

Improving Transition of Care from an Inpatient to Outpatient Setting for Adult Patients with Sickle Cell Disease at Johns Hopkins Aramco Healthcare

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Introduction

Sickle cell disease (SCD) is among the most common severe monogenic disorders worldwide. Patients with SCD experience recurrent vaso-occlusive crises (VOC), where the hallmark clinical manifestation is pain. Acute pain represents the most common reason for emergency department visits and hospitalizations.

Recent U.S. data show there are, on average, 75,000 hospitalizations due to SCD every year with a cost of more than \$450 million dollars (Lutz, Meiler, Bekker, & Tao, 2015). Moreover, there were, on average, 197,000 emergency room visits per year for patients with SCD in the United States, with a hospital admission rate of 29%. The cost of these visits was estimated at more than \$365 million dollars.

In Saudi Arabia, the prevalence of SCD varies geographically, with highest prevalence in the Eastern Province, where Johns Hopkins Aramco Healthcare is located, is nearly 25%. Furthermore, in the Eastern Province, 15-21.1% of hospital admissions into the pediatric and medicine wards were related to SCD (Al-Suliman et al., 2006).

In 2015, there were 37% SCD-related readmissions, and a similar rate was reported in 2016. That was found to be higher than the readmission benchmark rate, which is nearly 33%. All most all, 98% of SCD readmissions in JHAH were adult patients (Medical Records Department, 2015a).

Despite the high prevalence of SCD, there is no standard practice of care for patients with SCD in JHAH. This led to several issues including limited access to specialists (such as hematologists), poor communication and follow-up, and inadequate analgesia during admission and at home.

As a result of these issues, patients rely on receiving care in emergency departments, which is associated with a higher readmission rate, decreased patient satisfaction and an impact on patient quality of life.

Project Purpose and Aims

The purpose of this QI project was to improve the transition of care from an inpatient to outpatient setting for adult patients with SCD, by improving pain management during admission and at home by translating evidence-based guidelines into a clinical pathway.

The aims of the project were: 1) to implement a standardized protocol to provide timely and effective pain management in adult medical wards, during admission and at the time of discharge, and 2) to reduce the readmission rate and emergency room visits.

Methods

- A multidisciplinary team developed an evidence-based clinical pathway for the treatment of adults with pain from SCD.
- This pathway included an ER algorithm to assist with evaluation and decision-making, the ER treatment order set, and discharge planning.

- It also included an admission order set and patient discharge instructions: the admission order included opioid and non-opioid analgesics, laboratory work, intravenous (IV) fluids, PCA orders, and a nursing management plan.
- The clinical pathway was developed and implemented in February 2017. The three-month period, February-April 2016, served as the pre-intervention period, and a second three-month period, February-April 2017, was defined as the post-intervention period. To account for any seasonal confounding variables, the same three-month period was used in two consecutive years (2016 and 2017).
- A comprehensive staff education plan for nursing and physicians was developed and conducted, both before and during the implementation, to facilitate understanding of the evidence-based clinical pathway.
- Two groups were used to compare the pre- and post-intervention outcomes; this was completed with a sample of 60 patients in each group of the pre- and post-intervention implementation.
- It included adult patients age 14 years and above who had been admitted to the medical ward with an SCD crisis.
- It excluded patients with an SCD age below 14 years or main complaints unrelated to VOC.
- It included a retrospective and prospective review of the electronic medical records to compare the mean length of stay, the mean of the re-hospitalization rate, the mean of the ER visits, the mean time for the first analgesia given, and the mean level of the pain score during hospitalization.
- Additionally, data included a patient satisfaction survey for the post intervention group to assess the level of pain control during admission. The patient survey included four demographic items and seven items to measure the experience with acute pain management.

Results

Demographic and Clinical Characteristics

A total of 120 adult patients with VOC (pre-60, post-60) was included in the project. No statistically significant difference was found in the age between pre-and post-intervention. The mean age of the pre-intervention group was 31.8±13.03 compared to 33.1±13.12 in the post-intervention group.

Female participants were more in the pre-intervention group (n=35, 58%), while they were more male participants in the post-intervention group (n=32, 53.3%). Nearly half of the pre-intervention group were on Hydroxyurea (n=34, 56%), while in the post-intervention group the majority were on Hydroxyurea (n=43, 71.7%). Only 20% (n=12) from the pre-intervention group were on a chronic blood transfusion, compared to 38.3% (n=23) in the post-intervention group.

Outcomes Using Opioid Analgesia on a Regular Basis

The percentage of patients who were placed on regular opioids on admission increased significantly from 26.7% in pre-intervention, to 78.3% after the implementation of the pathway (p value = 0.000). Opioids were predominantly ordered as per needed (PRN) for the pre-

intervention group and the implementation of the pathway encouraged physicians to order them on a more regular basis.

Using Intravenous and Patient-Controlled Analgesia

Using intravenous medication (IV) or patient-controlled analgesia (PCA) increased significantly from 20 to 70% (p value = 0.000).

Time to First Analgesia

The mean time to the first analgesic administration decreased significantly from 127 to 54 minutes (p value = 0.000).

Length of Stay (LOS)

There was no significant difference between the pre- and post-intervention groups in terms of the length of stay with means (4.0 ± 2.36 vs. 3.6 ± 2.23).

Prescribing Oral Opioids and Follow-up Appointments

There was a slight improvement (63.3% vs. 81.7%) between the pre- and post-intervention groups in terms of analgesic opioid prescriptions at discharge. However, follow-up appointments were significantly impacted with the implementation of the new pathway; they increased significantly from 33.3% pre-intervention to 78.3% post-intervention (p value = 0.000), which might reflect improvement of the compliance rate of using hydroxyurea (56% vs. 71.7%) and chronic blood transfusions (20% vs. 38.3%).

Readmission within 30 Days

The readmission rate decreased significantly from (46.7% to 20%, p = 0.002) after pathway implementation.

Emergency Visits

Emergency visits were significantly less, 3.73 (± 5.24) in comparison to 7.32 (± 10.27), with the pre-intervention group (P = 0.000).

Conclusions

Introduction of a pain management pathway for adults with SCD were found to be highly effective; it provided a framework to clinicians for appropriate assessment and aggressive treatment that resulted in the following:

Utilization of PCA and the IV routes increased significantly (20% vs. 70%, p = 0.00). PCA was found to be efficient and to improve patient satisfaction, which was similarly reported by Melzer-Lange et al. 2004.

Improvement in the average time intervals to the first analgesic medication was also significant (127.9 ± 41.98 vs. 54 ± 26, p = 0.00), and the time interval to the first analgesic was shorter in this study than previously reported adult data (Tanabe, et al., 2007).

This was accompanied with a significant difference in the decrement in the pain scores after 48 hours post admission (3 ± 0.99 vs. 1.5 ± 1.2, p = 0.00).

Significant reduction of the readmission rate (46.7% vs. 20%, p =

0.00) and ER visits (7.3 ± 10.27 vs. 3.73 ± 5.24, p = 0.00) within a short period-of-time (3 months).

Compliance with the prescribing opioids and follow-up appointments also increased significantly.

The results of this study show that implementing an evidence-based clinical pathway helped to standardize and improve care across the various points of entry through which sickle cell patients seek pain management.

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