Lee, W. and Packer, M. Prognostic importance of serum sodium concentration and its modification by converting enzyme inhibition in patients with severe chronic heart failure. 

Although past reports have identified a variety of prognostic factors in patients with severe chronic heart failure, previous studies have not evaluated the interaction of prognostic variables and drug treatment. We analyzed the association of 30 clinical, hemodynamic, and biochemical variables with survival in 203 consecutive patients with severe heart failure; all variables were assessed just before initiation of treatment with a variety of vasodilator drugs, and all patients were subsequently followed for 6 to 94 months. By regression analysis, pretreatment serum sodium concentration was the most powerful predictor of cardiovascular mortality, with hyponatremic patients having a substantially shorter median survival than did patients with a normal serum sodium concentration (164 vs 373 days, p = .006). The unfavorable prognosis for hyponatremic patients appeared to be related to the marked elevation of plasma renin activity that we noted in these individuals (10.0 +/- 2.0 ng/ml/hr), since hyponatremic patients fared significantly better when treated with angiotensin converting-enzyme inhibitors than when treated with vasodilator drugs that did not interfere with angiotensin II biosynthesis (median survival 232 vs 108 days, p = .003). In contrast, there was no selective benefit of converting-enzyme inhibition on the survival of patients with a normal serum sodium concentration, in whom plasma renin activity was low (1.9 +/- 0.3 ng/ml/hr). This interaction between serum sodium concentration, drug treatment, and long-term outcome suggests that the renin-angiotensin system may exert a deleterious effect on the survival of some patients with chronic heart failure, which can be antagonized by converting enzyme inhibition, and provides a clinical counterpart for the similar prognostic role that has been postulated for angiotensin II in experimental preparations of heart failure.