Long Distance Titration of Heart Failure Medications by Telephone Calls

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Introduction

- Heart failure (HF) guidelines recommend timely titration of beta blockers and other heart failure medications to doses shown to be effective in clinical trials.
- Doses are often not optimized in clinical practice because of difficulty in organizing frequent clinic visits and perceived medication side effects.
- Long distance titration of HF medications by telephone is an option that could help up-titrate HF medication in a timely manner without frequent clinic visits but has not been extensively investigated.

Aims of the Study

- To assess whether an experienced HF nurse (RN), supervised by cardiologist or nurse practitioner could optimize medications.
- To assess whether intensive long distance titration of heart failure medications by telephone results in improvement of left ventricular function and a reduction in the need for cardiac device.

Methods

- Patients with the stable HF, NYHA Class I-III, needing HF medication titration were referred to the clinic from inpatient services, medicine and other cardiology clinics.
- A complete history and exam, SMA10, BNP, EKG, and 2-D ECHO were obtained at the initial visit. A weighing scale and home BP monitor was provided and patients were educated about daily weights, recording of vital signs, low sodium diet, signs and symptoms of worsening HF, medication side effects, and dose adjustments.
- Telephone calls were made to patients at 1 to 3 week intervals to titrate doses depending on HR, BP, symptoms and weight. These patients were not telemonitored.

Methods

- Clinic visits and lab tests were ordered only as required. Most labs were done at the patient's local facility (CBOC etc) to minimize visits to Minneapolis.
- A second 2-D ECHO was obtained 3-6 months post optimization of HF medications.
- Since patients were on different beta-blockers and ACE-I and or ARB, medication doses were calculated as a percent of target doses.
- Pre and post optimization vital sign measurements are reported.

Beta-blocker Titration

- Metoprolol SR initial dose 12.5 mg QD, goal dose 200 mg QD.
- Carvedilol initial dose 3.125 mg BID, goal dose 25-50 mg BID.
- Titrate every 2 weeks to a target HR of 60 bpm or goal dose.

ACE-I/ARB titration

- Lisinopril initial dose 2.5 mg QD, goal dose 20 mg QD.
- Valsartan initial dose 40 mg BID, goal dose 160 mg BID.
- Titrate every 2 weeks to target dose or as blood pressure, renal function, serum potassium levels tolerate.

ACE-I/ARB Titration

- ARB used in patients who do not tolerate ACE-I.
- ARB added to ACE-I if patient remained symptomatic despite ACE-I. Very close lab monitoring required.

Spironolactone Titration

- Initial dose 12.5 mg QD, goal dose 25-50 mg QD.
- Titrate to goal dose or as renal function, serum potassium levels tolerate.

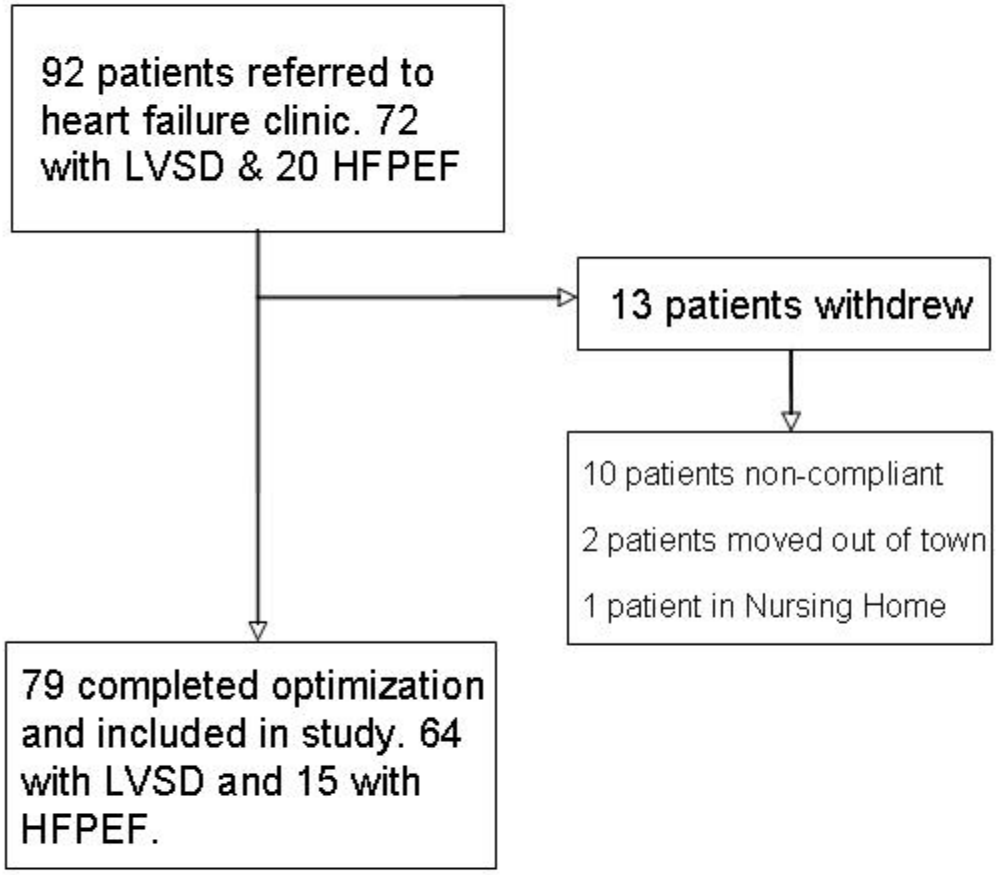
Hydralazine and Isosorbide Dinitrate Titration

