Supplemental Digital Content File 2**:** Randomized controlled trials (n=55) comparing intravenous mannitol with other therapeutic modalities in critical care and surgery.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year (authors)** | **Patient population** | **Mannitol (n)** | **Therapy compared (n)** | **Outcomes measured** | **Results (mannitol vs. control)\*** |
| **Traumatic brain injury** | | | | | |
| 1984 (Schwartz et al.)45 | Severe head injury | 20% mannitol, 1 g/kg (n = 31) | Pentobarbital, 10 mg/kg bolus, plus 0.5-3 mg/kg/h infusion (n = 28) | Mortality in non-hematoma patients (n (%)) | 7 (41%) vs. 10 (77%), p value unspecified |
| Mortality in hematoma patients (n (%)) | 6 (43%) vs. 6 (40%), p value unspecified |
| 1997 (Biestro et al.)46 | Traumatic brain injury | 15% mannitol, 100 mL (n = 8) | 10% glycerol in normal saline, volume unspecified (n = 8) | ∆ ICP 60 mins after administration (mmHg) | -17.8 ± 3.0 vs. -22.1 ± 3.0, p value unspecified |
| ∆ ICP 120 mins after administration (mmHg) | -18.2 ± 2.9 vs. -15.0 ± 2.9, p value unspecified |
| ∆ CPP 60 mins after administration (mmHg) | 12.0 ± 3.6 vs. 19.4 ± 3.6, p value unspecified |
| ∆ CPP 120 mins after administration (mmHg) | 14.6 ± 3.5 vs. 14.0 ± 3.2, p value unspecified |
| 2003 (Vialet et al.)47 | Traumatic brain injury | 20% mannitol, 2 mL/kg (n = 10) | 7.5% saline, 2 mL/kg (n = 10) | Episode of intracranial hypertension (times/day) | 13.3 ± 14.2 vs. 6.8 ± 5.5, p = 0.02 |
| Serum sodium 4 hours after administration (mmol/L) | 146 ± 7 vs. 146 ± 10, p > 0.05 |
| Treatment failure (n (%)) | 7 (70%) vs. 1 (10%), p = 0.01 |
| 2005 (Battison et al.)30 | Traumatic brain injury or subarachnoid hemorrhage | 20% mannitol, 200 mL (n = 9) | 7.5% saline–6% dextran-70 solution, 100 mL (n = 9) | ∆ ICP 60 mins after administration (mmHg) | -7.5 (-5.8– -11.8) vs. -13.0 (-11.5– -17.3), median (range), p < 0.05 |
| MAP 60 mins after administration (mmHg) | 116.5 (110.3–118.0) vs. 110.5 (107.8–116), median (range), p > 0.05 |
| CPP 60 mins after administration (mmHg) | 97.5 (90.3–97.5) vs. 97.5 (93.3–100.8), median (range), p > 0.05 |
| Serum sodium at 60 mins after administration (mmol/L) | 149 (145.5–151.0) vs. 153 (147.8–156.3), median (range), p < 0.05 |
| 2005 (Harutjunyan et al.)48 | Traumatic brain injury or intracranial hemorrhage | 15% mannitol, dose unspecified (n = 15) | 7.2% saline in hydroxyethyl starch, dose unspecified (n = 17) | ICP 30 mins after administration (mmHg) | 12 (6–19) vs. 10 (6–14), median (range), p > 0.05 |
| CPP 30 mins after administration (mmHg) | 72 (60–93) vs. 75 (62–86), median (range), p < 0.05 |
| MAP 30 mins after administration (mmHg) | 81 (69–106) vs. 85(74–100), median (range), P > 0.05 |
