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Hospitalized Patients with Acute Decompensated Heart Failure

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The Impact of a Brief Educational Intervention on Prescribing Rates of SGLT2 Inhibitor in Hospitalized Patients with Acute Decompensated Heart Failure

Introduction

Heart failure (HF) is an increasing public health concern in the United States representing an increased burden on the healthcare system.¹⁻⁴ HF currently accounts for approximately 1 million hospitalizations in the United States annually, with approximately 7 million individuals diagnosed with heart failure at this time.¹ Current annual expenditures in the United States for HF is approximately \$30 billion in direct costs, which is projected to increase to \$70 billion by 2030.¹ There is evidence that HF mortality has been increasing since 2012 after declining in the United States from 2004-2012 and that increases in HF mortality are being driven by younger adults with a higher burden of comorbid conditions.¹

Hospitalization for heart failure (HHF) represents an increased risk for morbidity and mortality^{2,3,5}; as high as 40% which can persist for six months following hospitalization.³ Foundational therapy includes angiotensin receptor neprilysin inhibitors (ARNI), sodium glucose co-transporter 2 inhibitors (SGLT2i), mineralocorticoid receptor antagonists (MRA), and beta blockers (BB) which are all recommended as Class 1a therapy⁶. The use of foundational therapy in HF has been shown to reduce morbidity and mortality^{3,6,7} whether or not the patient is in an ambulatory or acute care setting. Despite the inherent high risk associated with HHF, it does represent an opportunity for intensification of therapy.^{3,8} Since 2022, SGLT2i are recommended as a part of foundational therapy⁶ for HF and are recommended for utilization by expert consensus in patients with ADHF.^{2,4,5,9-11}

SGLT2i therapy has been shown to have benefit for patients with HF^{2,4,9,11} and importantly, these benefits are experienced relatively quickly following initiation of therapy compared to ARNI, MRA, and BB. In the Effect of Sotagliflozin on Cardiovascular Events in

Patients with Type 2 Diabetes Post Worsening Heart Failure (SOLOIST-WHF)⁴ and EMPagliflozin in patients hospitalized with acUte heart failure who have been StabilizEd (EMPULSE)⁵ trials, the mortality curves in the Kaplan-Meier curves were noted to separate at approximately 15 days and then remain separated in favor of SGLT2i having decreased mortality compared to placebo. HHF has been noted to have significant increase in risk for mortality^{2,3}, as high as 40%-60% which can persist for up to six months following hospitalization, often referred to as a “vulnerable period” in the literature. Repeated HHF allow stacking and overlapping of these “vulnerable periods” and a persistent elevation in mortality risk. Initiation of SGLT2i therapy has been shown to reduce cardiovascular mortality in HF by 26%^{7,12-14} and with a rapid onset and relatively few adverse reactions or hemodynamic compromise, SGLT2i can be a key therapy in reducing cardiovascular mortality of HF in general and hospitalization in particular. Despite guideline recommendation and strong consensus of expert opinion, SGLT2i remains underutilized in current practice in comparison to other foundational therapy.¹¹

Provider knowledge deficit has been postulated as a driver behind low utilization rates of SGLT2i.¹⁵ Just-in-time education sessions for providers is one method to bridge this knowledge deficit by providing a focused, short education session emphasizing the importance of SGLT2i in contemporary heart failure management. The concept of just-in-time education is to provide focused didactic material through case-studies, short lectures, or simulation to address a very specific knowledge gap and improve evidenced based practice. Just-in-time education has been utilized in other high-risk occupations such as the defense industry, manufacturing, and aviation.¹⁶ Recently the just-in-time concept was adapted to a nursing model to improve nursing recognition and response to patient deterioration with activation of the hospital medical emergency team (MET), the program resulted in an increase in staff nurse perception of the

need for recognition of patient deterioration and an increase in prevalence of utilization of the MET from prior to education.¹⁶

The purpose of this QI project was to explore the impact of a brief educational intervention on the utilization of SGLT2i for patients hospitalized with ADHF in an acute care setting.

Methods

Design

This is a single center, pre- and post-descriptive cohort study utilizing de-identified data. The study was deemed exempt by the University institutional review board and the Quality Committee at the institution. Data collection occurred before and after an education session targeting a group of hospitalist providers.

