

Ultrafiltration vs. Diuretics for the Treatment of Fluid Overload in Patients with Heart Failure: A Hospital Cost Analysis

Costanzo MR¹, Fonarow GC², Rizzo JA³

¹Advocate Heart Institute, Naperville, IL, USA, ²University of California Los Angeles, Los Angeles, CA, USA, ³Stony Brook University, Stony Brook, NY, USA

Background

- Heart failure is a common, serious disease in the United States and Europe.
- Patients with heart failure often require treatment for fluid overload resulting in costly inpatient visits.
- The first line of treatment for fluid overload is diuretic therapy (DIUR-T), but if DIUR-T fails alternative treatment options should be considered.
- Limited data exists on the costs (or cost savings) associated with the use of alternative therapies to treat patients with fluid overload.

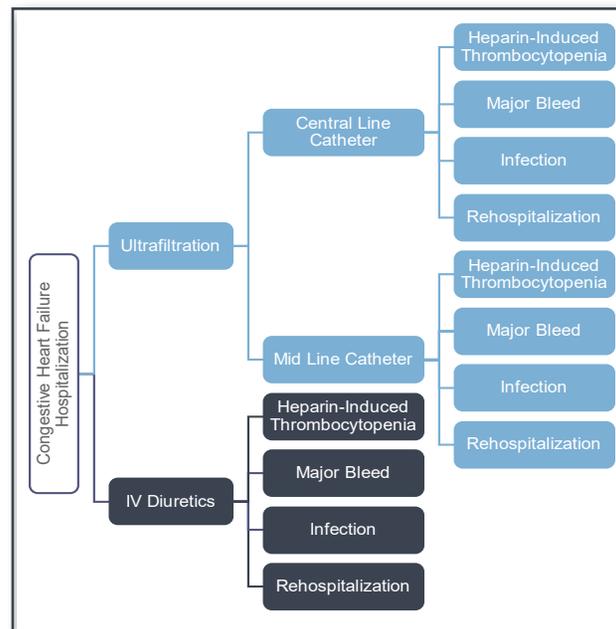
Objective

The purpose of this study was to perform a cost-analysis from the hospital perspective on ultrafiltration versus DIUR-T in the treatment of patients with heart failure related fluid overload.

Methods

- The cost-analysis model used a decision-analytic framework to reflect treatment decisions, probabilistic outcomes, and associated costs for treating patients with heart failure and fluid overload with veno-venous ultrafiltration or intravenous DIUR-T (Figure 1).
- The model was informed by clinical data obtained from published literature and the Healthcare Cost and Utilization Project (HCUP) for the calendar year 2014.
- A 90-day timeframe was considered to account for hospital readmissions beyond 30 days.
- Sensitivity and scenario analyses were performed to gauge the robustness of the results.

Figure 1: Decision Analytic Framework*



Results

- Initial hospitalization costs were higher in the ultrafiltration arm due to the cost of the ultrafiltration system itself.
- Fluid removal by ultrafiltration led to reduced hospital readmission days which resulted in a cost savings of \$6,148 per patient.
- UF treatment showed a total cost savings of **\$3,975 or 14.4%** (\$23,633 for UF vs. \$27,608 for DIUR-T).
- A one-way sensitivity analysis was performed that incorporated varied model input values that showed a greater cost savings for the ultrafiltration arm compared to DIUR-T (Figure 3).

Figure 2: Hospital Readmission Costs per Patient at 90 Days Following Discharge

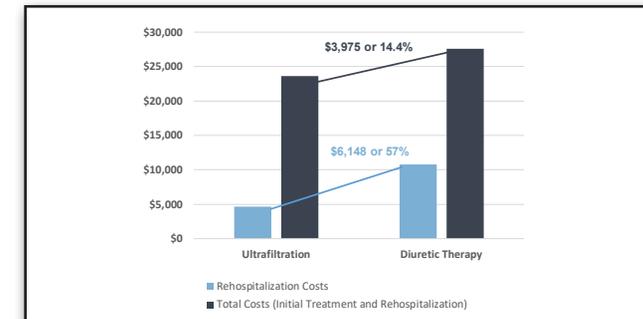
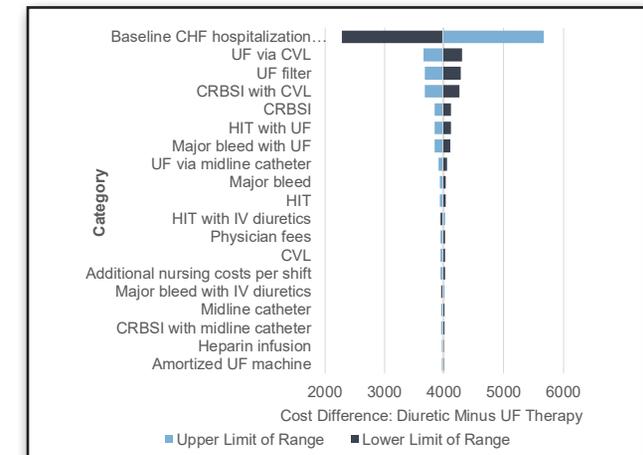


Figure 3: Tornado Diagram for One-way Sensitivity Analysis



Abbreviations: CHF, congestive heart failure; UF, ultrafiltration; CVL, central venous line; CRBSI, catheter-related bloodstream infection; HIT, heparin-induced thrombocytopenia; IV, intravenous.

Conclusion

Ultrafiltration is a viable alternative to DIUR-T when treating fluid overload in heart failure patients. Despite higher upfront costs, ultrafiltration substantially reduced hospital cost via readmission rates and durations, over a 90-day period compared to DIUR-T.