| Mortality in ICU (n (%)) | 9 (60%) vs. 10 (58.8%), p > 0.05 |
| 2008 (Francony et al.)49 | Traumatic brain injury or stroke | 20% mannitol, 231 mL (n = 10) | 7.45% saline, 100 mL (n = 10) | ∆ ICP 30 mins after administration (%) | -41 ± 23 vs. -37 ± 18, p > 0.05 |
| ∆ CPP 30 mins after administration (%) | 21 ± 23 vs. 7 ± 11, p > 0.05 |
| ∆ MAP 30 mins after administration (mmHg) | 2 ± 9 vs. -5 ± 7, p > 0.05 |
| Urine output 1 hour after administration (mL) | 306 ± 174 vs. 114 ± 72, p < 0.01 |
| ∆ serum sodium after administration (mmol/L) | -1.7 ± 3.2 vs. +2.1 ± 1.4, p < 0.01 |
| ∆ serum osmolality 30 mins after administration (%) | 2 ± 2 vs. 2 ± 2, p > 0.05 |
| 2009 (Ichai et al.)50 | Traumatic brain injury  (3 groups) | 20% mannitol, 1.5 mL/kg (n = 34) | Sodium lactate, 1.5 mL/kg (n = 35) | ∆ ICP after administration (mmHg) | -3.2 ± 0.9 vs. -5.9 ± 1, p = 0.009 |
| ∆ CPP after administration (%) | 108.2 ±1.6 vs. 109.9 ± 2.1, p > 0.05 |
| ∆ MAP after administration (%) | 100.1 ± 1.1 vs. 100.0 ± 1.5, p > 0.05 |
| ∆ serum sodium after administration (%) | -97.7 ± 0.8 vs. +101.4 ± 0.7, p = 0.03 |
| ∆ plasma osmolality after administration (mOsm/L) | 3.06 ± 0.67 vs. 0.66 ± 0.95, p = 0.046 |
| 2011 (Cottenceau et al.)51 | Traumatic brain injury | 20% mannitol, 4 ml/kg (n = 25) | 7.5% saline, 2 mL/kg (n = 25) | ICP 30 mins after administration (mmHg) | 10.5 ± 6.8 vs. 12.2 ± 6.1, p = 0.0001 |
| CPP 30 mins after administration (mmHg) | 76.9 ± 17.4 vs. 79.3 ± 11.6, p = 0.0001 |
| MAP 30 mins after administration (mmHg) | 87.4 ± 11.6 vs. 91.2 ± 10.2, p > 0.05 |
| Serum sodium 30 mins after administration (mmol/L) | 139.1 ± 4.1 vs. 148.3 ± 5.2, p value unspecified |
| 2011 (Sakellaridis et al.)52 | Traumatic brain injury | 20% mannitol 2 mL/kg (n = N/A) | 15% saline, 0.42 mL/kg (n = N/A) | ∆ ICP after administration (mmHg) | -7.96 ± 5.79 vs. -8.43 ± 6.65, p = 0.58 |
| 2014 (Mojtahedzadeh et al.)53 | Traumatic brain injury | 20% mannitol, 1 g/kg bolus, plus 0.25-0.5 g/kg infusion (n = 10) | 5% saline, 125 mL bolus, plus 500 mL infusion (n = 11) | ROS on postoperative day 1 (pmol/L) | 3.7 ± 2.4 vs.7.3 ± 2.3, p value unspecified |
| TAP on postoperative day 1 (umol/L) | 302.1 ± 41 vs. 341.2 ± 39.5, p value unspecified |
| NO on postoperative day 1 (mmol/L) | 14.06 ± 2.2 vs. 18.6 ± 2.1, p value unspecified |
| 2016 (Jagannatha et al.)54 | Traumatic brain injury | 20% mannitol, 2.5 mL/kg (n = 20) | 3% saline, 2.5 mL/kg (n = 18) | ∆ ICP after administration (mmHg) | -8.9 ± 8.4 vs. -10.1 ± 8.7, p = 0.135 |
| MAP on postoperative day 1 (mmHg) | 95 ± 11 vs. 90 ± 10, p value unspecified |
| In hospital mortality (n (%)) | 10 (50%) vs. 3 (16.7%), p = 0.07 |
| 6-month mortality (n (%)) | 10 (50%) vs. 6 (33.3%), p = 0.41 |