- Hydralazine and isosorbide dinitrate were used in patients who were intolerant of ACE-I/ARB and was added to ACE-I and beta blockers in African-Americans who remained symptomatic.

Results

- These results are for the first 92 patients referred to the up-titration clinic are presented.
- The median time to optimization was 54 (IQR 20-97 days).
- Thirteen patients were withdrawn from this analysis due to noncompliance (10), moving (2) or entering nursing home (1).
- There were 79 patients with LV systolic dysfunction (EF<40%) and 14 with preserved LV function.
- The baseline characteristics are shown in Table 1.

Study Cohort



Results

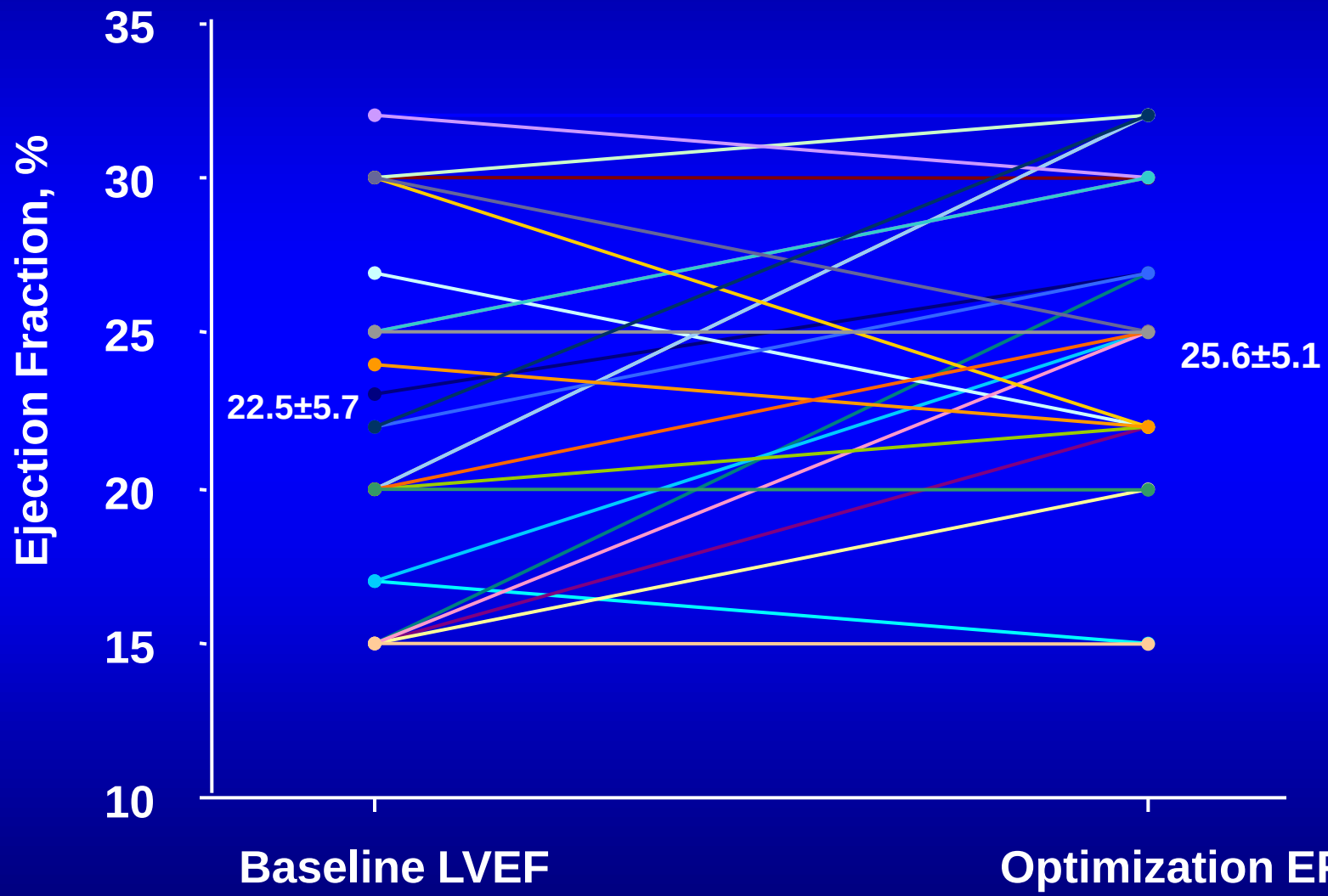
Baseline and post optimization data on 64 patients with LVD

