

Effect of equiosmolar solutions of hypertonic sodium lactate versus mannitol in craniectomy patients with moderate traumatic brain injury

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Abstrak

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Brain relaxation and prevention from cerebral edema are essential in craniectomy. Osmotherapy with 20% mannitol are generally used to withdraw fluid from the brain parenchyma, however may cause hemodynamic fluctuation, due to increase diuresis. On the other hand 0.5 M hypertonic sodium lactate (HSL) appeared as an alternative of osmotherapy. This study aimed to observe the effect of hypertonic sodium lactate (HSL) on brain relaxation, blood glucose level and hemodynamic variables in craniectomy due to moderate brain injury.

Methods: A randomized controlled study of 42 cases with moderate brain injury, aged 18 - 65 years, ASA 1 - 3, between September-November 2012, was carried out. The patients were divided into group M (n = 21) that received 2.5 mL/kg 20% mannitol and group HSL that received 2.5 mL/kg 0.5M HSL. Mean arterial pressures (MAP), central venous pressures (CVP) and urine output were measured after induction, and at 15, 30, 45, 60 min after infusion. Brain relaxation was assessed at a four-point scale after opening the duramater. Blood glucose levels were measured before induction and at 60 min after the infusion. Appropriate statistical tests were used for comparison. Unpaired t-test was used to compare hemodynamic and blood glucose level, and chi-square was used to compare brain relaxation.

Results: MAP at 60 minute was significantly higher in HSL group than M group (81.66 ± 7.85 vs 74.33 ± 6.18 mmHg; $p = 0.002$). There was no difference in brain relaxation ($p = 0.988$). A significant increase in blood glucose level was observed in group HSL (17.95 ± 11.46 mg/dL; $p = 0.001$).

Conclusion: Half-molar HSL was as effective as 20% mannitol in producing brain relaxation, with better hemodynamic stability and gave significant increase in blood glucose level.