| **Severe neurologic conditions** | | | | | |
| 1978 (Santambrogio et al.)55 | Ischemic stroke (4 groups) | 20% mannitol, 0.8-0.9 g/kg (n = 36) | Normal saline, volume unspecified (n = 41) | Patients with improved outcome (n (%)) | 12 (33.3%) vs. 14 (34.1%), p > 0.05 |
| 1998 (Schwarz et al.)20 | Ischemic stroke or intracranial hemorrhage | 20% mannitol, 200 mL (n = 14#) | 75 g/L saline and 60 g/L hydroxyethyl starch, 100 mL (n = 16#) | ICP 15 mins after administration (mmol/L) | 21.5 ± 1.2 vs. 18.9 ± 1.3, p value unspecified |
| CPP 35 mins after administration (mmol/L) | 84.9 ± 3.9 vs. 78.2 ± 5.3, p < 0.05 |
| Serum sodium 15 mins after administration (mmol/L) | 136.3 ± 1.8 vs. 144.3 ± 1.3, p value unspecified |
| 2003 (Erard et al.)56 | Hypovolemic shock and increased ICP  (3 groups) | 20% mannitol, dose unspecified (n = 10) | 7.5% saline, dose unspecified (n = 10) | Serum osmolality after administration (mOsm/L) | 329 ± 7 vs. 321 ± 11, p value unspecified |
| Serum sodium after administration (mmol/L) | 129 ± 3 vs. 151 ± 5, p < 0.001 |
| MAP 30 mins after administration (mmHg) | 75 ± 8 vs. 78 ± 10, p > 0.05 |
| 2004 (Kalita et al.)57 | Intracranial hemorrhage | 20% mannitol, 100 mL (n = 12) | Normal saline, 100 mL (n = 9) | ∆ GCS score after administration (time unspecified) | 0.08 ± 3.32 vs. 1.11 ± 0.93, p value unspecified |
| 2005 (Misra et al.)58 | Intracerebral hemorrhage | 20% mannitol, 100 mL (n = 65) | Normal saline, 100 mL (n = 63) | 1-month mortality (n (%)) | 16 (24.6%) vs. 16 (25.4%) p > 0.05 |
| 3-month functional disability (n (%)) | 41 (63.1%) vs. 38 (60.3%), p > 0.05 |
| 2007 (Misra et al.)59 | Intracranial hemorrhage | 20% mannitol, 1.5 g/kg (n = 12) | Normal saline, same volume (n = 12) | Clinical improvement (n (%)) | 5 (42%) vs. 0 (0%), p = 0.037 |
| 2010 (Upadhyay et al.)60 | Cerebral edema  (3 groups) | Mannitol (% unspecified), 2 mL/kg bolus, plus 5 mL/kg infusion (n = 98) | 3% saline, 2 mL/kg bolus, plus 5 mL/kg infusion (n = 100) | Serum sodium after administration (mEq/L) | 128 ± 2.4 vs. 136 ± 6.2, p < 0.001 |
| Serum osmolality after administration (mOsm/L) | 310 ± 4.3 vs. 308 ± 5.6, p > 0.05 |
| Duration of coma (hours) | 98.6 ± 21.3 vs. 77.50 ± 13.1, p < 0.001 |
| 2011 (Diringer et al.)61 | Ischemic stroke | 20% mannitol, 1 g/kg (n = 5) | 23.4% saline, 0.686 mL/kg (n = 4) | MAP after administration (mmHg) | 113 ± 14 vs. 103 ± 11, p > 0.05 |
| Serum sodium 4 hours after administration (mmol/L) | 146.5 ± 8.4 vs. 147.3 ± 4.8, p > 0.05 |
| CBF of peri-infarct core after administration (mL/100g/min) | 30.2 ± 5.6 vs. 37.2 ± 6.0, p value unspecified |
| CBF of infarct core after administration (mL/100g/min) | 6.3 ± 5.2 vs. 9.7 ± 11.2, p value unspecified |