Variable	Baseline (n=64)	Post Optimization (n=64)
AGE, years, mean(SD)	66.7 (12.9)	
BMI (Kg/m^2) mean (SD)	31.3 (7.1)	
Systolic blood pressure, mmHg, mean(SD)	126 (20)	115 (11.8)
Heart rate, per minute, mean(SD)	67 (13)	62.2 (6.5)
NYHA Class		
I, %	25	23
II, %	23	31
III, %	52	45
Medications		
ACE inhibitor, (%)	62.5	70.3
ARB, (%)	9	27
ACE-I or ARB, (%)	72	98
ACE-I/ARB at target dose (%)	20	50
ACE-I/ARB fraction of target dose (%)	39	87
Beta-Blocker, %	61	97
Beta-Blocker at target dose (%)	12	41
Beta-blocker at fraction of target dose (%)	22	71
Spironolactone, %	13	27
Hydralazine %	8	19
Isosorbide dinitrate (%)	15	25
Lasix (%)	68	61
Important Labs		
K (mmol/dL)	4.3 (0.35)	4.3 (0.4)
BUN (mg/dL)	21 (15-28)	23 (16-30)
Cr (mg/dL)	1.2 (0.3)	1.4 (0.4)
eGFR (ml/min/m^2)	64 (19)	62 (18)
BNP (pg/mL)	281 (90-735)	204 (87-451)
Hgb (g/dL), mean (SD)	14.1 (1.7)	13.7 (1.8)
Ejection Fraction (%), mean (SD)	26.6 (7.3)	35.7 (11.3)

