

## KSN 2017 Abstract

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### The association of comorbidities with adverse outcomes during pre-dialysis periods among incident renal replacement therapy patients

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**Objectives** : Optimal level of estimated glomerular filtration rate (eGFR) to start renal replacement therapy (RRT) is still controversial. Several observational studies have shown that initiation of RRT at high eGFR was associated with poorer post-RRT patient survival. However, most of the previous studies have been based on registry data by patients who survived to initiate RRT. Therefore, we investigated pre-dialysis morbidity and adverse outcome preceding initiation of dialysis as clinical outcomes and the association of pre-dialysis clinical outcomes with eGFR at RRT initiation.

**Methods** : Patients with chronic kidney disease with an eGFR less than 20 ml/min were enrolled. The Khan, Davies, and Charlson comorbidity indices were calculated for each patient based on the comorbidity at the enrolled time. Medical records of 1,044 incident dialysis patients who started maintenance dialysis between January 2010 and December 2015 were reviewed. Patients were classified as 'safe starter' vs. 'urgent starter'. Urgent starter was defined as the patients who started maintenance dialysis from urgent indication such as uremic encephalopathy, uremic pericarditis, pulmonary edema, or serum potassium more than 7.0 mEq/L. Comparisons of the comorbidity scores and pre-dialysis morbidities between the safe starter and the urgent starter were done.

**Results** : Among total 1,044 patients, female was 580 (44%). Mean age at RRT initiation was  $58.6 \pm 14.8$  years old. Body mass index was  $23.3 \pm 3.7$  kg/m<sup>2</sup>. Mean eGFR at RRT initiation was  $6.7 \pm 4.3$  ml/min/1.73m<sup>2</sup>. Proportion of early referral (three months earlier than RRT initiation) was 84%. Diabetes and hypertension were prevalent in 560 (53.6%) and 915 (87.6%), respectively. Mean modified Charlson score was  $4.1 \pm 2.6$ . Patients were classified by Davies score index as follows : low risk 342 (32.8%), medium risk 604 (57.9%), high risk 98 (9.4%), respectively.

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Mean eGFR at RRT initiation was higher in larger comorbidity burdens ( $5.0 \pm 2.9$  ml/min/1.73m<sup>2</sup> vs.  $7.2 \pm 4.6$  ml/min/1.73m<sup>2</sup> vs.  $8.9 \pm 4.0$  ml/min/1.73m<sup>2</sup>, low risk vs. medium risk vs. high risk group, respectively,  $p < 0.001$ )(Figure 1). According to RRT indications, urgent starter group had higher modified Charlson score than safe starter group ( $4.9 \pm 2.1$  vs.  $3.5 \pm 2.3$ ,  $p < 0.001$ ). Mean eGFR at RRT initiation of urgent starter group was higher than the safe starter group ( $8.0 \pm 5.1$  ml/min/1.73m<sup>2</sup> vs  $6.0 \pm 3.5$  ml/min/1.73m<sup>2</sup>,  $p < 0.001$ ). When the pre-dialysis period from enroll time to RRT initiation was reviewed, patients with higher comorbidities experienced more cardiovascular adverse outcome such as myocardial infarction or angina, and more infection event requiring hospitalization(Figure 2). Cox regression resulted hazard ratio of each risk groups to pre-RRT cardiovascular adverse events as follows: medium risk, 4.362 (95% Confidence Interval (C.I.) 1.708 – 11.142); high risk, 8.837 (95% C.I. 3.056 – 25.550), respectively. The hazard ratio of each risk groups to pre-RRT infection were as follows: medium risk, 2.567 (95% C.I. 1.509 – 4.367); high risk, 3.854 (95% C.I. 1.935 – 7.675), respectively.

**Conclusions :** Patients with larger comorbidities experienced more adverse events during pre-RRT periods. Timing of RRT initiation should be individualized considering burden of comorbid conditions.

**Keywords :** Cardiovascular disease, Renal replacement therapy, Pre-dialysis adverse outcome, Comorbidity index