Patient and Facility-level Variation in the Level of eGFR at Dialysis Initiation

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BACKGROUND

- The decision about when to start dialysis in patients with progressive chronic kidney disease remains controversial.
- Initiation at a higher glomerular filtration rate (GFR) may be associated with an increase in mortality. (1)
- Recent observational studies using large registry databases have suggested that early initiation of dialysis may be associated with an increased risk of death. (2)
- Despite the controversy over appropriate timing of dialysis initiation, it is clear that patients with CKD have consistently been starting dialysis at progressively higher levels of eGFR over the last two decades (3)

OBJECTIVE

- The purpose of this study was to assess the variability in the estimated GFR (eGFR) at dialysis initiation and to determine the extent to which this variability relates to patient (case-mix), facility and geographic factors.

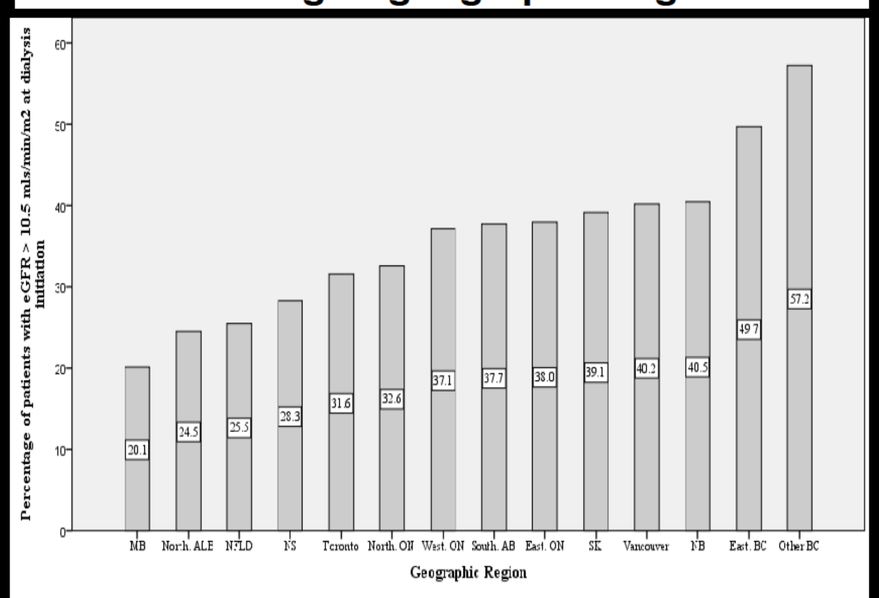
METHODS

- Data from the Canadian Organ Replacement Registry (CORR) on 33,263 dialysis patients with an eGFR measure at dialysis initiation between Jan. 2001 and Dec. 2010, representing 63 dialysis facilities and 14 geographic regions were included in the study.
- eGFR was estimated by the MDRD equation. (4)
- Multi-level models were used to evaluate the variation in timing of dialysis initiation by eGFR at the patient-, facility- and geographic-level.
- Models were adjusted for patient and facility characteristics to determine the relative variability at each level.

RESULTS

- The mean eGFR at dialysis initiation varied considerably across geographic regions and over the study period. The proportion initiating dialysis with an eGFR≥10.5ml/min was 35.3%, varying from 20% to 60% across geographic regions, and 10 to 67% across facilities.

Crude proportion of patients initiating dialysis with an eGFR > 10.5 ml/min/m^2 according to geographic region.



- In unadjusted models, 89 % of the variation was attributable to patient case mix, whereas 8 % was attributed to the facility, and 3 % to the region. After adjustment for patient- and facility-level variables including quality indicators, 95.3 % of the variability was attributable to patient case mix, 4.5 % to the facility, and 0.2 % to the region.

Multi-level model analysis of the unadjusted and adjusted variation (percentage) at the patient, facility and geographic level for initiation of dialysis.

Model	Geographic regional-level variation (%)	Facility-level variation (%)	Patient-level variation (%)
eGFR ≥ 10.5 ml/min/1.73m^2 m^2+			
Unadjusted	2.6	8.2	89.2
Fully adjusted	0.2	4.5	95.3
Reduced	0.6	4.3	95.1
eGFR as a continuous variable+			
Unadjusted	2.7	6.6	90.7
Fully adjusted	0	3.1	96.9
Reduced	0.2	3.0	96.8
eGFR as a continuous variable + pre-dialysis care > 90 days*			
Unadjusted	3.1	8.7	88.2
Fully adjusted	0.2	4.1	95.7
Reduced	0.6	3.9	95.6

- These findings were consistent regardless of whether the eGFR was examined as a continuous variable or categorized as > 12.0 ml/min or in an analysis limited to patients with > 3 months of pre-dialysis care. Increasing numbers of co-morbid conditions, male gender, a lower serum phosphate and lower BMI were associated with dialysis initiation at a higher eGFR.

DISCUSSION

- Patient related factors such as demographics, co-morbid conditions, laboratory variables, and length of pre-dialysis care accounted for over 95% of the observed variability in eGFR at dialysis start.
- These results suggest that patient factors explain much of the variability in eGFR at dialysis initiation with a small but significant contribution based on the treatment facility
- The presence of co-morbid illnesses such as cardiovascular disease, diabetes and other serious illnesses, was associated with starting dialysis at a higher eGFR.

STRENGTHS & LIMITATIONS

- Strengths:
  - Large nationally representative cohort.
  - Multi-level model that accounted for within facility and geographical regional clustering.
  - Models were adjusted for a large number of covariates and were consistent across numerous sensitivity analyses.
- Limitations:
  - Cardiac function was unknown.
  - Low facility and geographic variability may reflect a small sample size in some participating facilities.
  - Increasing average age and number of co-morbidities make interpretation difficult.

CONCLUSIONS

- Over one third of patients in Canada initiated dialysis with an eGFR > 10.5 ml/min between 2001 and 2010.
- Patient characteristics (case-mix) accounted for the majority of variation with less, but significant variation at the facility level.
- Knowledge translation activities targeted towards dialysis facilities may reduce the facility level variation further.

BIBLIOGRAPHY

1. Susantitaphong P, Altamimi S, Ashkar M, Balk EM, Stel VS, Wright S, et al. GFR at Initiation of Dialysis and Mortality in CKD: A Meta-analysis. American Journal of Kidney Diseases. 2012;59(6):829-40.
2. Clark WF, Na Y, Rosansky SJ, Sontrop JM, Macnab JJ, Glassock RJ, et al. Association between estimated glomerular filtration rate at initiation of dialysis and mortality. Canadian Medical Association Journal. 2011 January 11, 2011;183(1):47-53.
3. System URD. USRDS 2008 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States,. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases,. 2008;Bethesda, MD, 2008.
4. Tangri N, Tighiouart H, Meyer KB, Miskulin DC. Both patient and facility contribute to achieving the centers for medicare and medicaid services' pay-for-performance target for dialysis adequacy. *J Am Soc Nephrol*. 2011;22(12):2296-2302.

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