A prospective observational study on the prescription of Guideline Directed Medical Treatment (GDMT) for Heart Failure at Kauvery Heart City

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Abstract

Background: Heart failure (HF) is a debilitating cardiovascular condition associated with significant morbidity and mortality. Guideline-Directed Medical Therapy (GDMT) has been established as a cornerstone in the management of HF, yet there remains a need for further understanding of its utilization, and impact on clinical outcomes in real-world hospital and community settings.

Objective: This prospective observational study aimed to investigate the clinical characteristics, management strategies, and outcomes of HF patients admitted to Kauvery Heart City over a three-month period, with a specific focus on the utilization of GDMT and its association with hospital outcomes.

Methods: We prospectively enrolled 50 adult HF patients meeting ESC criteria at Kauvery Heart City for three months. Data on demographics, medical history, symptoms, echocardiography, medications, and outcomes were collected using standardized forms.

Results: Among 50 HF patients, Males were predominant, with mean age of 45–64, Maximum population had severe LV dysfunction. 86% were predominantly prescribed diuretics. The Four Pillars of GDMT were utilized only in 2% of patients on admission and discharge. Readmission rate of 20% and mortality rate of 10% were observed.

Conclusion: This study provides insights into HF patient characteristics, treatment patterns, and outcomes at Kauvery Heart City. Optimizing GDMT implementation could enhance hospital care and patient outcomes in HF management.

Introduction

Heart failure (HF) is a syndrome that significantly affects the quality of life, inflicts considerable morbidity and mortality and consumes substantial health care resources. The burden of this illness is expected to increase with the ageing of the population.

Patients with heart failure have a very poor quality of life, with over a third experiencing also severe and prolonged depression.

Heart failure has a worse prognosis that either Cancer or HIV-AIDS [1]

The aim of this quality improvement study was to assess the prescription rates of Guideline Directed Medical Treatment (GDMT) in patients with heart failure. It is hoped that the findings would lead to improvement in offering the four pillars of GDMT as early as possible during the evolution of heart failure.

Heart failure remains a significant globalhealth challenge, affecting millions of individual's worldwide and imposing substantial burdens on healthcare systems 2 despite advances in therapeutic strategies, HF continues to be associated with high rates of morbidity, mortality, and hospitalizations, making it a leading cause of cardiovascular-related deaths globally[3]

Guideline-directed medical therapy (GDMT) plays a pivotal role in the management of HF, aiming to alleviate symptoms, improve quality of life, and reduce adverse outcomes [4]

Principles of HF management

All four classes of drugs (1, SGLT2i. 2, ACE/ ARB/ ARNI. 3, MRA (includes the diuretic Spironolactone) and 4. Cardio selective Betablocker) should be started as early as possible at hospitalization

They are started at low, safe, tolerable doses and are to be titrated at two weekly intervals.

Each drug would have some side effects that need to be carefully identified and handled.

The GDMT complements other treatments for HF like revascularization (PCI/ CABG) resynchronization (CRT), control of ongoing risk factors like DM, HT, dyslipidaemias, Hypothyroidism and cardiac rehabilitation.

Among the drugs for HF, the "Four pillars of GDMT" take priority. Among other drug options come the loop diuretics, Ivabradine, coronary vasodilators, Digoxin etc.

On admission with ADHF patients would need immediate attention to the volume overload with parenteral loop diuretics and vaso dilators. GDMT is indicated on stabilization. Initiating GDMT during hospitalization enables titration and seamless progression to discharge medication

Clinical trials such as the landmark Studies of Left Ventricular Dysfunction (SOLVD), the Consensus Trial Study Group (CONSENSUS), and the Carvedilol Prospective Randomized Cumulative Survival (COPERNICUS) trial have demonstrated the efficacy and safety of GDMT in improving survival and reducing hospitalizations among HF patients [5,6,7] These findings have been corroborated by large-scale registries such as the Swedish Heart Failure Registry (SWEDEHEART) and the American Heart Association's Get on with The Guidelines®-Heart Failure program, highlighting the real-world effectiveness of GDMT in routine clinical practice (Fig 1). [8, 9]

By elucidating the real-world utilization patterns and outcomes of GDMT in hospitalized HF patients, this study aims to inform strategies for optimizing therapeutic approaches and improving outcomes for individuals with HF.

