All-Cause Mortality and Incidence of Major Adverse Cardiac Events in Sickle Cell Nephropathy: A Comparative Study

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Introduction

- Sickle cell disease (SCD) is an autosomal recessive disease resulting in hemolytic anemia and recurrent vaso-occlusive events.
- It can result in a broad range of functional and structural renal and cardiac alterations. Chronic kidney disease, in SCD, is associated with proteinuria, microalbuminuria, and hemoglobinuria. Cardiac complications in SCD include pulmonary hypertension, left ventricular diastolic heart disease, dysrhythmia, and sudden death.
- In patients with advancing age, cardio-renal dysfunction can have substantial effects on morbidity and premature mortality. Our primary aim was to compare incidence of major adverse cardiac events (MACE) and all-cause mortality in sickle cell nephropathy (SCN).

Methods

- Study design: retrospective study using the HCA Enterprise Data Warehouse evaluating admissions with a diagnosis of MACE with a prior diagnosis of SCD/SCN in patients during 2019
- 6,693 patients with SCD aged 18-75 years were identified using ICD-10 codes, of which 658 patients (9.8%) had SCN
- Primary outcome: incidence of MACE and all-cause mortality. MACE encompassed those with nonfatal stroke, nonfatal myocardial infarction and congestive heart failure exacerbations.
- Secondary outcome: length of stay (LOS)
- Logistic regression was used for MACE and all-cause mortality
- Multiple linear regression was performed LOS
- Statistical significance evaluated using α=0.05

Results

- 6,693 identified adults patients with SCD had an average age of 36.34 ± 13.8 years.
- Patients were more likely to be African American (90.2%) and female (65.1%). Approximately 10% of the cohort had SCN, 3.6% had MACE, 12.8% had asthma, 9.1% were diabetic and 11% were tobacco users.
- The average age for patients who died in the hospital was 47.67 years, while the average for patients diagnosed with MACE and CHF were 52.83 and 52.46 years, respectively (Figure 1).
- SCN patients had an average length of stay of 4.76 days compared to 2.52 days for sickle cell patients without nephropathy (Figure 2). On multivariate linear regression, SCN patients had a 0.371-day longer stay compared to patients without nephropathy, which did not yield a significant relationship between length of stay and SCN (p = 0.169, 95% CI (-0.157, 0.899)).
- As seen in Table 2, patients with SCN had a significantly higher mortality [OR 2.343 p = 0.035, 95% CI (1.063, 5.166)] compared with patients without nephropathy. There was trend toward an increased risk of CHF exacerbations [OR 1.438, p = 0.109, 95% CI (.923, 2.241)], but the odds ratio for MACE events was not significant [OR 1.281, p = 0.265, 95% CI (.828, 1.982)], nor was the regression for LOS (p = 0.169, 95% CI (-.157, .899)).

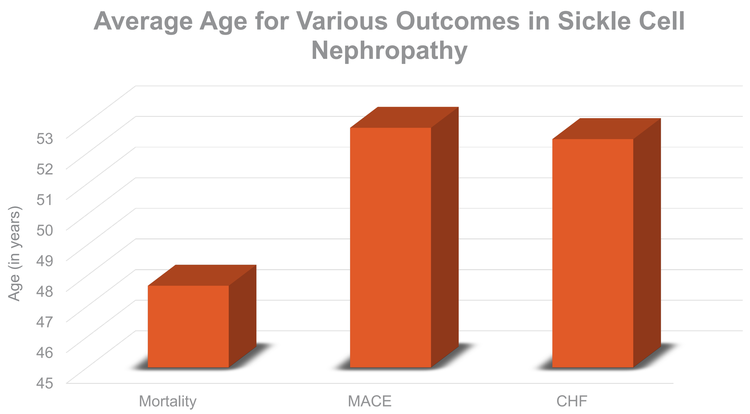

Figure 1: Average Age for Various Outcomes in Sickle Cell Nephropathy

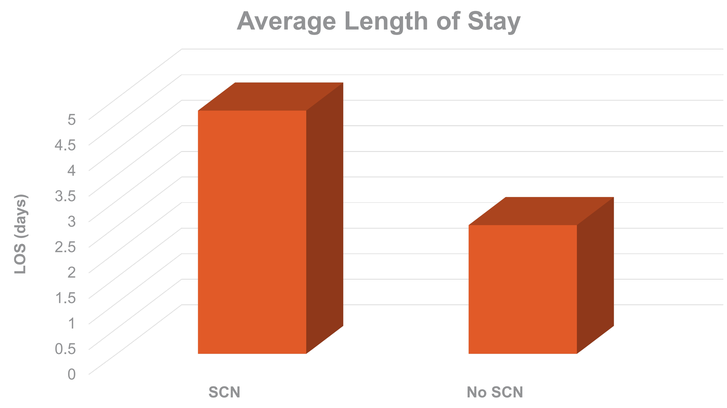

Figure 2: Length of Stay for Patients With and Without SCN

Conclusion

- Based on the analysis of 6,693 patients with SCD, SCN was associated with significantly higher odds of all-cause mortality.
- SCN was not associated with significantly higher odds of MACE or prolonged LOS.
- While SCN may be associated with all-cause mortality, further studies are warranted to understand the association between SCN and cardiovascular complications.

Table 2: Logistic Regression for Various Outcomes in Patients With and Without SCN

Outcomes	Odds Ratio	P-Value	95% Confidence Interval
Mortality	2.343	.035	1.063 - 5.166
CHF	1.438	.109	0.923 - 2.241
MACE	1.281	.265	0.828 - 1.982

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