

Pure ultrafiltration as a therapeutic strategy in hemodialysis patients with volume overload: a prospective pilot study with Cardiosmart equipment



Dalmastri V.^{1,2,3}, Tomassetti A.³

¹ IRCCS – Bologna University Hospital, Bologna, Italy

² Dialysis Center, Maggiore Hospital, Bologna Local Health Authority (AUSL Bologna), Bologna, Italy

³ University of Bologna, Bologna, Italy

Introduction

Fluid overload in patients treated with chronic hemodialysis is a frequent condition that develops due to an imbalance between fluid and salt intake and ultrafiltration. This situation is particularly common among patients with heart failure - a frequent complication of chronic kidney disease (CKD) - in whom the ultrafiltration rate is often limited to prevent intradialytic adverse events.

Fluid overload is a known risk factor for mortality and adverse cardiovascular events. To counter this, additional hemodialytic treatments are often administered.

However, these supplemental treatments may be harmful due to two main reasons: (1) not only ultrafiltration but also solute shifts contribute to hemodynamic instability; and (2) the risk of hemodialysis overdosage, especially in frail patients, must be considered.

For these reasons, pure ultrafiltrative treatments are hypothesized to be beneficial and may represent a safer alternative in selected patients.

Methods

Conduction of an explorative, monocentric, prospective clinical trial.

Inclusion criteria:

Patients with CKD on chronic hemodialysis three times per week who meet at least one of the following:

- Persistent positive delta on dry weight after dialysis sessions for at least one week

or

- Need for two or more supplemental dialysis treatments within the last 30 days.

Exclusion criteria:

- Severe hyperkalemia (>6.5 mmol/L) at screening despite maximal medical therapy,
- Previous adverse reaction to the dialysis membrane,
- Current hospitalization for sepsis, acute coronary syndrome, or decompensated heart failure.
- Eligible patients will receive, in addition to their regular dialysis schedule, a supplemental pure ultrafiltration session using Medica Cardiosmart device for a duration of one month.

The following parameters will be assessed after one month of treatment:

- Median delta on dry weight
- Change in dry weight
- Incidence of intradialytic hypotension
- Serum potassium, creatinine and urea levels
- Serum proBNP levels,
- Mortality.

Results

Results will be available after completion of data collection and analysis.

Conclusion

This study aims to evaluate the clinical utility and safety of pure ultrafiltration using Cardiosmart equipment in chronic hemodialysis patients with persistent fluid overload. By avoiding solute shifts and reducing treatment burden, this approach may offer a viable and safer alternative to standard supplemental hemodialysis, particularly in frail populations.