Abstract: P1443

Title: INTRAVENOUS FLUID REPLACEMENT THERAPY AND HOSPITAL OUTCOMES FOR VASO-OCCLUSIVE EPISODES IN PATIENTS WITH SICKLE CELL DISEASE

Abstract Type: Poster Presentation

Session Title: Sickle cell disease

Background:

Vaso-occlusive event (VOE) is the most common reason for hospitalization in pediatric patients with sickle cell disease (SCD). While intravenous (IV) fluid therapy in patients with VOE can help reduce red blood cell sickling, clinical practices vary across providers and institutions, in part due to a lack of evidence on the optimal IV fluid regimen. Excessive IV fluid therapy in hospitalized patients can lead to volume overload and resultant complications. In this retrospective analysis, we examined the relationship between IV fluid rate and hospital length of stay (LOS). We assessed the relationship between IV fluid rate and risk for adverse events, such as acute chest syndrome (ACS), pediatric intensive care unit (ICU) transfer and readmission within 4 weeks.

Aims:

Primary Aim: Investigate the relationship between IV fluid therapy and hospital length of stay (HLOS) in pediatric patients with sickle cell disease admitted with VOE

Secondary Aim: Evaluate the incidence of adverse events associated with IV fluid therapy. Adverse events defined as the development of acute chest syndrome (ACS) during admission, transfer to the pediatric intensive care unit and re-admission within 28-days from previous admission.

Methods:

This was a retrospective analysis from a single center between January 2015 and April 2020. Patients with SCD (HbSS, HbSC, HbS-β^0 thalassemia, or HbS-β^+ thalassemia), age 0-30, with consecutive admissions hospitalized for VOE were included after local IRB approval. Records were reviewed for demographic variables and clinical parameters such as IV fluids administered, medical history, pain medication use and hospitalization outcomes. For the first 3 days of each admission, an "IV fluid ratio" was calculated by dividing actual IV fluid rate administered by estimated weight-based maintenance IV fluid (mIVF) rate. A multivariate linear regression analysis of average IV fluid ratio and LOS was performed.

Results:

In this study, 617 hospital admissions in 162 patients were included. ACS occurred in 141 admissions (22.9%), 55 (9%) of which developed during the admission. ICU transfer occurred in 15 (2.4%) admissions (7 for exchange transfusion, 7 for respiratory failure, 1 for hypertension). Readmission within 4 weeks occurred in 121 (19.7%) admissions. One hundred twenty-one (19.7%) of the 617 hospitalizations required readmission within four weeks of their previous admission.

Our analysis showed a positive association between LOS and IV fluid ratio. For each additional 0.5 times the mIVF rate, the LOS increased by 0.53 days ($P<0.001$; CI: 0.609–0.989). Multivariate logistic regression analysis showed that IV fluid therapy did not increase the odds of ACS, ICU transfer or readmission within 30 days.

Summary/Conclusion:

We found that increased IV fluid therapy was associated with prolonged LOS, which places a burden on patients, families, and the health system. There was no association with adverse events during hospitalization. Further investigation is needed to determine the optimal IV fluid regimen to manage VOE, decrease complications and

reduce resource utilization.

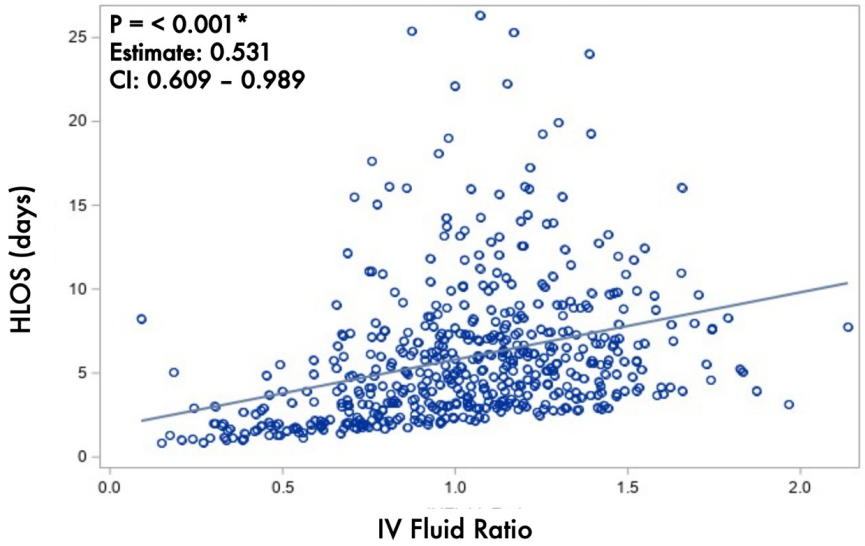

Figure 1: Multivariate Linear Regression Analysis of IV Fluid Ratio and LOS

Keywords: Complications, Sickle cell disease, Acute chest syndrome, Sickle cell patient