| 2015 (Wang et al.)62 | Intracranial hemorrhage | Mannitol (% unspecified), dose unspecified (n = 1533) | Control (therapy unspecified) (n = 993) | 3-month dead or disability (n (%)) | 775 (50.6%) vs. 566 (57%), p = 0.18 |
| Non-fatal adverse event (n (%)) | 19 (6.4%) vs. 31 (9.9%), p < 0.01 |
| **Elective craniotomy** | | | | | |
| 1997 (Gemma et al.)43 | Elective craniotomy | 20% mannitol, 0.5 g/kg (n = 25) | 7.5% saline, 2.5 mL/kg (n = 25) | MAP 30 mins after administration (mmHg) | 83 ± 3 vs. 77 ± 3, p > 0.05 |
| Intraoperative urine output (mL) | 194 ± 148 vs. 236 ± 180, p > 0.05 |
| CSFP 30 mins after administration (mmHg) | 12.5 ± 5.6 vs. 10.9 ± 6.4, p > 0.05 |
| 2001 (De Vivo et al.)63 | Elective craniotomy  (3 groups) | 18% mannitol, 0.5 g/kg (n = 10) | 3% saline, 3.5 mL/kg, bolus plus 3% saline, 20 mL/h, infusion (n = 10) | Serum sodium at the end of surgery (mmol/L) | 137.6 ± 7 vs. 139.2 ± 5, p > 0.05 |
| Postoperative serum potassium (time unspecified) (mmol/L) | 4.08 ± 0.27 vs. 4.16 ± 0.28, p > 0.05 |
| MAP at the end of surgery (mmHg) | 86.11 ± 10.38 vs. 80.44 ± 16.71, p value unspecified |
| Postoperative ICP (time unspecified) (mmHg) | 12.72 ± 0.97 vs. 10.86 ± 0.97, p value unspecified |
| 2003 (Afifi et al.)64\*\* | Elective craniotomy | 20% mannitol, dose unspecified (n = 20) | 3% saline, dose unspecified (n = 20) | ∆ ICP 60 mins after administration (mmHg) | -13 ± 5 vs. -12 ± 5, p > 0.05 |
| 2005 (Chen et al.)65 | Elective craniotomy | 20% mannitol, 1 g/kg (n = 20) | 3% saline, 5.33 mL/kg (n = 20) | CSFP 30 mins after administration (mmHg) | 14.1 ± 1.3 vs. 11.0 ± 2.3, p < 0.05 |
| CPP 30 mins after administration (mmHg) | 69 ± 4 vs. 70 ± 4, p > 0.05 |
| MAP 30 mins after administration (mmHg) | 91 ± 10 vs. 89 ± 12, p > 0.05 |
| Serum sodium 30 mins after administration (mmol/L) | 134.1 ± 1.1 vs. 147.3 ± 1.4, p < 0.05 |
| 2007 (Rozet et al.)44 | Elective craniotomy | 20% mannitol, 5 mL/kg (n = 20) | 3% saline, 5 mL/kg (n = 20) | MAP 30 mins after administration (mmHg) | 77 ± 13 vs. 76 ± 15, p > 0.05 |
| Intraoperative fluid intake (mL) | 6,648 ± 1,346 vs. 4,335 ± 581, p = 0.16 |
| Satisfactory brain relaxation  (4-point scale) (n (%)) | 14 (70%) vs. 14 (70%), p > 0.05 |
| Urine output 6 hours after administration (mL) | 2,969 ± 1,600 vs. 1,500 ± 509, p = 0.06 |
| 2010 (Wu et al.)66 | Elective craniotomy | 20% mannitol, 150 mL (n = 116) | 3% saline, 160 mL (n = 122) | Intraoperative urine output (mL) | 707 (560–1100) vs. 596 (350–980), median (range), p < 0.001 |
| Satisfactory brain relaxation (3-point scale) (n (%)) | 81 (69.8%) vs. 101 (82.8%), p < 0.05 |
| Intraoperative fluid intake (mL) | 1314 ± 166 vs. 1294 ± 189, p = 0.4 |
