Predictors of Emergency Medical Services Usage by Dialysis Patients

Bartolacci J., *Goldstein J., Kiberd B.A., Clark D., Tennankore K.K.*

Introduction
Patients receiving chronic dialysis often require Emergency Medical Services (EMS), but little is known about clinical characteristics associated with high EMS utilization. The purpose of this study was to evaluate dialysis patient characteristics associated with increased rates of EMS utilization.

Methods
We analyzed a cohort of chronic dialysis patients within the Nova Scotia Health Authority renal program from January 1, 2009-December 31, 2013 (last follow up 01 July 2015) who required treatment by EMS and transport to a facility for further care. Dialysis patient data was linked to Emergency Health Services (EHS) data. Time to EHS use or death was the outcome of interest and analyzed using a multivariable Anderson-Gill Cox Regression model for multiple recurring events. Variables of interest for inclusion in the model were patient demographics (age, Caucasian race, sex), albumin level, comorbidities (including cause of end-stage renal disease, coronary artery disease, congestive heart failure and peripheral vascular disease) and dialysis characteristics (modality, access and referral time). In addition, we evaluated frailty using a validated clinical frailty scale (CFS) that categorizes patients from 1 (very fit) to 7 (severely frail) based on clinician impression at the time of dialysis start.

Results
468 patients were included in this study, of whom 264 (56%) required treatment and transport by EMS. There were 782 EMS treated and transport events and 191 deaths (total time at risk of 1237 years). The highest severity of frailty using the CFS was associated with a 5 fold higher relative hazard for EMS use (HR 5.21, 95% CI [3.09-8.80] $P<0.001$. Frailty severity scores of 4-6 were also associated with a higher relative hazard for EMS use. Other factors associated with EMS use included central venous dialysis access (HR 1.25, 95% CI [1.04-1.51]) and select comorbid conditions.

Conclusion
There are multiple clinical factors that are associated with a high use of EMS in dialysis patients. A greater frailty severity is associated with a considerable increased relative hazard for EMS use and should be further explored to determine ways to reduce EMS use for this vulnerable patient population.