Reviewer's report

Title: A Comparison of Medical Outcomes and Healthcare Costs in the End-of-Life Between Dialysis Patients with and without Cancer: A National Population-based Study

Version: 1 Date: 19 Mar 2019

Reviewer: Devika Nair

Reviewer's report:

Strengths of this study include the patient-centeredness and economic relevance of the topic, and the fact that the time period studied was adequate to measure the authors' outcomes of interest. A known limitation of using claims data and retrospective cohort analyses that the authors acknowledge is the inability to include unmeasured confounders and covariates (medication adherence, coexistent major depressive disorder, etc.) that may have otherwise influenced the outcomes in this study. The manuscript contains useful information but would benefit from more precise wording and slight alterations clarify and unify the authors' overall message to readers. I have included the following general and specific comments and questions to hopefully help the authors further strengthen their contribution:

Major comments
- Patients who receive chronic peritoneal dialysis often have different clinical and personal characteristics as compared to those who receive chronic hemodialysis, such as prolonged maintenance of their residual renal function and better self-efficacy (Ueda et al Adv Perit Dial 2017, Tong et al Am J Kidney Dis 2013). These and other characteristics may have influenced some of the outcomes the authors were interested in measuring, such as hospitalization rate. If possible with the claims data, would consider restricting analyses to just hemodialysis patients. Otherwise can state this as a limitation.

- The authors define 'quality of end-of-life care' only in terms of objective measures associated with higher healthcare costs. Quality of end-of-life care should ultimately be based on whether outcomes at the end of a patient's life were in concordance with his or her wishes leading up to that moment. Would suggest that the authors replace 'quality of end-of-life care' with 'medical outcomes at the end of life and associated healthcare costs' or a similar phrase.

- Would be interested in data re: differences in healthcare costs between patients in this study who received hospice vs. those who did not, if this information is available

- An interesting finding in this study is that a high percentage of dialysis patients had high healthcare utilization during the last month of life but low hospice utilization. Would highlight this in the Abstract. Readers may be interested in learning more about barriers to hospice utilization in Taiwan (if the authors are aware of any literature that explains this), especially since hospice is covered by the national health insurance program. The authors begin to describe some of this in the Discussion on page 18 - would expand upon this.
- Overall, this work would also be strengthened if the authors can a) more explicitly justify why analyses were stratified by presence or absence of cancer, and b) more clearly explain what question they were aiming to answer using their multiple regression analyses.

Minor comments

Abstract

- Background:
- The authors should revise or exclude the first sentence of this abstract, as end-of-life care for dialysis patients is being increasingly investigated in their home country (Wu et al J Palli Med 2019, Kang et al J Palli Med 2019) as well as around the world. Would also include that survival was investigated in this study.

- Methods:
- If word count allows, would include what variables were used to measure quality of end-of-life care

- Conclusions:
- Would consider adding the finding that a high percentage of dialysis patients had high healthcare utilization during the last month of life but low hospice utilization

Manuscript

- Background:
- Page 5 Line 9 - remove comma after 'diseases.'
- Page 5, Line 41 - "The mortality of dialysis patients decreased by 26% from 2001 … to 2015… in the United States; however, the mortality did not significantly change from 2000…to 2012 in Taiwan. These data indicate that the quality of dialysis has improved." Would like additional information or justification on why this means that the quality of dialysis has improved. I was not able to obtain details from the corresponding reference [#4].
- Page 7, Line 14-15 - "Dialysis is also associated with a higher risk of cancer in patients."
- Would suggest removing this sentence or otherwise expanding upon it (ie are the authors suggesting that because patients who are dialysis-dependent also have a high cancer prevalence and therefore would be more likely to utilize hospice care?)
- Page 7, Line 1 - would replace 'hospice' with 'palliative'
- Page 7, Line 17 - what is meant by 'high quality dialysis'?
- Page 7, Lines 17-19 - Presumably the authors hypothesized that 'DC' patients who used hospice would have better quality of end-of-life care and decreased healthcare costs during the last month of their life? An explanation of the authors' hypothesis would help readers better understand the reasoning behind comparing quality of end-of-life care and healthcare costs between 'DC' vs 'D' patients. If no hypothesis was pre-specified, then the authors can state that this was mainly exploratory
- Page 7, Lines 17-18 - would include why the use of hospice increased during this time (ie due to policy changes as the reference suggests, etc.)
- Methods
  - Page 9, Line 8 - replace 'ERSD' with 'ESRD'
  - Page 10, Line 10 - would specify whether 'potassium imbalance' refers to hyperkalemia or hypokalemia, or both, if this data is available. Appears to be specified in Table 4.
  - Page 11, Lines 1-4 - was the presence of cancer only ascertained at one time-point?
  - Page 12, Line 16 - was this truly a regression analysis? (if the authors are referring to the analyses used to obtain data in Tables 1-3)
  - Page 12, Line 19 - did the authors pre-specify which variables they thought would be most predictive of particular outcomes? Was there any collinearity between any of these variables? Would like more information on the reasoning behind doing this

- Results
  - Page 13, Line 5 - would replace 'with' with 'on.' Also, were these peritoneal dialysis patients as well as hemodialysis patients?
  - Page 13, Line 6 - would specify how death was measured in this study (ie exit from database, etc) Was data available on whether patients received a kidney transplant?
  - Would include results of Kaplan Meier plots or survival statistics of 'DC' vs 'D' groups. This may help explain some of the findings (ie could it appear that the 'DC' patients had more days in the hospital because they were living longer?). Would be important to include information on whether patients were transplanted in this section.
  - Page 15, Line 4 - what variables were adjusted for?

- Discussion
  - Page 17, Line 7-8 - "In the current study, we showed that DC patients were more likely to receive hospice care compared with D patients"

- Figure
  - Would specify whether these patients are on peritoneal dialysis or hemodialysis
  - Replace 'Alived' with 'Alive'

- Tables
  - Tables 1-3 may be able to be combined into one table
  - Table 4 - would group these into 'D' vs 'DC' patients and again specify whether hemodialysis or peritoneal dialysis, if that data is available
  - The calculation of AUCs may not add much meaningful information to this Table; would consider removing this here and in the Results section as well

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- Are the description of any error bars and probability values appropriate?
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