Impact of a Nurse-Driven Diuretic Protocol on Hospital Length of Stay in Patients with Acute Heart Failure Exacerbations

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Background

- **Heart failure (HF) accounts for approximately 3 million hospitalizations and $40 billion in healthcare costs annually.[1,2]**
- **Treating congestion and volume overload is a cornerstone of HF management.[3]**
  - ➢Congestion is associated with poorer quality of life and disease prognosis.[3]
  - ➢Intravenous (IV) loop diuretics are the preferred agents for the treatment of congestion in acute decompensated heart failure (ADHF).[3]
- **Patients who take chronic oral loop diuretics may develop diuretic resistance due to compensatory mechanisms involving sodium retention.[4]**
  - ➢These patients may require higher doses of IV loop diuretics in an exacerbation.[4]
- **Patients with diuretic resistance may have prolonged hospital admissions due to failure to titrate diuretics to effective doses.[4]**
  - ➢Traditionally, urine-output has guided dose titration, but recent data suggests natriuresis (sodium excretion in the urine) can allow for quicker titration to effective doses.[4]
- **Rao VS, et al. demonstrated that a nurse-driven, natriuresis-based protocol can help overcome the challenges of urine-output guided diuretic titration.[4]**
  - ➢However, that study did not assess clinical outcomes.[4]
  - ➢The protocol from this study was adapted and implemented at Saint Francis Hospital as the Heart Failure Diuretic Protocol (HFDP).

Purpose

- To analyze the hospital length of stay and other efficacy and safety outcomes in patients with ADHF receiving IV diuretics per the HFDP compared to those treated outside of the protocol.

Nurse-Driven Dosing Protocol

Daily urinary sodium excretion (UNa) goal = 370 mmol

Bumetanide	• Step 1: 2 mg • Step 2: 4 mg • Step 3: 8 mg • Step 4: 12 mg
Furosemide	• Step 1: 80 mg • Step 2: 160 mg • Step 3: 320 mg • Step 4: 500 mg

- **Spot UNa collected 2 hours after administration of each diuretic dose.**
- **Subsequent dose steps are determined based on percent of daily UNa excretion goal.**
- **Protocol is continued until UNa excretion goal met.**

Outcomes Assessed

Primary Outcome	• Hospital length of stay
Secondary Outcomes (Efficacy)	• Time to euvolemia (JVP=8) • Days of IV therapy • Time to highest IV diuretic dose • Incidence of thiazide diuretic co-administration • Change in weight • Adherence to protocol

Secondary Outcomes (Safety)	• Incidence of AKI (Increase in serum creatinine ≥ 0.3 mg/dL or decrease in GFR by ≥ 20%)
	• Incidence of SBP < 90 mmHg
	• Electrolyte abnormalities
	  • K < 3.0
	  • Mg < 1.5
	  • Na < 135 or > 145
	• Interruption of diuretics based on hold parameters
	• SBP < 90 mmHg
	• SCr increase by > 0.5 mg/dL

Methods

- Retrospective chart review approved by the Institutional Review Board.
- Patients admitted to the HF floor between 9/15/2021 and 9/15/2022 with a HF-service consult will be assessed for inclusion criteria.
  - ➢ Outcomes will be compared between eligible patients who were treated per the HFDP or without the protocol.

Patient Criteria

Inclusion	• Male and female patients aged 18 to 89 years old. • Prior diagnosis of HF • Oral loop diuretic use prior to admission. • Admitted for ADHF and requiring IV loop diuretics. • Patients with a HF-service consult.
Exclusion	• Patients requiring intensive care unit (ICU) services.

References

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Disclosures

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