

Comparison of two techniques of goal directed fluid therapy in elective neurosurgical patients - a randomized controlled study

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Background: Goal directed fluid therapy (GDFT) may be a rational approach to adopt in neurosurgical patients, in whom intravascular volume optimization is of utmost importance. Most of the parameters used to guide GDFT are derived invasively. We postulated that the total volume of intraoperative intravenous fluid administered during elective craniotomy for supratentorial brain tumours would be comparable between two groups receiving GDFT guided either by the non-invasively derived plethysmography variability index (PVI) or by stroke volume variation (SVV).

Methods: 60 ASA category 1, 2 and 3 patients between 18 and 70 years of age were randomized to receive intraoperative fluid guided either by SVV (SVV group; n = 31) or PVI (PVI group; n = 29). The total volume of fluid administered intraoperatively was recorded. Serum creatinine was measured before the surgery, at the end of the surgery, 24 h after surgery and on the fifth post-operative day. Arterial cannulation was performed before induction in all patients. Serum lactate was measured before induction, once in 2 h intraoperatively, at the end of the surgery and 24 h after the surgery. Brain relaxation score was assessed by the surgeon during dural opening and dural closure. Patients were followed up till discharge or death. The duration of mechanical ventilation and the duration of hospital stay was noted for all patients.

Results: The volume of fluid given intraoperatively was significantly higher in the SVV group ($p = 0.005$). The two groups were comparable with respect to serum lactate and serum creatinine measured at pre-determined time intervals. Brain relaxation score was also comparable between the groups. SVV and PVI displayed moderate to strong correlation intraoperatively. The duration of mechanical ventilation and the length of the hospital stay were comparable between the two groups.

Conclusions: PVI and SVV are equally effective in guiding GDFT in adults undergoing elective craniotomy for supratentorial brain tumours.