An in-person education session was held with a hospital-based provider group composed of physicians, physician associates, and nurse practitioners who are contracted by the health system to provide inpatient services for the hospital. This training was provided to ten inpatient providers who have primary rounding responsibilities. This education session was focused on the hospitalist group as they provide approximately 50% of the inpatient care at this facility; specialty medical teams, surgical services, and family medicine teams were not included. There were two education sessions held spanning the different time periods that the hospitalists were scheduled, and all ten of the primary rounding providers were able to attend one of the provider sessions that was a total of one hour with 45 minutes devoted to presenting didactic content and fifteen minutes devoted to question and answers. The sessions were provided by the principal investigator, a nurse practitioner from the advanced heart failure team, nationally certified in heart failure care and management. A PowerPoint presentation was utilized to cover the didactic content, this didactic session covered: (1) epidemiological trends in HF, (2)

underpinning studies of SGLT2i usage in HF, (3) the mechanisms of action in HF, (4) the role of SGLT2i prescribing in HF, and (5) their safety and efficacy in ADHF. In addition to the presentation, a laminated card was given to each provider highlighting key points of SGLT2i usage in ADHF for quick reference during clinical care and to provide further reminders during point of care when orders were placed. This information was provided in the just-in-time education model directed at utilization of SGLT2i in ADHF designed to enhance the provider's knowledge of safe and effective prescription during ADHF.

Data Collection

Data was collected for 30 days pre-intervention to establish a baseline prescription rate for SGLT2i and then for 60 days post-intervention. Patient inclusion criteria were (1) age ≥ 18 years old and (2) admitted with a primary diagnosis of ADHF without regard for left ventricular ejection fraction. Exclusion criteria included: (1) age < 18 years old, (2) primary admission diagnosis not ADHF, (3) patients with type 1 diabetes due to risk for ketoacidosis, (4) patients with end-stage renal disease on dialysis, and (5) pregnant and lactating women. These exclusion criteria are consistent with FDA labeling and indications for SGLT2i therapy, these populations are ineligible for SGLT2i therapy. Admission diagnosis of ADHF was chosen as exclusion criteria to avoid confounding from patients who have HF who may have been admitted to the hospital for another reason.

To determine the impact of the educational session on prescriptive practices, the number of ADHF patient discharges performed by the hospitalist group who received the education was compared to the total number of ADHF discharges for the hospital. Data were obtained through querying the Electronic Health Record (EHR) to provide the total number of orders received by the pharmacy for SGLT2i therapy, the provider placing the order, and total number of discharges by provider. From the list of the patients with HF provided by the

hospitalist census, the EHR was queried for each patient on the list for the primary admission diagnosis, whether or not a SGLT2i was prescribed, and if contraindications/exclusions for SGLT2i therapy were present.

Analysis

De-identified data were imported into a Microsoft Excel spreadsheet. Data analysis was performed using Microsoft Excel. Frequencies and percentages were calculated and compared for the group that received the education intervention to the group that did not receive the education intervention.

Results

Sample

Ten rounding physicians attended the education sessions, or 100% of the providers with primary rounding responsibilities for the hospitalist group. Specific patient demographic data was not obtained due to the limited scope of this study and was not requested in the initial IRB request. Following the intervention, data was collected for 60 days and a total of 131 patients were screened for inclusion or exclusion. Fifty patients met the pre-specified inclusion criteria and were included in the evaluation. Eighty-one patients were excluded due to no primary diagnosis of ADHF or end-stage renal disease requiring renal replacement therapy. In the 30 days prior to the intervention there were 706 total discharges from the hospital with 391 of those discharges performed by the hospitalist group. Following the intervention in a 60 day period, there was a total of 1,321 discharges from the hospital with 728 discharges performed by the hospitalist group. The hospitalist group was on average responsible for 55% of the hospital inpatient census and discharges during the study period.

Prescribing Rates

The baseline prescribing rate for all SGLT2i prescriptions written in the acute care setting by the hospitalist team was 44% of all prescriptions written for SGLT2i in the baseline 30 day period prior to the education intervention. Following the education intervention the hospitalist group showed an increase in SGLT2i prescriptions to 57% or 13 percentage points in the first 30 days, however the rate dropped to 19% in the second 30 days.

