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The dose of hemodialysis and patient mortality.

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Abstract

The relationship between the delivered dose of hemodialysis and patient mortality remains somewhat controversial. Several observational studies have shown improved patient survival with higher levels of delivered dialysis dose. However, several other unmeasured variables, changes in patient mix or medical management may have impacted on this reported difference in mortality. The current study of a U.S. national sample of 2,311 patients from 347 dialysis units estimates the relationship of delivered hemodialysis dose to mortality, with a statistical adjustment for an extensive list of comorbidity/risk factors. Additionally this study investigated the existence of a dose beyond which more dialysis does not appear to lower mortality. We estimated patient survival using proportional hazards regression techniques, adjusting for 21 patient comorbidity/risk factors with stratification for nine Census regions. The patient sample was 2,311 Medicare hemodialysis patients treated with bicarbonate dialysate as of 12/31/90 who had end-stage renal disease for at least one year. Patient follow-up ranged between 1.5 and 2.4 years. The measurement of delivered therapy was based on two alternative measures of intradialytic urea reduction, the urea reduction ratio (URR) and Kt/V (with adjustment for urea generation and ultrafiltration). Hemodialysis patient mortality showed a strong and robust inverse correlation with delivered hemodialysis dose whether measured by Kt/V or by URR. Mortality risk was lower by 7% (P = 0.001) with each 0.1 higher level of delivered Kt/V. (Expressed in terms of URR, mortality was lower by 11% with each 5 percentage point higher URR; P = 0.001). Above a URR of 70% or a Kt/V of 1.3 these data did not provide statistical evidence of further reductions in mortality. In conclusion, the delivered dose of hemodialysis therapy is an important predictor of patient mortality. In a population of dialysis patients with a very high mortality rate, it appears that increasing the level of delivered therapy offers a practical and efficient means of lowering the mortality rate. The level of hemodialysis dose measured by URR or Kt/V beyond which the mortality rate does not continue to decrease, though not well defined with this study, appears to be above current levels of typical treatment of hemodialysis patients in the U.S.

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