

## SELECTED ULTRAFILTRATION STUDY SUMMARIES

Well-designed clinical trials will clarify the benefit of UF in terms of morbidity and mortality, but many small studies published in recent years have been consistent in their description of benefits in patients with HF.

Studies consistently report success with removal of 300 to 500 milliliters per hour. This translates to 3 to 5 kilograms removal potential in a single nursing shift, and significant removal capacity when administered continuously.

Investigator	Population	UF Rate	Conclusions
Abraham et al., <i>CHF Solutions Web Site</i>	21 patients with moderate to severe fluid overload	400 ml/hr (2.6 liters total)	<ul style="list-style-type: none"> <li>• Safe and effective</li> <li>• Symptoms relief, with no change in electrolytes, hematocrit</li> </ul>
Marenzi et al., (2001). <i>J Am Coll Cardiol.</i>	24 NYHA Class IV patients in ICU	542 ml/hr (4.9 liters total)	<ul style="list-style-type: none"> <li>• UF performed safely without side effects</li> <li>• Urinary output increase, diuretic decrease</li> <li>• NYHA class improvement in all</li> </ul>
Ronco et al., (2001). <i>Cardiology.</i>	22 patients treated with either 4 or 24 hour therapy	625 ml/hr vs. 100 ml/hr (2.5 liters total)	<ul style="list-style-type: none"> <li>• Blood volume more stable at lower UF rates</li> <li>• Hematocrit monitoring useful</li> </ul>
Canaud et al., (1998). <i>Nephrol Dial Transplant.</i>	52 NYHA Class IV patients observed over 10 years	Up to 500 ml/hr	<ul style="list-style-type: none"> <li>• 75% improved NYHA functional class</li> <li>• 46% improved cardiac and/or renal function (lasting &gt;3 months for most)</li> </ul>
Agostoni et al., (1994). <i>Am J Med.</i>	16 moderate CHF, randomized to UF or furosemide	500 ml/hr (1.7 liters total)	<ul style="list-style-type: none"> <li>• Ultrafiltration: improved neurohormonal profile, lasting functional improvement (at 3 months)</li> <li>• Furosemide: continued neurohormonal activation, no change in functional class, recurring symptoms</li> </ul>
Sakurai et al., (1993). <i>Nippon Rinsbo.</i>	NYHA Class IV patients	500 ml/hr	<ul style="list-style-type: none"> <li>• Up to 500 ml/hr can be removed without impacting systemic circulation</li> <li>• Reversal of renal dysfunction</li> </ul>
Agostoni et al., (1993). <i>J Am Coll Cardiol.</i>	36 patients randomized to UF or furosemide	500 ml/hr (1.9 liters total)	<ul style="list-style-type: none"> <li>• Ultrafiltration: improvement in hemodynamic status, neurohormonal profile, and exercise capacity</li> <li>• Furosemide: changes not observed</li> </ul>
Rimondini et al., (1987). <i>Am J Med.</i>	11 NYHA class IV patients	500 ml/hr (2-3 liters total)	<ul style="list-style-type: none"> <li>• Evidence of congestion relief</li> <li>• Maintenance of CV stability</li> <li>• Urine output increased substantially</li> </ul>

*“Of the various therapies that have been attempted for diuretic-resistant CHF, ultrafiltration strategies hold particular promise.”*

(2002). Ultrafiltration in Congestive Heart Failure. *Cardiology.*

