Trends in Peritoneal Dialysis Exit-Site Infection Rates in an Integrated Health Care Model in the United States

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Introduction

Peritoneal dialysis (PD) plays a major role in the management of patients with end stage kidney disease (ESKD). Exit-site infections (ESIs) are a significant complication of PD due to their potential to progress to peritonitis, resulting in higher rates of morbidity, mortality, and PD dropout.[1-4]

Objective/Research Question

Unlike peritonitis rates[5], ESI infection rates, patterns, and trends have not been generally recorded or reported by established registries. To address this gap, we studied data from nine Kaiser Permanente Southern California (KPSC) hospitals over the last decade to report yearly PD ESI rates and examine trends over time.

Methods

This is a historical cohort study using data provided by the Renal Registry of Southern California Permanente Medical Group for nine KPSC hospitals. Each hospital provided quarterly data from 2014–2023 with number of patients and ESI rate, reported as one episode per number of patient-months. As an initial exploration of difference over time, we considered the yearly aggregate ESI rates per center at the beginning and end of our study period (2014-2023).

Calculations:

- Mean ESI rate per year per hospital
- Mean ESI rate across all hospitals per year
- Total # patients across all hospitals per year
- Significance tests to compare distributions of ESI rates in 2014 and 2023

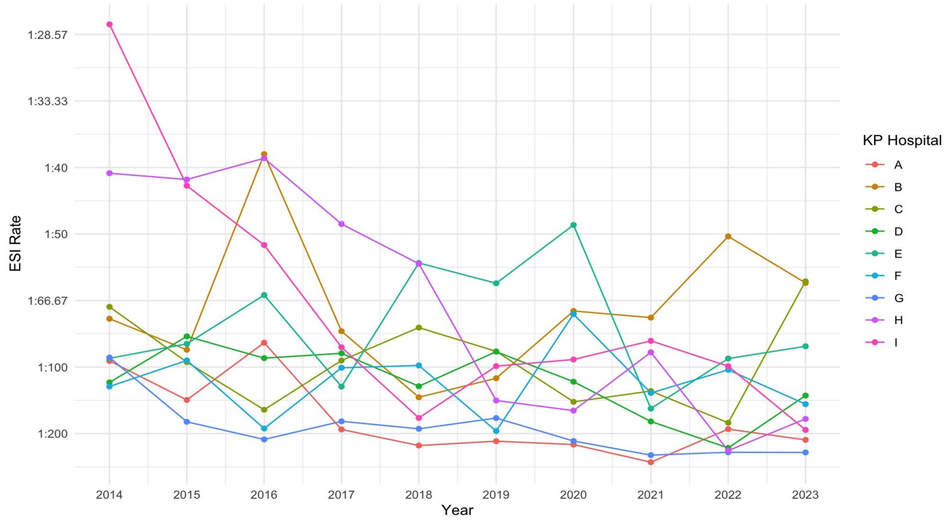

Figure 1. Mean ESI rate per year across 9 KPSC hospitals, reported as 1 episode per patient-months

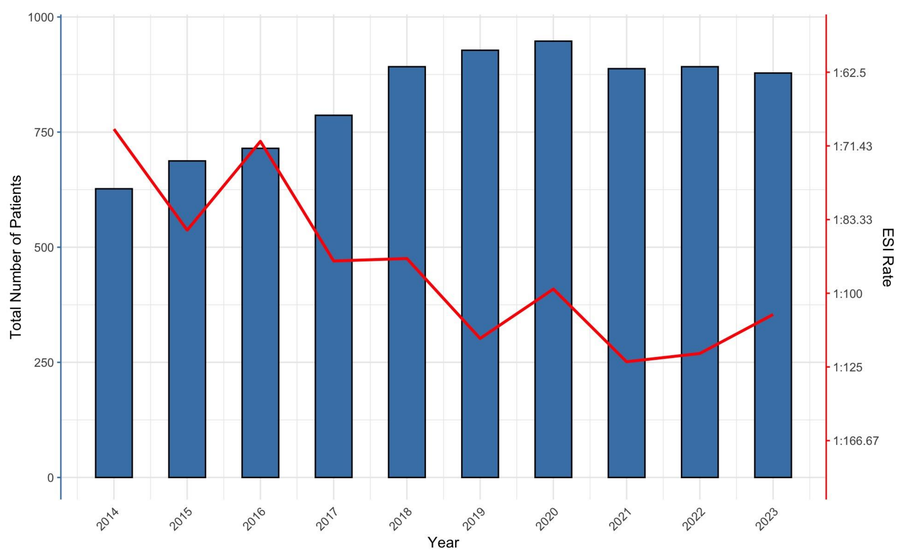

Figure 2. Total number of patients per year and mean ESI rate per year across all hospitals

Results

The mean ESI rate across all hospitals was one episode per 69.2 patient-months in 2014 and one episode per 106.1 patient-months in 2023. We found significant difference in the beginning and ending distributions via *t*-test (DF = 16) whereby the *t*-statistic's 95% confidence interval lay between –123.7 to –10.5 with a *p*-value of 0.023. Normality was deemed plausible by Shapiro-Wilk tests (*p*-values of 0.41 and 0.69 for beginning and ending distributions, respectively). We further corroborated the difference nonparametrically with a Wilcoxon rank-sum test with a *p*-value of 0.06 (*W*).

Conclusion & Limitations

This study adds to the existing literature by reporting trends in ESI rates. Although current studies report ESI rates as episodes per patient-years, we report ESI rates as episodes per patient-months to represent how the data were collected. Our data analysis demonstrates a statistically significant decrease in mean ESI rates at 9 KPSC hospitals over the last decade (2014–2023).

Limitations of our study include a modeling assumption that the beginning and ending distributions of ESI rates are independent of one another. To properly investigate the temporal components of our time series, we are currently building a linear mixed-effects model for publication. With further analysis, we hope to explore underlying factors that may explain the patterns and trends in ESI rates, such as COVID-19, summer vs. winter months, and neighborhood deprivation indices.

References

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