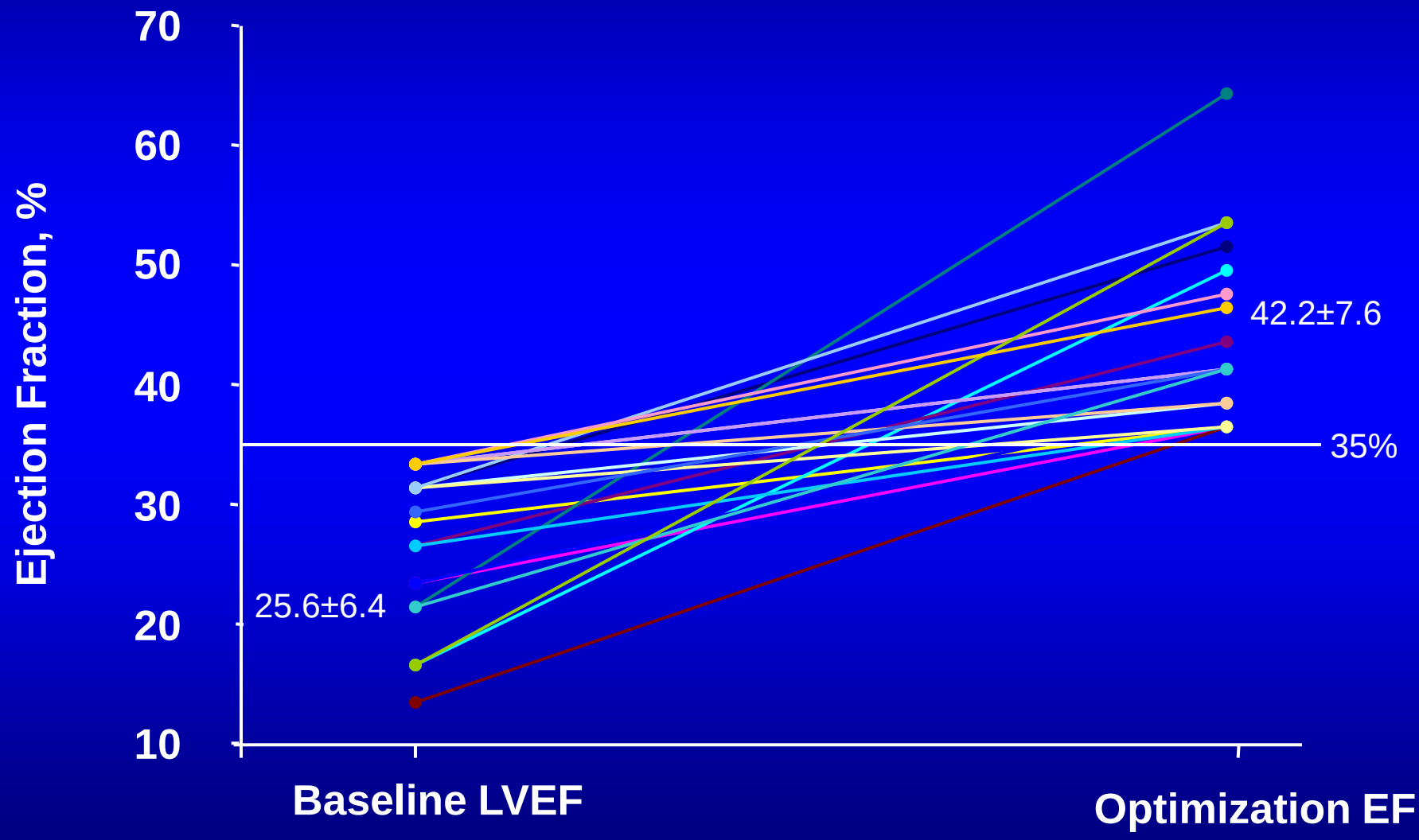
Results

- The mean EF increased from 26.6 ± 7.3 % at baseline to 35.7 ± 11.3 % post optimization (mean increase 9.5 ± 9.9 %).
- There were 44 patients with EF of < 35 % at baseline who were, therefore, potential candidates for ICD and/or CRT therapy. The EF increased ≥ 35% in 45% (20/44) of patients.

Change in EF from baseline to 3-6 months after optimization in patients whose LVEF remained < 35 %



Change in EF from baseline to 3-6 months after optimization in patients whose LVEF increases to >35 %



Reasons for not reaching target dosages

Drugs and Reasons	Proportion
ACE inhibitor or ARB (n=30)	
Low BP	75%
High Potassium	19%
Increase in Creatinine	6%
Beta Blocker (n=37)	
HR < 60 beats/min	83%

Conclusions

- This data confirm that it is feasible and safe for an experienced heart failure R.N. supervised by a cardiologist or NP to up-titrate HF medications to standard of care by phone.
- Telephone titration of HF meds was only possible in patients who demonstrated consistent compliance with meds and who were capable of daily monitoring vital signs at home.
- Optimization of HF medication reduced the number of patients qualifying for ICD/CRT devices with a potential to reduce costs.