| 2011 (Aboeldahab et al.)67 | Elective craniotomy | 20% mannitol, 0.5 g/kg (n = 20) | Control, therapy unspecified (n = 20) | ICP 30 mins after administration (mmHg) | 19.64 ± 0.47 vs. 22.22 ± 0.86, p > 0.05 |
| Satisfactory brain relaxation (2-point scale) (n (%)) | 19 (95%) vs. 18 (90%), p > 0.05 |
| 2011 (Demneri et al.)68\*\* | Elective craniotomy | 20% mannitol, 4.75 mL/kg (n = 60) | 7.5% saline, 2 mL/kg (n = 60) | Satisfactory brain relaxation (4-point scale) (n (%)) | 37 (52.9%) vs. 49 (70%), p < 0.05 |
| 2011 (Vilas Boas et al.)69 | Elective craniotomy | 20% mannitol, 250 mL (n = 17) | Hypertonic saline (% unspecified), 120 mL (n = 12) | Serum sodium 30 mins after administration (mEq/L) | 132.1 ± 0.67 vs. 140.9 ± 0.90, p value unspecified |
| Satisfactory brain relaxation (4-point scale) (n (%)) | 17 (100%) vs. 12 (100%), p > 0.05 |
| 2012 (Attari et al.)70 | Elective craniotomy | 20% mannitol, 1 g/kg (n = 20) | 3.2% saline, same volume (n = 20) | Satisfactory brain relaxation (3-point scale) (n (%)) | 12 (57.9%) vs. 20 (100%), p < 0.05 |
| 2013 (Mousa et al.)71 | Elective craniotomy | 20% mannitol, 1 g/kg (n = 39) | Normal saline, dose unspecified (n = 38) | Intraoperative urine output (mL) | 1683.8 ± 381.2 vs. 815.5 ± 209.7, p = 0.001 |
| Satisfactory brain relaxation (4-point scale) (n (%)) | 26 (66.7%) vs. 21 (55.3%), p > 0.05 |
| 2014 (Gayatri et al.)72 | Elective craniotomy | 20% mannitol, 5 mL/kg (n = 25) | 3% saline, 5 mL/kg (n = 25) | MAP 30 mins after administration (mmHg) | 77 ± 9 vs. 83 ± 13, p > 0.05 |
| Fluid balance (intake – output) 120 mins after administration (mL) | 1,408 ± 548 vs. 1,638 ± 720, p > 0.05 |
| E/A ratio 30 mins after administration | 1.64 ± 0.48 vs.1.62 ± 0.66, p > 0.05 |
| 2014 (Li et al.)73 | Elective craniotomy | 20% mannitol, 250 mL (n = 20) | 7.2% saline-6% hydroxyethyl starch, 250 mL (n = 20) | MAP 30 mins after administration (mmHg) | 77.9 ± 6.1 vs. 71.3 ± 6, p > 0.05 |
| Intraoperative urine output (mL) | 1,686 ± 918 vs. 869 ± 470, p < 0.01 |
| Intraoperative fluid intake (mL) | 3,808 ± 606 vs. 3,353 ± 750, p < 0.05 |
| Serum osmolality 30 mins after administration (mmol/L) | 302.5 ± 5.4 vs. 308.2 ± 4.8, p < 0.01 |
| Cardiac index 30 mins after administration (L/min/m2) | 3.13 ± 0.64 vs. 3.28 ± 0.95, p > 0.05 |
| Satisfactory brain relaxation (3-point scale) (n (%)) | 15 (75%) vs. 19 (95%), p < 0.05 |
| 2014 (Malik et al.)74 | Elective craniotomy | 20% mannitol, 5 mL/kg (n = 56) | 3% saline, 5 mL/kg (n = 58) | Urine output 6 hours after administration (mL) | 5,500 ± 750 L vs. 4,380 ± 720, p < 0.005 |
| Fluid intake 6 hours after administration (mL) | 7,219 ± 0.96 vs. 7,041 ± 0.85, p = 0.482 |
| Satisfactory brain relaxation (4-point scale) (n (%)) | 38 (65.5%) vs. 48 (85.7%), p < 0.05 |