During the study data collection period of 60 days, there were 50 patients who were eligible to receive SGLT2i therapy. Of the eligible patients during the study period of 60 days only 35% of eligible patients (see **table 1**) received SGLT2i therapy following the educational intervention. Detailed patient information regarding eligibility for SGLT2i therapy was NOT available in the 30 days prior to the study period.

Discussion

SGLT2i are a foundational therapy, well supported in the literature,^{2,4-6,9,17} however like many novel therapies under-utilization remains a persistent problem in clinical practice.^{10,11} Initial data collection showed that baseline use of SGLT2i therapy was less than 50% for eligible patients by the hospitalist provider group, falling in line with use patterns seen in EVOLUTION-HF (Utilization of Dapagliflozin and Other Guideline Directed Medical Therapies in Heart Failure Patients: A Multinational Study Based on Secondary Data).¹¹ Investigators found that in comparison to peer nations, the United States lagged in utilization of novel therapies for HF and discontinued indicated therapies on a more frequent basis.¹¹ Knowledge deficit by the provider group, given the recent addition of SGLT2i therapy along with a more recent push by expert consensus for multiple-agent initiation of therapy for heart failure is a likely underpinning cause of low baseline utilization. There was an initial increase in utilization following the education intervention which was not sustained over time suggesting that providers returned to previous practice patterns.

The education presentation did have initial success, demonstrating a 13-percentage point increase in the prescribing rate of SGLT2i in the initial 30-day period following the education intervention. This phenomenon of provider inertia^{3,9–11,18} has been well studied in the literature, and more recently attention has been turned to use of the EHR to help spur and sustain long-term changes in provider practice patterns. The Pragmatic trial of Messaging to Providers about outpatient Treatment of Heart Failure (PROMPT-HF)¹⁵ was an outpatient centered, cluster randomized study, which can still provide insight into acute care from an ambulatory setting. Study investigators compared provider clusters who received alerts through the EHR to those who provided medication adjustments without EHR alerts.¹⁵ The study findings were expressed in terms of a “win ratio” shows that provider clusters with use of EHR alerts resulted in greater “wins” or more patients receiving appropriate medical therapy compared to the group without alerts.¹⁵ Alerts through the EHR system may provide for a more sustained change in provider prescribing behavior.

Previous studies have demonstrated that addition of an EHR prompt is associated with an increased trend in provider medication adjustments, compared to usual practice or didactic education alone.^{15,19,20} Next steps could include utilization of the EHR to provide point of care electronic prompts to providers encouraging them to push forward with care. Utilization of electronic prompts embedded in the EHR could address the inertia and make prescription of appropriate therapy the baseline that the provider would have to “opt-out” of while providing their clinical reasoning for not advancing therapy. EHR alerts are easily scalable through an organization and can help provide standardization of practice within the health system reducing variation between providers across service lines and within practice groups. A further next step would be to perform a comprehensive needs assessment to determine what barriers are present for SGLT2i prescription. Further provider groups to investigate in the future would

include the cardiology service as many patients included in this study received consultation by a cardiologist without recommendation for SGLT2i therapy.

Limitations

This study was performed at a single center community acute care hospital and included a relatively small number of patients. Only the hospitalist service was evaluated rather than all services who provided inpatient care to the facility. A greater longitudinal time period would have given a better idea of prescribing patterns following the educational intervention.

Conclusion

Hospitalization for HF continues to be a significant source of mortality in patients with ADHF, while serving as a potential area to allow for intensification of medical therapy. A brief educational intervention may be effective in initially increasing prescribing rates; however, this change may not be sustained over time. Interventions focused on provider behavior should be considered utilizing the EHR as a unifying platform within an individual healthcare system to improve utilization of appropriate therapy for HF.

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Table 1

Measure	Baseline	1 month post	2 month post
SGLT2 Prescribing rates			
Hospitalist	44 (%)	57 (%)	19 (%)
Other service	56 (%)	43 (%)	81 (%)
Eligible Patients prescribed SGLT2i			
Hospitalist	N/A		35 (%)