SUBCUTANEOUS (SC) FUROSEMIDE (FUR) USE FOR FLUID OVERLOAD (FO) IN PERSONS LIVING WITH DIABETES MELLITUS

Authors: Ajay Ahuja, MD; Phani Kamineni, PharmD , MPH; Katie Luepke, PharmD; Barbara Cornelius, Matt Goodwin, PharmD; John Mohr, PharmD
MannKind Corporation, Westlake Village, CA

OBJECTIVE

To evaluate 30-day hospitalization rates stratified by diabetes mellitus (DM) status in outpatients with fluid overload treated with SC FUR in the AT HOME-HF trial

CONCLUSIONS

- SC FUR was associated with lower hospitalization rates and longer time to hospitalization compared with usual care (UC), regardless of diabetes status.
- Safety profile was favorable with low event rates.
- Clinicians managing persons living with diabetes (PWD) should recognize the risk of heart failure and consider SC FUR as a potential strategy to reduce heart failure–related hospitalizations.
- Larger studies are needed to confirm these findings.

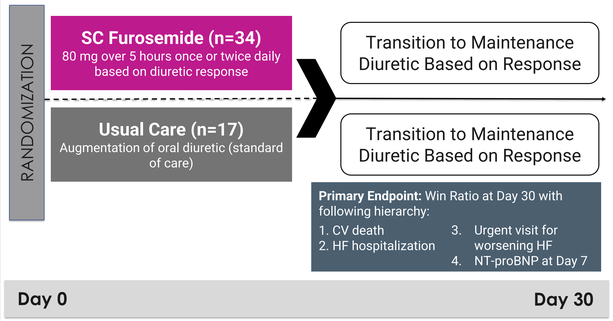
INTRODUCTION

PWD are at elevated risk for heart failure (HF), a leading cause of hospitalizations in the population. This increased risk of progression led the American Diabetes Association's 2025 Standards of Care to recommend heart failure screening using B-type natriuretic peptide (BNP) or N-terminal pro–B-type natriuretic peptide (NT-proBNP) to support prevention of symptomatic heart failure. Despite early detection, many patients progress to symptomatic disease requiring diuretic therapy. SC FUR (Furoscix) is an 80 mg/10 mL buffered formulation of furosemide designed for self-administered subcutaneous delivery, with equivalent bioavailability to IV FUR.

METHODS

AT HOME-HF was an open-label, randomized pilot study exploring short-term efficacy and safety with SC FUR in patients with worsening congestion, compared with enhanced oral medical therapy in the outpatient setting. HF patients with signs/symptoms of FO were randomized 2:1 to SC FUR or UC, **Figure 1**. Both SC FUR dosing and UC regimen were determined by the investigators based on clinical response.

Figure 1. AT HOME-HF Study Methodology



The primary hierarchical composite endpoint was assessed at 30 days, with results expressed as a win ratio. Results were previously published (Konstam, et al. JACC HF 2024;12(11):1830–1841.

For this analysis, HF patients were stratified by presence/absence of DM across arms. Descriptive analyses were performed, with participant characteristics and outcomes summarized after stratification by DM diagnosis.

RESULTS

Of 51 HF patients, 28 (55%) had concomitant DM, 19 (56%) in SC FUR group and 9 (53%) in UC group. The majority of SC FUR doses (90%) were administered within the first 7 days, with 97% given once daily.

Table 1 summarizes baseline characteristics. There was with higher prevalence of chronic kidney disease (CKD) among PWD, consistent with known comorbidities. Most patients, regardless of DM status had New York Heart Association Class III HF.

Table 1. Baseline Demographics by DM Status

	Diabetes (n=28)		No Diabetes (n=23)	
	SC FUR (n=19)	UC (n=9)	SC FUR (n=15)	UC (n=8)
Age, mean (SD)	62 (10)	66 (13)	64 (13)	75 (7)
Sex, n (%)				
Male	15 (79%)	6 (67%)	10 (67%)	5 (63%)
Female	4 (21%)	3 (33%)	5 (33%)	3 (38%)
BMI, mean (SD)	35 (7)	40 (12)	37 (8)	33 (6)
Race, n (%)				
White	14 (74%)	5 (56%)	9 (60%)	8 (100%)
Black	5 (26%)	4 (44%)	6 (40%)	0 (0%)
CKD, n (%)	13 (68%)	4 (44%)	4 (27%)	7 (88%)
eGFR, mean (SD)	51 (24)	64 (37)	63 (15)	40 (14)

BMI, body mass index; CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; SD, standard deviation

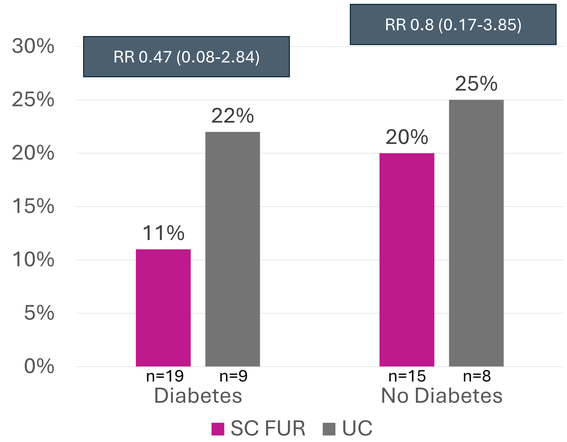
Mean (SD) SC FUR doses were similar between patients with diabetes (3.2 [2.12]) and without diabetes (3.8 [2.27]), **Table 2**.

Table 2. SC FUR Doses by DM Status

	Diabetes (n=19)	No Diabetes (n=15)
Mean Doses (SD)	3.2 (2.12)	3.8 (2.27)
Median Doses (Range)	3 (1,9)	3 (1,7)

HF hospitalization occurred in 11% of PWD in the SC FUR group versus 22% in the UC group, **Figure 2**. In those PWD hospitalized, mean days until hospitalization was 19 for SC FUR and 3.5 for UC (Relative Risk [RR] 0.41 [0.06-2.93]). There were no repeat hospitalizations across either group.

Figure 2. 30-Day Hospitalization Stratified by DM



Adverse events were infrequent, with infusion site pain reported most often, and events occurring more commonly in PWD, **Table 3.**

Table 3. Summary of Adverse Events

PREFERRED TERMS	Diabetes (n=28)		No Diabetes (n=23)		Total (n=51)
	SC FUR (n=19)	UC (n=9)	SC FUR (n=15)	UC (n=8)	
Infusion site pain	6	0	3	0	9
Renal impairment	5	2	1	1	9
Hypokalemia	5	0	3	0	8
Nausea	2	0	1	0	3
Fatigue	0	1	1	1	3
Blood creatinine increased	2	0	1	0	3
Dyspnea	2	1	0	0	3

American Diabetes Association · June 5-8, 2026 · New Orleans, LA