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Blood Urea Nitrogen/Creatinine Ratio Identifies a High-Risk but Potentially Reversible Form of Renal Dysfunction in Patients With Decompensated Heart Failure

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Background—Identifying reversible renal dysfunction (RD) in the setting of heart failure is challenging. The goal of this study was to evaluate whether elevated admission blood urea nitrogen/creatinine ratio (BUN/Cr) could identify decompensated heart failure patients likely to experience improvement in renal function (IRF) with treatment.

Methods and Results—Consecutive hospitalizations with a discharge diagnosis of heart failure were reviewed. IRF was defined as ≥20% increase and worsening renal function as ≥20% decrease in estimated glomerular filtration rate. IRF occurred in 31% of the 896 patients meeting eligibility criteria. Higher admission BUN/Cr was associated with inhospital IRF (odds ratio, 1.5 per 10 increase; 95% confidence interval [CI], 1.3–1.8; $P<0.001$), an association persisting after adjustment for baseline characteristics (odds ratio, 1.4; 95% CI, 1.1–1.8; $P=0.004$). However, higher admission BUN/Cr was also associated with post-discharge worsening renal function (odds ratio, 1.4; 95% CI, 1.1–1.8; $P=0.011$). Notably, in patients with an elevated admission BUN/Cr, the risk of death associated with RD (estimated glomerular filtration rate <45) was substantial (hazard ratio, 2.2; 95% CI, 1.6–3.1; $P<0.001$). However, in patients with a normal admission BUN/Cr, RD was not associated with increased mortality (hazard ratio, 1.2; 95% CI, 0.67–2.0; $P=0.59$; p interaction=0.03).

Conclusions—An elevated admission BUN/Cr identifies decompensated patients with heart failure likely to experience IRF with treatment, providing proof of concept that reversible RD may be a discernible entity. However, this improvement seems to be largely transient, and RD, in the

