JACC: ADVANCES VOL. 3, NO. 7, 2024

EDITORIAL COMMENT

Optimization of Guideline-Directed Medical Therapy During Hospitalization for Heart Failure

Mind the Gap!

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Contemporary management of heart failure with reduced ejection fraction (HFrEF) consists of 4 foundational pillars of guideline-directed medical therapy (GDMT) that have demonstrated incremental benefits in morbidity and mortality for patients with HFrEF. However, despite the high-quality evidence to support their use, rates of GDMT utilization remain dishearteningly low, and when GDMT is prescribed, it frequently occurs at subtarget doses.[1-3] Hospitalization for decompensated heart failure is a pivotal moment in a patient's clinical trajectory that, for some, signifies the incident heart failure diagnosis and for others indicates a risk-enhancing event. Aggressive implementation of GDMT during a heart failure hospitalization, when the patient can be closely monitored while being decongested, is safe and significantly reduces subsequent morbidity and mortality.[4] Despite the opportunity, GDMT optimization during a hospitalization for decompensated heart failure has been underutilized.[5,6]

In this issue of *JACC: Advances*, Margolin et al[7] describe contemporary real-world experience with GDMT management in 391 patients hospitalized for decompensated HFrEF at their institution between 2017 and 2018. They sought to evaluate whether demographic and socioeconomic factors were associated with deficiencies in implementation of GDMT during hospitalization and to evaluate the impact of GDMT utilization on subsequent clinical outcomes. The authors used a modified optimal medical therapy (mOMT) score accounting for medication contraindications such as renal dysfunction (estimated glomerular filtration rate <30 mL/min), bradycardia (heart rate <60 beats/min) or hyperkalemia (serum potassium >5.0 mEq/L) that limited GDMT uptitration or initiation. The mOMT score, ranging from a score of 0 to a maximum value of 1.0, was a calculated fraction of total earned vs maximal possible points based upon dosing of GDMT after accounting for the medication contraindications listed above. The authors evaluated both the admission and discharge mOMT score to understand the changes in medical therapy during admission and assessed clinical outcomes as a function of discharge mOMT score. The findings were consistent with previous registry data, finding that implementation of GDMT was suboptimal. The calculated mOMT score for the entire population was 0.470 ± 0.22, and only 12.5% of patients achieved a perfect (mOMT score of 1.0, 6.1%) or near perfect (mOMT score ≥0.75 but <1.0, 6.4%) mOMT score. Furthermore, the change in mOMT score from admission to discharge was only 0.045 ± 0.237, demonstrating clinical inertia.

When evaluating demographic and socioeconomic factors, the authors report an associated GDMT deficiency in patients experiencing homelessness and in Black patients, but no significant differences in mOMT score according to sex, marital status, ethnicity, primary language, type of insurance, or economic status as assessed by the distressed

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

ISSN 2772-963X https://doi.org/10.1016/j.jacadv.2023.100819

communities index quintile. It is important to note, however, that the lower discharge mOMT score in Black patients compared with non-Black patients was predominantly observed in patients with a new diagnosis of HFrEF. Furthermore, Black patients require a higher number of medications to achieve a near-perfect or perfect mOMT score due to the addition of hydralazine and isosorbide dinitrate, which would not be indicated until optimized on other pillars of GDMT. When hydralazine and isosorbide dinitrate were excluded from calculation of mOMT scores, there was no difference in mOMT scores between Black and non-Black patients, regardless of whether HFrEF was new-onset or preexisting.

When considering clinical outcomes, the authors found in univariate analysis that greater optimization of therapy (higher mOMT score) was associated with decreased rates of the composite endpoint of combined 1-year mortality or HF rehospitalization at 1 year (HR: 0.382, 95% CI: 0.015-0.947; $P = 0.038$) as well as HF rehospitalization at 1 year and 1-year all-cause mortality in patients with new onset, but not previously diagnosed, HFrEF. For the entire population, mOMT remained significantly associated with the composite endpoint after adjustment for age and sex, but not after multivariable analysis.

Significant limitations of this study include the lack of sodium-glucose co-transporter-2 inhibitors (SGLT2i), which were not guideline-recommended for systolic heart failure during the period studied. Similarly, the study did not evaluate the preferred angiotensin receptor-neprilysin inhibitor (ARNI) use independently from other inhibitors of the renin angiotensin system (angiotensin-converting enzyme inhibitors and angiotensin receptor blockers). Future evaluation of a mOMT score that incorporates SGLT2i and ARNI may demonstrate greater impact of mOMT scoring on clinical outcomes.

The findings of this retrospective, real-world study add to the literature demonstrating suboptimal utilization of GDMT and clinical inertia in medication optimization during a crucial moment in the clinical trajectory of HFrEF. These findings highlight the need for additional quality improvement and implementation efforts to improve the delivery of care to patients with HFrEF. In the recent past, there have been numerous publications describing interventions and strategies to improve GDMT utilization including GDMT uptitration clinics, virtual GDMT consult teams, digital health tools and apps, patient activation programs, and more.[8] Despite these validated tools, inadequate rates of GDMT remain pervasive in our health systems.

The 2020 American College of Cardiology/American Heart Association Clinical Performance and Quality Measures for Adults with Heart Failure report introduced 2 new performance measures that are suitable for public reporting or pay-for-performance relating to dose of GDMT: achieving at least 50% of target dose of beta-blockers and achieving at least 50% of target dose of ARNI, angiotensin converting enzyme inhibitors (ACEI), or angiotensin receptor blockers (ARB).[9] The Get With The Guidelines Heart Failure Registry publicly reports data from participating centers using an inpatient sampling, which includes prescription of GDMT components; however, participation is voluntary and currently does not include rates of GDMT in the outpatient setting. We recently published GDMT utilization rates from our center including all patients with HFrEF in both the inpatient and outpatient settings. We also challenged others in the heart failure community to do the same, believing that such transparency would serve to facilitate implementation of center-specific quality improvement efforts and potentially drive patient care to high-quality centers.[10]

Yet, it is important to recognize that every health care system is inherently different, with different infrastructures, resources, patient populations, and payer mixes. Thus, improvement efforts must be tailored to each health care institution. Additionally, essential in the efforts to improve GDMT utilization must also be efforts to provide equitable access to the cost-effective foundational therapies for HFrEF that lead to a substantial improvement in patient outcomes and decrease in health care utilization. Margolin and colleagues found mOMT scores were significantly lower in patients who were homeless, reflecting the inequity in access to life-saving medications and potentially follow-up care in this population. Others have also demonstrated amplified gaps in implementation of GDMT in other populations including minoritized racial and ethnic groups, women, and those of lower socioeconomic status. Notably, even for those who are not homeless or uninsured, access to SGLT2i and ARNI often remains prohibitive due to cost.[11] In order to close the gaps in GDMT optimization, individualized interventions that address multifaceted implementation barriers at the level of the health care system, clinician, and patient must be sought to facilitate delivery of high-quality HF care, reduce the burden of HF, and optimally impact outcomes for patients with HFrEF.

FUNDING SUPPORT AND AUTHOR DISCLOSURES

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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KEY WORDS **GDMT, guideline-directed medical therapy, HFrEF**