

## Fluid Balance and Outcomes

Adapted from Going with the Flow: Fluid Management in the ICU

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**Table 3 Studies in critically ill patients describing the association with fluid overload and worse outcome**

Study	Design	Population	Exposures	Outcomes
<b>Pediatric Studies</b>				
Goldstein <i>et al</i> <sup>[33]</sup>	Retrospective	Pediatric critically ill starting CRRT	% FO	↑ % FO associated with ↑ mortality
Foland <i>et al</i> <sup>[60]</sup>	Retrospective	Pediatric critically ill starting CRRT	% FO	↑ % FO associated with ↑ organ dysfunction + mortality
Sutherland <i>et al</i> <sup>[31]</sup>	Retrospective	Pediatric critically ill starting CRRT	% FO	↑ % FO associated with ↑ mortality
Arikan <i>et al</i> <sup>[30]</sup>	Retrospective	Pediatric critically ill starting CRRT	% FO	↑ % FO associated with ↓ lung function
<b>Adult Studies</b>				
Payen <i>et al</i> <sup>[61]</sup>	Post-hoc prospective	Adult critically ill septic patients	FB	↑ FB associated with ↑ mortality
Murphy <i>et al</i> <sup>[62]</sup>	Retrospective	Adult critically ill ALI patients	AIFR + CLFM	↑ Survival for ↑ AIFR + ↑ CLFM
Bouchard <i>et al</i> <sup>[63]</sup>	Post-hoc prospective	Adult critically ill AKI patients	% FO > 10%	↑ FB associated with ↑ mortality
Wiedemann <i>et al</i> <sup>[36]</sup>	RCT	Adult critically ill with ALI	Conservative vs liberal fluid management strategy	↑ MV-free days; ↑ ICU-free days with conservative strategy
Fulop <i>et al</i> <sup>[64]</sup>	Retrospective	Adult critically ill starting CRRT	VRWG	↑ VRWG associated with ↑ mortality
Boyd <i>et al</i> <sup>[65]</sup>	Post-hoc analysis from VASST	Adult critically ill septic patients	Quartiles of FB + CVP at 12 h and 4 d	↑ FB at 12 h and 4 d associated with ↑ mortality; CVP < 8 at 12 h ↓ mortality
Grams <i>et al</i> <sup>[66]</sup>	Post-hoc FACCT	Adult critically ill with ALI + AKI	FB + diuretics	↑ FB associated with ↑ mortality
Heung <i>et al</i> <sup>[67]</sup>	Retrospective	Adult critically ill starting CRRT	% FO	↑ % FO associated with ↓ kidney recovery
Bellomo <i>et al</i> <sup>[68]</sup>	Post-hoc RENAL	Adult critically ill with AKI	FB	↑ FB associated with ↑ mortality

**Positive fluid balance = increased mortality, increased MV, increased ICU stay, decreased kidney recovery**

References:

- McDermid et al: World J Crit Care Med 2014; 3(1): 24-33.