The impact of outpatient pharmacological optimization on echocardiographic parameters in heart failure with reduced ejection fraction

A. Pandey¹, L. Kuehl², A.K. Pandey³, I. Bonavie², A. Singh², S. Verma⁴

¹University of Ottawa, Ottawa, Canada
²Cambridge Cardiac Care Centre, Cambridge, Canada
³University of Guelph, Guelph, Canada
⁴St. Michael's Hospital, Toronto, Canada

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Background: The 2022 landmark STRONG-HF study demonstrated that aggressive uptitration of guideline directed medical therapy (GDMT) in patients recently hospitalized for heart failure leads to a reduction in the composite endpoint of heart failure hospitalization and mortality. However, the impact of optimization of GDMT on echocardiographic parameters in heart failure with reduced ejection fraction (HFrEF) is unknown.

Purpose: This goal of this study was to determine the impact of a virtual HFrEF optimization program for achieving GDMT uptake and its impacts of echocardiographic parameters.

Methods: We conducted a single center study at a Canadian community cardiovascular centre using a prospective pre-post design. NYHA class II/III HFrEF patients referred from inpatient and outpatient settings were enrolled in our virtual 3-month HFrEF optimization program. All participants underwent an initial consult with a nurse and cardiologist. After this, all patients were seen remotely by a nurse every two weeks for adjustment of HFrEF medications with the goal of maximally tolerated GDMT dosing within 3 months was. Transthoracic echocardiograms were performed prior to participation in the program & after completion.

Results: Over 9 months, 284 NYHA class II/III HFrEF patients enrolled in the virtual HFrEF optimization program. Mean age was 67 and 70% were male. Mean ejection fraction was 34% and 54% had New York Heart Association Class II symptoms. At intake, the proportion of patients prescribed each class of GDMT was: 69% for Beta-blockers, 23% for Mineralocorticoid Receptor Inhibitors (MRA), 16% for Valsartan-Sacubitril and 7% for SGLT2 inhibitors. At 3-month follow-up, rates of GDMT prescription were improved: 90% for beta-blockers (p<0.01), 71% for MRA (p<0.01), 95% for ARNI (p<0.01) and 79% for SGLT2 (p<0.01). From baseline to follow-up echocardiogram, mean Left Ventricular End Diastolic Diameter improved from 5.51 to 5.13 cm (p<0.01). Mean Left Ventricular End Systolic Diameter improved from 4.33 to 3.75 cm (p<0.01). Mean Left Ventricular Mass Index was improved from 112.5 to 102.5 g/m² (p<0.01). Mean Left Ventricular Ejection Fraction improved 34.4% to 49.8% (p<0.01). No hospitalizations due to medication-related adverse events were reported and 18 patients were hospitalized for HF exacerbation during study follow-up. Mean serum creatinine increased from 97.4 to 104.5 µmol/L (p<0.01); mean serum potassium increased from 4.48 to 4.58 (p<0.01).

Conclusions: This study demonstrates that a virtual program for GDMT optimization can safely and rapidly promote uptake of therapy in HFrEF patients. Furthermore, medical optimization was associated with significant reductions in left ventricular size, mass and ejection fraction. This provides a structural explanation for reductions in morbidity and mortality seen in STRONG-HF. Future studies should examine the effect of similar interventions on patient outcomes in a randomized setting.