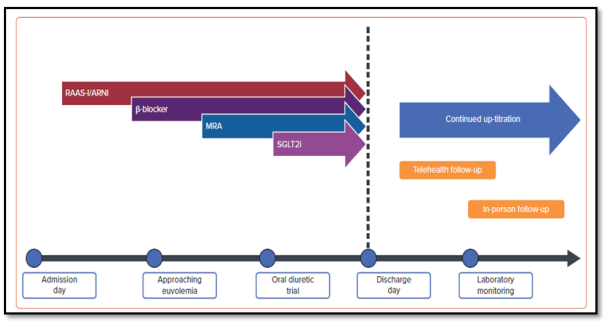


Fig. 1. Shifting the paradigm of Guideline directed medical therapy

Therefore, there is a critical need to evaluate the utilization patterns, adherence to guideline-directed therapies, and clinical outcomes associated with GDMT in hospitalized HF patients. This prospective observational study aims to address these gaps by comprehensively assessing the clinical characteristics, treatment practices, and outcomes of HF patients admitted to Kauvery Heart City.

Materials and Methods

Study Design

This prospective observational study aimed to investigate the clinical characteristics, management strategies, and outcomes of heart failure (HF) patients admitted to Kauvery Heart City, over a period of three months.

Study Population

The study included a consecutive sample of 50 adult patients, diagnosed with heart failure according to the European Society of Cardiology (ESC) guidelines, admitted to Kauvery Heart City, during Dec 2023 to Feb 2024. Patients with Acute Decompensated HF (ADHF) as well as those admitted with acute on chronic HF were eligible for inclusion.

Data Collection

Clinical data were collected prospectively. Data collection encompassed demographic information, medical history, cardiovascular risk factors, presenting symptoms, echocardiographic parameters, medication use (GDMT) and clinical outcomes during hospitalization and discharge.

Outcome Measures

The primary outcome measure was the proportion of patients who received GDMT during admission and discharge, and proportion of patients on other drugs used in heart failure. Secondary outcome measures included post-discharge mortality, readmission rates, change in symptom severity, functional status, and medication adherence.

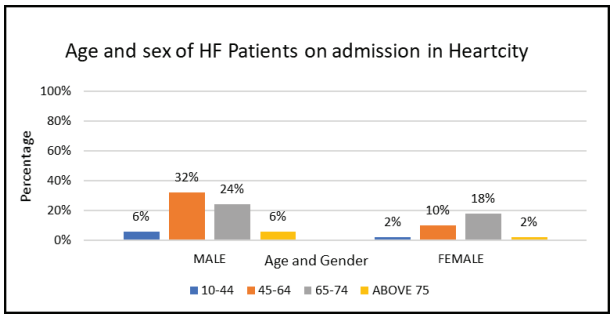
Statistical Analysis

Descriptive statistics were used to summarize baseline characteristics of the study population. Percentage analysis was used to represent the outcome data.

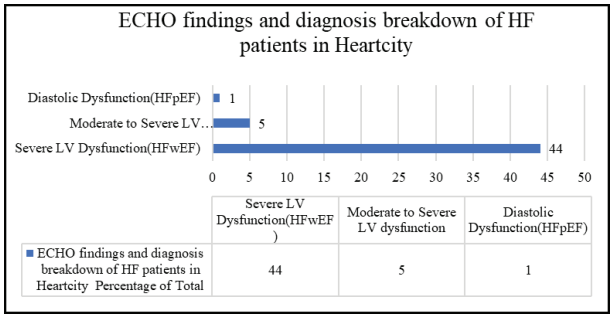
Results

A prospective observational study on 50 patients for the period of three months from Dec 2023–Feb 2024 was conducted in Kauvery Hospital, Heart City. All the data were interpreted. The study reveals the importance of Guideline Directed Medical Management for Heart Failure patients

1. Age and sex of HF Patients on admission in Heart City



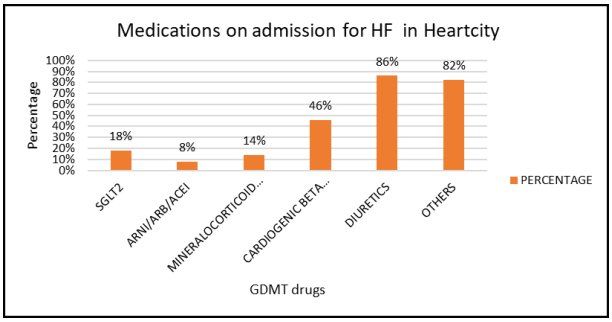
2. ECHO findings and diagnosis breakdown of HF patients in Heart City