| 2015 (Dostal et al.)75 | Elective craniotomy | 20% mannitol, 3.75 mL/kg (n = 38) | 3.2% saline, 3.75 mL/kg (n = 36) | Intraoperative urine output (mL) | 1,395 ± 825 vs. 656 ± 496, p < 0.0001 |
| Satisfactory brain relaxation (4-point scale) (n (%)) | 21 (55%) vs. 27 (75%), p = 0.0281 |
| Intraoperative fluid intake (mL) | 3,391 ± 1,823 vs. 2,304 ± 1,429, p = 0.0058 |
| Serum sodium at the end of surgery (mmol/L) | 137.9 ± 3.9 vs.140.7 ± 3.9, p = 0.003 |
| 2015 (Hernández-Palazón et al.)76 | Elective craniotomy | 20% mannitol, 5 mL/kg (n = 20) | 3% saline, 5 mL/kg (n = 20) | Satisfactory brain relaxation (4-point scale) (n (%)) | 16 (80%) vs. 15 (75%), p > 0.05 |
| 2015 (Li et al.)77 | Post-elective craniotomy | 20% mannitol, 125 mL (n = 18) | 3.1% saline, 125 mL (n = 17) | Serum sodium 30 mins after administration (mmol/L) | 134.9 ± 3.1 vs. 139.2 ± 3.5, p = 0.001 |
| Urine output 6 hours after administration (mL) | 835 ± 221 vs. 775 ± 253, p = 0.455 |
| 2015 (Raghava et al.)78 | Elective craniotomy | 20% mannitol, 5 mL/kg (n = 25) | 3% saline, 5 mL/kg (n = 25) | Serum sodium 120 mins after administration (mmol/L) | 138.9 ± 4.4 vs. 143.7 ± 5.4, p = 0.001 |
| Serum potassium 120 mins after administration (mmol/L) | 3.9 ± 0.8 vs. 3.9 ± 0.7, p = 0.89 |
| Serum osmolality 120 mins after administration (mOsm/L) | 293.0 ± 10.3 vs. 301.2 ± 10.6, p < 0.05 |
| Satisfactory brain relaxation (4-point scale) (n (%)) | 22 (88%) vs. 21 (84%), p > 0.05 |
| Intraoperative fluid intake (mL) | 5,172 ± 2361 vs. 4,296 ± 1347, p = 0.114 |
| 2016 (Hernández-Palazón et al.)79 | Elective craniotomy | 20% mannitol, 3 mL/kg (n = 30) | 3% saline, 3 mL/kg (n = 30) | MAP 30 mins after administration (mmHg) | 79 ± 13 vs. 75 ± 10, p < 0.05 |
| Satisfactory brain relaxation (4-point scale) (n (%)) | 27 (90%) vs.25 (83%), p > 0.05 |
| Urine output 6 hours after administration (mL) | 1,744 ± 923 vs. 1,556 ± 798, p = 0.41 |
| Fluid intake 6 hours after administration (mL) | 3,330 ± 824 vs. 3,028 ± 834, p = 0.16 |
| Cardiac index 30 mins after administration (L/min/m**2**) | 3.3 ± 0.9 vs. 3.2 ± 0.9, p = 0.55 |
| **Miscellaneous** | | | | | |
| 1978 (Jarnberg et al.)80 | Upper abdominal surgery | 15% mannitol, 0.5 g/kg (n = 8) | Furosemide, 1 mg/kg (n = 8) | Urine output 6 hours after administration (mL) | 817 ± 87 vs. 1607 ± 142, p < 0.05 |
| 1988 (Gubern et al.)81 | Various surgeries for obstructive jaundice | Mannitol (% unspecified), 50 g (n = 17) | Control, therapy unspecified (n = 14) | 24 hours urine output on postoperative day 2 (mL) | 1,584 ± 353 vs. 1,360 ± 629, p < 0.05 |
| Postoperative serum Cr (time unspecified) (mg/dL) | 1.03 ± 0.6 vs. 1.4 ± 1.02, p value unspecified |
