Spring 5-3-2024

Iron Deficiency Screening Implementation for Patients with Heart Failure Reduced Ejection Fraction

Rachel Kister
Southern Illinois University Edwardsville

Brittany Beler
Southern Illinois University Edwardsville

Nicholas Bauder
Southern Illinois University Edwardsville

Executive Summary

Introduction of the Problem

Preventative care, including diagnostic testing, has always been vitally important in health care as it provides medical information to patients and providers. This leads to early identification and treatment for diseases that could lead to debilitating issues if not caught early enough. With all the research that has, is, and will be conducted, it can be overwhelming for some offices to keep up with the demand of implementing new protocols and ideas. Two Midwest suburban cardiology offices identified a need for an iron deficiency screening tool and treatment protocols for patients with congestive heart failure due to emerging research and guidelines indicating the benefits of treating anemia in this patient population. These offices were separate entities not within the same healthcare system. When speaking with leaders in both offices, the need for a protocol to help identify iron deficiency anemia in patients with heart failure reduced ejection fraction (HFrEF) was identified. Neither office had a screening tool nor consistent screening practices, and they needed help with researching and developing an appropriate tool for this problem.

Literature Review

Iron deficiency (ID) is a commonly overlooked comorbidity among patients with heart failure, affecting up to 50% of all ambulatory patients (von Haehling et al., 2019; McDonagh et al., 2018). Patients afflicted by heart failure with a reduced ejection fraction (HFrEF) are already disadvantaged by inadequate blood perfusion from the heart's inability to pump blood effectively to the body’s vital organs. In addition to the blood’s low iron-carrying capacity, heart failure drastically worsens previously existing symptoms such as fatigue, dyspnea, and reduced exercise capacity. Current research indicates that treating these patients requires intravenous (IV) iron

replacement therapy rather than oral iron replacement due to decreased absorption rates with oral supplementation (Zhang et al., 2019). For patients with HFrEF and iron deficiency, receiving IV iron replacement therapy when indicated has been shown to increase quality of life, improve exercise capacity, decrease heart failure symptoms, and decrease hospital readmission rates (Anand & Gupta, 2018; von Haeling et al., 2019; Tkaczyszyn et al., 2021; Ponikowski et al., 2020). These factors are beneficial to the patient and reduce strain on the healthcare system.

Project Methods

Research was conducted through a literature review to identify recent and updated guidelines regarding ID and HFrEF to implement within the two healthcare facilities. The two facilities needed formal screening tools to identify patients with HFrEF and low iron deficiency. We created and implemented a screening tool that follows the best evidence-based practice. It involved compiling literature, creating a cohesive guideline from multiple quality sources, and simple diagnostic testing. After implementation, the screening tool was evaluated for feasibility, ease of work, and sustainability.

This quality improvement project sought to develop and implement a screening process that healthcare providers can utilize to quickly identify patients with heart failure who are candidates for IV iron replacement therapy. This, in turn, will benefit patients identified by prompting early initiation of IV iron replacement therapy. The long-term goal is to help providers advocate for their patients by using evidence-based research to prevent hospital readmissions, increase patient exercise capacity, decrease heart failure symptoms, and improve the overall quality of life for patients with heart failure.

This quality improvement project was implemented at two large suburban cardiology clinics. One suburban clinic in the central United States has 13 provider locations. The second

facility has five provider locations within the central Midwest United States, with a total of 110 providers, additionally serving in 37 outreach clinics. The project was implemented in two locations, all specializing in cardiology. The Institutional Review Board at Southern Illinois Edwardsville determined on April 26, 2023, that this was a quality improvement project and, thus, exempt from review.

Evaluation

Evaluating this quality improvement initiative was multifaceted and considered several data points. This included the number of patients who were screened for anemia correctly, the number of screening labs ordered, and provider interviews post-intervention. We first wanted to get a baseline of how often providers screened for iron deficiency in their patients with HFrEF and compare how often they were screened over time. The screening protocol we developed was based on data points from the American Heart Association (AHA) guidelines, European Society of Cardiology (ESC) guidelines, and American College of Cardiology (ACC) guidelines. All three guidelines recommend screening patients based on their most recent ejection fraction, hemoglobin and hematocrit, iron panel (consisting of ferritin, total iron binding capacity (TBIC), serum iron, and TSAT%), New York Heart Association (NYHA) screening guide, and Cardiomyopathy Questionnaire (Kansas City) (KCCQ-12). With all these factors, the provider would use a step-by-step screening, diagnosis, and treatment algorithm developed by Sindone et al. (2022) and recently published in the Journal of Clinical Medicine.

Ideally, the DNP project team wanted to access the electronic medical record to determine how many patients who met screening criteria were screened post-introduction of the screening tools. However, as the project progressed, it was discovered that very few patients at one location had HFrEF, and there was no way to know when these patients were scheduled to

be seen in the clinic. Instead, providers who utilized the screening tool filled out the screening tool on paper, and copies were provided for all providers partaking in the implementation. The screening tool provided the last echocardiogram ejection fraction, hemoglobin and hematocrit, and an iron panel with TSAT percentage as the metrics if completed. Providers determined the patient's NYHA classification based on objective patient assessment data. Then, the provider would use the algorithm within the provided screening tool. Based on metrics, labs, and NYHA classification findings, the provider would determine if the patient qualified for IV iron infusions. Due to providers' varying interpretations of the NYHA, the patient would fill out the KCCQ-12 within their appointment to see how their HFrEF affected their daily living activities and quality of life. The data was collected using a paper form within the clinic, and copies of the paper form within a binder were provided to the nurse practitioner and providers who served as stakeholders in this DNP project. This screening tool provides a clear and concise way to evaluate a patient properly and determines if they need appropriate labs drawn, how to interpret the labs, and if the patient should receive IV iron replacement.