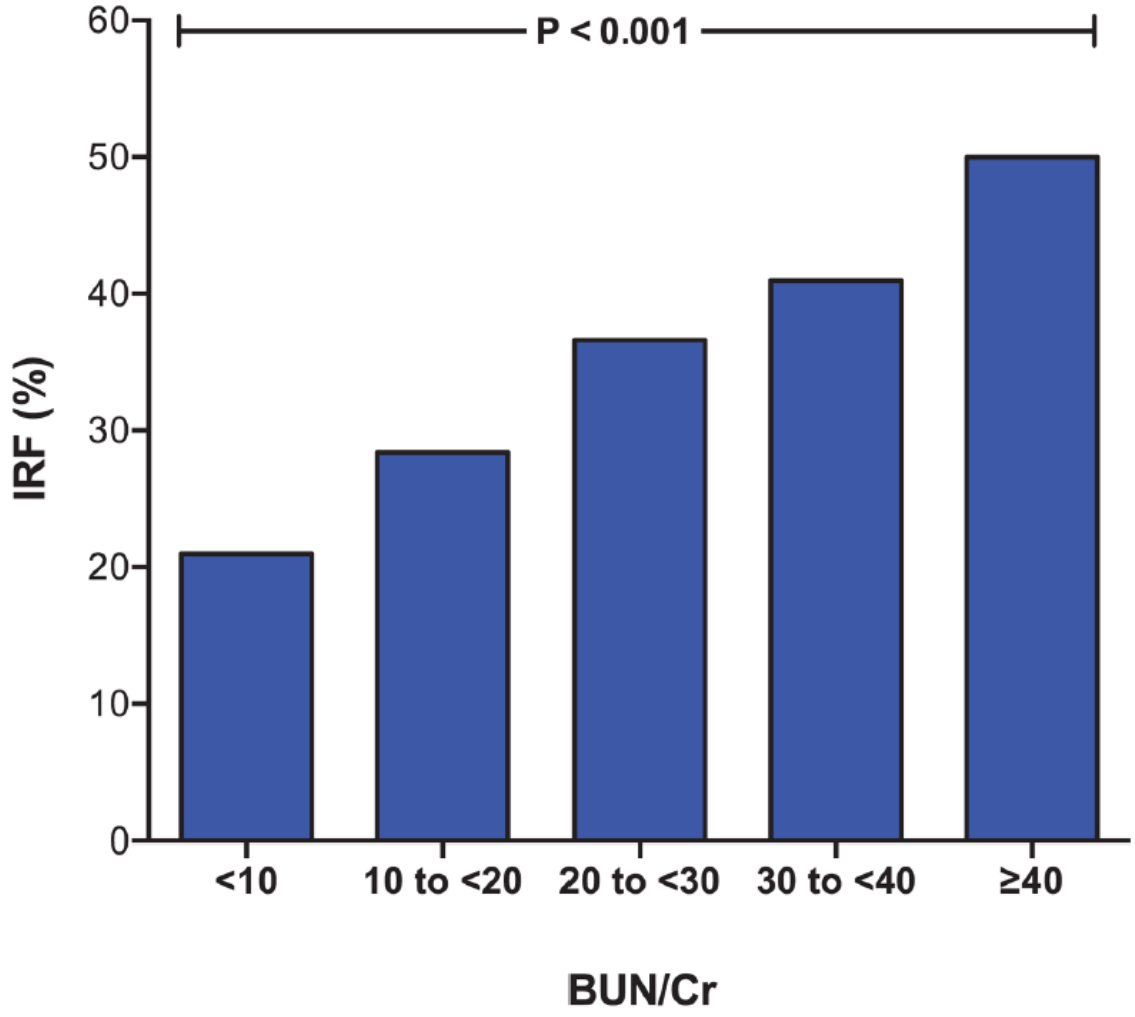

Figure 1.
Incidence of improvement in renal function during hospitalization with a progressively higher baseline blood urea nitrogen/creatinine ratio (BUN/Cr). IRF indicates improvement in renal function. IRF defined as a ≥20% improvement in glomerular filtration rate. Test for trend $P<0.001$.

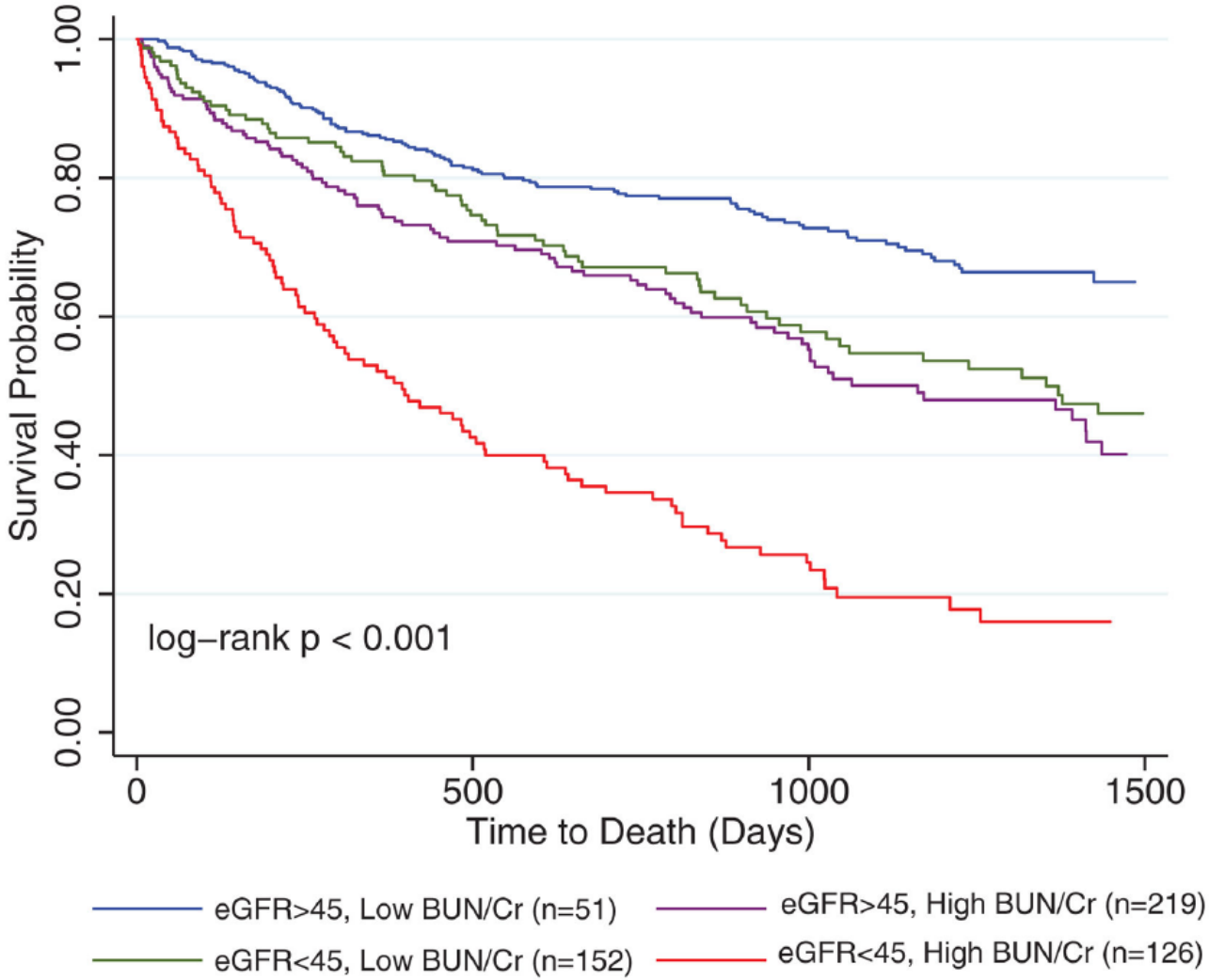

Figure 2.
Kaplan–Meier survival curves grouped by blood urea nitrogen/creatinine ratio (BUN/Cr) and renal dysfunction. eGFR indicates estimated glomerular filtration rate. BUN/Cr dichotomized as the top vs bottom quartile.