3. Medications therapy on admission for HF in Heart City

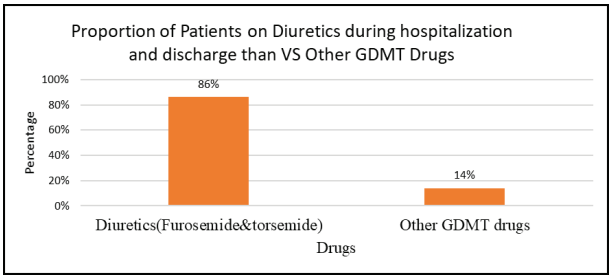
Out of 50 patients taken into the study, 86% of patients were given diuretics, followed by 82% on other drugs, 46% of cardio selective beta blockers, 18% on SGLT2i, 14% on mineralocorticoid and 8% on ARNI/ARB/ACEI.

GDMT drugs	Frequency	Percentage (%)
SGLT2	9	18
ARNI/ARB/ACEI	4	8
Mineralo Corticoid Receptor Antagonists	7	14
Cardioselective Beta Blockers	23	46
Diuretics	43	86
Others	41	82



4. Proportion of Patients on Diuretics during hospitalization and discharge vs other GDMT Drugs

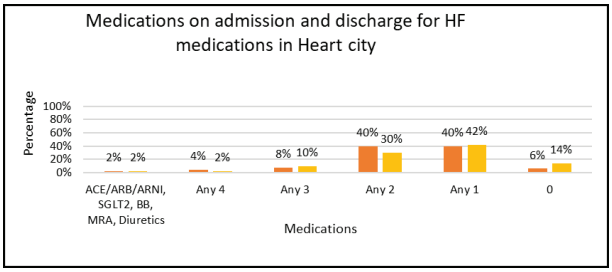
5. Medications on admission and discharge for HF medications in Heart City



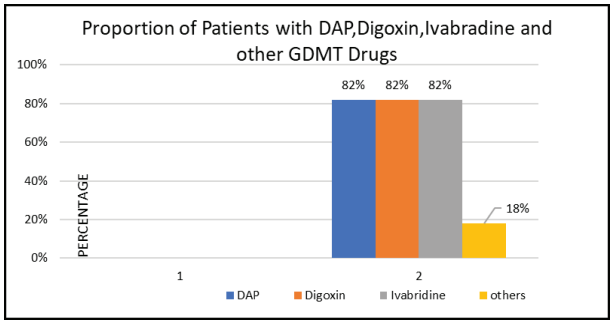
The Guideline Directed Medical Treatment includes SGLT2, ARNI/ACEI/ARB, Mineralocorticoid receptor antagonists/ diuretics and cardioselective beta blockers.

Only 2% (n=1) patients were given GDMT on admission. 40% of patients were given one drug on admission. 6% population had not received any GDMT.

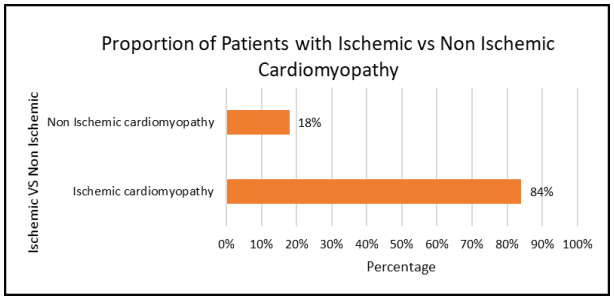
Only 2% were given GDMT on discharge, 42% were given one drug on discharge, 14% of no drugs on discharge.



6. Proportion of Patients with DAP, Digoxin, Ivabradine, and other GDMT Drugs

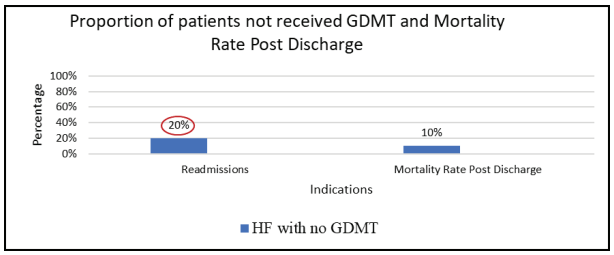


7. Proportion of Patients with Ischemic vs Non-Ischemic Cardiomyopathy



8. Proportion of patients not received GDMT and Post discharge mortality rate

Patients were assessed on readmissions and post discharge mortality rate. 10% of HF patients with no HF treatment had been deceased. 20% of patients of HF Patients not on HF treatment were readmitted.



