

Goal-directed fluid therapy

CVP 8-12 cmH₂O Early use of [mechanical ventilation](#)

MAP 65-90 mmHg [Fluid resuscitation](#)

SvO₂ >70% Use of vasoactive agents

ScvO₂ >65% [Noradrenaline](#)

Urine output >0.5 ml/kg/h [Dobutamine](#)

Hematocrit >30% [Transfusion](#)

Goal-directed [fluid therapy](#) (GDFT), assessed by an optimized cardiac stroke volume, has been proposed as the “gold standard” for [perioperative intravenous fluid therapy](#).

Despite numerous studies on [perioperative intravenous fluid therapy](#), there is insufficient [evidence](#) to draw definitive conclusions regarding [fluid management](#) in neurosurgical patients. Although evidence is still lacking, isotonic balanced [crystalloid](#) solutions should be considered the first-choice fluid, while hypotonic solutions should be avoided. Furthermore, [colloid](#) solutions should be used with caution, and their potential risks and benefits should be considered. To achieve an optimal fluid volume status while avoiding overhydration and excessive restriction, the amount and duration of fluid administration should be considered, and an individualized fluid strategy is recommended using GDFT based on dynamic fluid parameters ¹⁾.

[HES](#) has been sometimes used to maintain an optimal [volume](#) status to prevent [delayed cerebral ischemia](#) (DCI) due to [cerebral vasospasm](#) following a subarachnoid hemorrhage (SAH) as a component of the triple H-therapy. Compared to the standard therapy group, the [goal-directed fluid therapy](#) (GDFT) with a HES bolus group showed reduced frequencies of vasospasm and cardiopulmonary complications ²⁾.

¹⁾
Ryu T. Fluid management in patients undergoing neurosurgery. Anesth Pain Med (Seoul). 2021 Jul;16(3):215-224. doi: 10.17085/apm.21072. Epub 2021 Jul 22. PMID: 34352963.

²⁾
Mutoh T, Kazumata K, Ishikawa T, Terasaka S. Performance of bedside transpulmonary thermodilution monitoring for goal-directed hemodynamic management after subarachnoid hemorrhage. Stroke 2009; 40: 2368-74.

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