| Postoperative Cr clearance (time unspecified) (mL/min) | 51 ± 22 vs. 57 ± 33, p = 0.03 |
| 1990 (Crowley et al.)82 | Transurethral prostatectomy | 20% mannitol, 400 mL (n = 15) | Furosemide, 40 mg (n = 15) | Urine output 1 hour after administration (mL) | 688 ± 519 vs. 910 ± 672, p < 0.05 |
| Serum sodium at the end of surgery (mmol/L) | 137.2 ± 3.1 vs. 134.0 ± 8.4, p > 0.05 |
| 1991 (Plusa et al.)83 | Surgery for obstructive jaundice | 10% mannitol, 500 mL (n = 10) | Sodium taurocholate, 1 g, p.o. (n = 10) | Serum Cr on postoperative day 1 (mmol/L) | Data unspecified, p > 0.05 |
| 1996 (Nicholson et al.)84 | Infrarenal aortic aneurysm repair | Mannitol (% unspecified), 0.3 g/kg (n = 15) | Normal saline, same volume (n = 13) | Serum BUN 6 hours after surgery (mg/dL) | 6.1 ± 0.4 vs. 6.6 ± 0.9, p > 0.05 |
| Serum Cr 6 hours after surgery (mg/dL) | 111 ± 11 vs. 119 ± 11, p > 0.05 |
| Cr clearance 6 hours after surgery (mL/min) | 57.6 ± 10.7 vs. 63.6 ±10.2, p > 0.05 |
| 1998 (Pakulski et al.)85 | Intervertebral disc removal | 20% mannitol, 3.5 mL/kg (n = 20) | Normal saline, 3.5 mL/kg (n = 20) | Serum sodium after administration (mmol/L) | 137.0 ± 3.4 vs. 140.7 ± 3.0, p value unspecified |
| Serum potassium after administration (mmol/L) | 4.04 ± 0.14 vs. 3.96 ± 0.21, p value unspecified |
| 2000 (Dural et al.)86 | Coronary artery bypass grafting  (3 groups) | 20% mannitol, 1 mg/kg/h until end of surgery (n = 12) | Dopamine, 3 µg/kg/min until end of surgery (n = 12) | Urine output on postoperative day 1 (mL/kg/h) | 1.6 ± 0.4 vs. 1.9 ± 0.8, p > 0.05 |
| Serum Cr after aorta clamping (mg/dL) | 1.0 ± 0.2 vs. 1.1 ± 0.3, p value unspecified |
| Serum BUN after aorta clamping (mg/dL) | 16.5 ± 6.0 vs. 15.7 ± 4.3, p value unspecified |
| 2001 (Whitta et al.)87 | Liver transplantation | 10% mannitol, 0.5 g/kg (n = 12) | Normal saline, same volume (n = 13) | Intraoperative urine output (mL) | 912 ± 493 vs. 1,323 ± 1,419, p = 0.35 |
| Cr clearance 24hours after surgery (mL/min) | 78.6 ± 31.4 vs. 89 ± 41, p > 0.05 |
| Intraoperative fluid intake (mL) | 13,852 ± 11,827 vs. 10,741 ± 4517, p = 0.38 |
| 2003 (Ogiste et al.)88 | Extracorporeal shock wave lithotripsy | Mannitol (% unspecified), 0.5 g/kg (n = 10) | Control, therapy unspecified (n = 8) | ∆ urinary beta 2-microglobulin on postoperative day 1 (mcg/g Cr) | -49.6 vs. 52.7 (SD unspecified), p = 0.007 |
| ∆ urinary microalbumin on postoperative day 1 (mg/g Cr) | 74.7 vs. 491.3 (SD unspecified), p value unspecified |
| 2006 (Kostopanagiotou et al.)89 | Elective hepatectomy | 20% mannitol, 1.5 mL/kg (n = 15) | Normal saline, 1.5 mL/kg (n = 15) | Intraoperative urine output (mL) | 1,566.6 ± 344.5 vs. 637.5 ± 329.7, p < 0.001 |