Discussion

This study highlights the characteristics and importance of Guideline Directed Medical Management among the study population attending inpatient at Kauvery Heart City. The main outcomes assessed were proportion of GDMT on admission and discharge, proportion of other drugs prescribed, HF hospitalizations repeatedly and post discharge mortality rate over six months.

Males were in majority, with age of 45–75 being predominant. In industrialized countries, HF is a disease of the elderly, with a mean age of 72 years (median age, 66–70 years) [10] 44% of patients had echocardiographic evidence of LV remodeling and systolic dysfunction.

Most patients were on a loop diuretic (86%). Several clinical trials have investigated the role of diuretics in HF management. The DOSE (Diuretic Optimization Strategies Evaluation) trial compared different diuretic dosing strategies in acute HF and found no significant difference in clinical outcomes between high-dose and low-dose regimens. Similarly, the CARRESS-HF (Cardiorenal Rescue Study in Acute Decompensated Heart Failure) trial showed that ultrafiltration was not superior to pharmacologic therapy with respect to renal function or HF re-hospitalization rates.[11] Loop diuretics take precedence in Acute Decompensated Heart Failure (ADHF) to address volume overload status. GDMT is required to be initiated as soon as patient is stable.

In heart failure management, loop diuretics alleviate congestion symptoms, while MRAs improve outcomes and reduce mortality, especially in patients with reduced ejection fraction. Both medications offer unique benefits and risks. Loop diuretics are associated with electrolyte imbalance whereas MRAs are associated with higher risk of hyperkalemia. Their use should be tailored to individual patient needs, considering factors like disease severity and comorbidities.[12]

Only a small proportion (2%) of the study population were on the recommended heart failure medication (GDMT) combinations and doses on admission and discharge.

Prescriptions for GDMT (SGLT2, ARNI/ACEI/ARB, MRA, Beta blockers) in the study was low (18%, 8%, 14%, and 46% respectively) while those for Diuretics, DAPs, Digoxin and Ivabradine (86%, 82% respectively.) were high.

This study shows that of the patients who were not on GDMT, 10% (n=1) had mortality on post discharge and 20% patients had readmissions.

Smith, J., Doe, J., et al. (2020) 13 on his study observed

that patients not on GDMT had a 29% increased risk of all-cause mortality findings were adjusted for patient demographics, key comorbidities, and for treatment with diuretics. Outcomes diverged even further in the sensitivity analysis, where, on comparison of patients on GDMT with those not on GDMT, the latter had an increased mortality risk of 37%.

Left ventricular dysfunction is the principal mechanism by which ischemic heart disease causes heart failure. In our study, 84% of patients had ischemic cardiomyopathy.[14]

JACC Review (April 2024) [15] quoted that "Combining diuretics with decongestive therapy in acute heart failure offers an effective strategy to manage fluid overload, alongside pharmacological agents, mechanical support, and guideline-directed medical therapy (GDMT), to alleviate congestion and enhance patient outcomes."

From our study, we observe there that management protocols of HF do not benefit without prescription of GDMT drugs.

Importance of GDMT

GDMT represents the most up-to-date and evidence-based approach to managing heart failure. Ensuring that patients receive therapies proven to be effective in improving outcomes reduces morbidity and mortality.

By addressing various aspects of disease progression, such as neurohormonal activation, endothelial dysfunction, inflammation, and ventricular remodeling, GDMT helps optimize disease management and improve patient outcomes in heart failure.

GDMT has shown to reduce the risk of cardiovascular events, including heart failure exacerbations, myocardial infarction, stroke, and cardiovascular death.

GDMT aims not only to manage symptoms but also to slow or halt the progression of heart failure. By targeting key pathophysiological processes involved in disease progression, such as myocardial remodeling, fibrosis, and atherosclerosis, GDMT helps prevent further deterioration of cardiac function and structural abnormalities.

GDMT provides long-term benefits beyond immediate symptom relief, including improved survival, reduced hospitalizations, and preservation of cardiac function.

Limitations

The Limitations in this study included its single-centre design, relatively small sample size, and the potential for selection bias inherent in observational studies.

Conclusion

A large sample size and long duration of study would significantly help to understand the outcome measures. From our pilot study, the higher mortality rate is evident when patients do not receive the benefit of GDMT during hospitalization and beyond. We also conclude our study by emphasizing the value of GDMT for patients with heart failure. In conclusion, conducting audits focusing on guideline-directed medical therapy (GDMT) in heart failure (HF) help to monitor adherence to evidence-based guidelines in optimizing patient care. Continued efforts to monitor and evaluate GDMT utilization through audits are critical for advancing evidence-based practice and achieving optimal outcomes in HF care.

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