nitrogen (BUN) or creatinine (Cr) on a lab slip commonly presents a problem in underwriting, especially if there is no history or value with which to compare. Furthermore, the tests themselves can be misleading. The BUN can be elevated, not only in renal disease but whenever there is underperfusion of the kidneys (which occurs in states of volume contraction and low ejection fraction), and conditions of overproduction, as in an individual with an acute gastrointestinal bleed. The BUN can also be artificially depressed when there is decreased production, as in severe liver disease. The Cr is a better test, but it too has faults. It rises in states of overproduction, as in the use of protein supplements or in trauma. An elevated Cr can also result from a poorly spun specimen that is not processed for several days. Creatinine levels fall in states of muscle atrophy.

The various manuals give guidance on ratings based on the individual test results. While this is helpful, previous values and pertinent history make the underwriting decision less difficult. Lab values that remain stable for several years generally portend a good prognosis for renal function. Likewise, a normal urinalysis and the absence of any associated medical conditions improve the renal outlook. With adequate information, the offer can frequently be better than the manuals might recommend.

Unfortunately, it is not uncommon to identify an elevated Cr at the time of application with no history or previous lab results with which to compare. If the BUN is well within the normal range, the urinalysis is normal, and the Cr is only mildly elevated, problems in the handling of the blood specimen are often at fault. When the evidence points to a true renal lesion, any offer is fraught with some peril since it may not be clear whether the underlying process is stable or in an accelerating phase. In those circumstances, age, general health, family history, and the presence of any other medical conditions can offer guidance. Several equations have been developed to help determine the degree of renal impairment. Some of these are

- **Ccr (mL/min)** = \((140 - \text{age}) \times \text{IBW (in kg)}/(72 \times \text{Pcr (in mg/dL)})\) (note—in women, multiply by 0.85),
- **Cockcroft and Gault equation for the excretion rate of Cr (in g/24 h)—Cr = \((140 - \text{age}) \times \text{weight (in kg)}/5000\) (note—in women, multiply by 0.85),
- The gold standard, which is the 24-hour urine and blood creatinine to calculate Cr
clearance—\( \text{Ccr} = \frac{(\text{Uvol (in ml)} \times \text{Ucr (in mg/dL)} \times 100)}{(\text{serum Cr (in mg/dL)} \times 1440 \text{ minutes})} \),

where \( \text{Ucr} = \text{urine creatinine} \), \( \text{IBW} = \text{ideal body weight} \), \( \text{Pcr} = \text{plasma creatinine} \), and \( \text{Ccr} = \text{creatinine clearance} \).

When using any of these methods, it is imperative to remember that they are intended as an approximation of renal function. In reality, the clinical course and the rate of deterioration in renal function usually fluctuates. This fact decreases the usefulness of a commonly used method of estimating renal deterioration, that is, the plotting of the level of function against time.\(^1\)

In the figure, the inverse of the plasma creatinine is plotted as a percent of function against time. The purpose of plotting such a graph is to determine the point at which the line crosses the abscissa, which is the presumed point in time when renal function ceases. However, as stated above, renal functional decline is not linear. Furthermore, depending on underlying medical conditions, such as diabetes mellitus and cardiac disease, delaying intervention till all renal function is lost would prove ill advised.

From the underwriting perspective, it is common to equate client survival with renal survival. This conclusion must be adjusted for the underlying cause of the renal disease. In diabetics, the 1-year death rate according to the United States Renal Data System (USRDS) \(^{1992}\) was 23.2/100 patient years versus 13.2 for individuals with glomerulonephritis. This difference is significant mainly in the older population, where expected survival is similarly limited and an offer can be made. Likewise, transplantation improvements have resulted in changes in survival—the half-life for grafts from living donors has increased steadily from 12.7 to 21.6 years and that for cadaveric grafts has increased from 11 to 19.5 years.\(^3\)

REFERENCES