At clinic site one, 3 of 20 providers participated in the screening of HFrEF patients: Two were physicians, and one was a nurse practitioner. At clinic site two, 2 of 25 providers participated in screening patients: One physician and one nurse practitioner. At clinic site one, 12 patient screening tools were collected. Of the 12 screening tools provided, only 10 were included in the inclusive criteria of being HFrEF by the most recent echocardiogram and NYHA classification of II or III class. A provider at this site stated that due to the heavy workload and busy clinic scheduling, the screening tool was utilized many times, and patients were screened, but the data was not appropriately documented. One provider estimated that as many as 2-3 times the number of patients were screened than what was recorded. Data collected at this site,

therefore, is somewhat skewed and incomplete. Upon post-intervention interview, one nurse practitioner stated, “I felt the form was easy to use and very straightforward; it was just the fact that I forgot to do it.” Practice change and implementation of these changes have been shown to take time for healthcare providers to adapt to and consistently utilize.

The second provider group screened at least five patients using the screening tool provided. All five patients were accepted for data analysis by inclusive criteria. In post-intervention interviews, providers at the second location also mentioned that they screened more patients; however, due to time constraints, workload, and “inefficiency” of the paper screening tool, they were unable to document all patients who were screened. Providers at this location also expressed concerns about the affordability of IV iron infusions, access to infusion centers, and patient follow-up adherence. In a monthly cardiology meeting, providers in this group unanimously concurred that they should be screening patients with HFrEF for iron deficiency but also mentioned time constraints for adding any projects to their schedule at that time.

Several challenges occurred during project implementation, which impacted project outcomes and data collection. One of the cardiology clinics experienced a systemwide cyber-attack that impacted the electronic health record (EHR), phones, and fax. The clinic was shut down for 16 days (about two and a half weeks). Another limitation at site one was using paper forms instead of EHR to order IV iron infusions for patients. The electronic medical record was not equipped with care plan encounters in the outpatient setting that would allow providers to order the medication electronically. Many patients did not follow through with going to the lab to obtain provider-ordered ID screening. This could be due to the number of labs and tests needed to qualify for the treatment, what is required of them from their various providers, lack of time, going back for more testing, or lack of education on the importance of the screening labs. Due to

time constraints, providers ordered ID screenings for their patients but did not record this data on the screening tool paper form. Therefore, not all patient data was collected, and the results were likely skewed. Another potential limitation would be the person who reads each echocardiogram, as it can be subjective based on the interpreting reading physician and the sonographer's ability to obtain quality imaging with and without image-enhancing medications.

Impact on Practice

Before the project implementation, no protocol within either facility existed to help easily identify HFrEF patients with ID who may qualify for IV iron replacement therapy. Implementing this project allowed the providers to understand the importance of screening for iron deficiency anemia in HFrEF patients. Creating a screening tool for HFrEF and ID allowed providers to have the most recent evidence-based practice algorithm in front of them. Cardiology providers do not typically order IV iron infusions; this is often ordered and followed by Hematology/Oncology providers. Both Cardiology groups suggested that the initiation of IV iron infusions, maintenance, and ongoing labs be controlled and monitored by hematology/oncology providers.

The impact this project had on the participating cardiology clinics is that providers realized the importance of screening HFrEF patients to improve their patient's quality of life and to keep patients out of the hospital if possible. Ideally, this increases early identification and treatment for patients with HFrEF and ID who will benefit from IV iron replacement therapy. The immediate impact at each facility was that providers were educated about this 1A evidence-based guideline and screening that needs to be implemented into their practice. It would be important to evaluate long-term outcomes and implement changes in the protocol that would make it more feasible for use in a busy practice setting. Financial and time burdens to the

patients regarding blood work and infusions would need to be considered to outweigh the long-term benefits.

It is difficult to start a practice change, especially in high-volume healthcare centers where several people are involved in decision-making. Implementations require leadership assistance, such as administration and management, to help implement the screening tool across all cardiology and/or provider groups.

Conclusions

In conclusion, both cardiology clinics started utilizing the implemented screening tool, 15 patients with HFrEF were screened, and the potential for iron deficiency anemia was documented. The providers verbalized the easiness of working with the screening tool and its straightforwardness. However, they had difficulty with the screening paper tool due to time constraints during the fast-paced nature of everyday practice. Overall, the patients screened had baseline depleted levels in TSAT percentage, reduced ejection fraction, and serum iron levels.

Future projects should focus on implementation in clinics with high volumes of patients with HFrEF, including rural communities. Another suggestion would be to have collaborating providers in hematology/oncology help manage the patients who need IV iron replacement therapy. To have ease of access, implementing the screening tool in the EHR would help decrease barriers to not completing the screening tool.