| 2007 (Shim et al.)90 | Coronary artery bypass grafting | 20% mannitol, 0.5 g/kg (n = 25) | Normal saline, 2.5 ml/kg (n = 25) | Intraoperative urine output (mL) | 1,202 ± 521 vs. 727 ± 314, p < 0.05 |
| MAP 10 mins after administration (mmHg) | 74 ± 11 vs. 74 ± 11, p > 0.05 |
| Serum sodium after sternum closure (mmol/L) | 141 ± 2 vs. 141 ± 3, p > 0.05 |
| CK-MB 24 hours after surgery (ng/mL) | 7.0 ± 2.9 vs. 11.7 ± 11.5, p < 0.05 |
| 2009 (Ziegeler et al.)91 | Coronary artery bypass grafting  (3 groups) | 20% mannitol, 0.5 mL/kg (n = 17) | Hemofiltration 15 (mL/kg) (n = 17) | TNF-alpha 24 hours after surgery (pg/mL) | 0.01 ± 0.03 vs. 0.11 ± 0.27, p value unspecified |
| IL-10 24 hours after surgery (pg/mL) | 0.94 ± 1.57 vs. 1.63 ± 2.51, p value unspecified |
| 2013 (Shin et al.)92 | Orbital fracture repair | 20% mannitol, 100 mL (n = 54) | Hartman’s solution, volume unspecified (n = 54) | ∆ visual scale of surgical field after administration | 3.60 ± 2.08 vs. 0.24 ± 0.66, p < 0.05 |
| 2013 (Zhou et al.)93 | Retroperitoneal laparoscopic surgery | 20% mannitol, 0.5 g/kg (n = 20) | Normal saline, same volume (n = 20) | Time needed for satisfactory recovery (mins) | 12.19 ± 2.13 vs. 21.25 ± 3.61, p < 0.05 |
| Jugular venous oxygen content (mL/dL) | 15.67 ± 3.58 vs. 13.95 ± 3.67, p > 0.05 |
| 2014 (Kalimeris et al.)94 | Infrarenal/suprarenal aortic aneurysm repair | Hydration plus 20% mannitol, 0.5 g/kg (n = 43) | Hydration alone (n = 43) | Intraoperative urine output (mL) | 845 ± 454 vs. 677 ± 363, p = 0.062 |
| Cr clearance 24 hours after surgery (mL/min) | 1.07 ± 0.26 vs. 1.20 ± 0.3, p < 0.05 |
| 2014 (Sahmeddini et al.)95 | Liver transplantation | 20% mannitol, 1 g/kg (n = 28) | Normal saline, 500 mL (n = 25) | MAP 5 mins after portal vein declamping (mmHg) | 61.53 ± 0.98 vs. 50.01 ± 1.09, p < 0.05 |
| Cardiac output 5 mins after portal vein declamping (L/min) | 5.43 ± 0.78 vs. 4.78 ± 1.62, p value unspecified |
| Serum sodium after portal vein declamping (mEq/L) | 136.8 ± 2.6vs. 136.7 ± 6.3, p > 0.05 |
| Serum potassium after portal vein declamping (mEq/L) | 4.0 ± 0.01 vs. 3.9 ± 0.11, p value unspecified |

\* = Data are expressed as mean ± SD or median (range); \*\* = Conference abstract; # = Episodes of intracranial hypertension treatment

∆ = Change; ICP = Intracranial pressure; CPP = Cerebral perfusion pressure; MAP = Mean arterial pressure; BUN = blood urea nitrogen; Cr = Creatinine; CSFP = Cerebrospinal fluid pressure; GCS score = Glasgow Coma Scale score; CK-MB = Creatinine kinase MB; TNF-alpha = Tumor necrosis factor-alpha; IL-10 = Interleukin-10; CBF = Cerebral blood flow; TAP = Total antioxidant power; ROS = Reactive oxygen species; NO = Nitric oxide; E/A ratio: Early (E) and late (A) peak mitral inflow velocity; ICU = Intensive care unit