

Mannitol in severe traumatic brain injury

Level II: [mannitol](#) is effective for control of [Traumatic Intracranial Hypertension](#) (note: current information did not allow recommendations regarding [hypertonic saline](#) to be made)

- intermittent boluses may be more effective than continuous infusion
- effective doses range from 0.25–1 gm/kg body weight
- avoid [hypotension](#) (SBP < 90mm Hg) which may result from the diuretic effect of mannitol, which can lead to ↓ circulating fluid volume

Level III:

- indications: signs of [transtentorial herniation](#) or progressive neurological deterioration not attributable to systemic pathology
- [euvolemia](#) should be maintained (hypovolemia should be avoided) by fluid replacement. An [indwelling urinary catheter](#) is essential
- [serum osmolarity](#) should be kept < 320 mOsm when there is concern about [renal failure](#)

No controlled clinical trial has been conducted to show the benefits of [mannitol](#) over [placebo](#).

The exact mechanism(s) by which mannitol provides its beneficial effects is still controversial, but probably includes some combination of the following

1. lowering [ICP](#)

a) immediate plasma expansion: reduces the [hematocrit](#) and [blood viscosity](#) (improved rheology) which increases [CBF](#) and O₂ delivery. This reduces ICP within a few minutes, and is most marked in patients with CPP < 70mm Hg

With bolus administration, onset of ICP lowering effect occurs in 1–5 minutes; peaks at 20–60 minutes. When urgent reduction of ICP is needed, an initial dose of 1 gm/kg should be given over 30 minutes. When long-term reduction of ICP is intended, the infusion time should be lengthened to 60 minutes and the dose reduced (e.g. 0.25–0.5 gm/kg q 6 hrs). A large previous dose reduces the effectiveness of subsequent doses⁷²; thus it is desirable to use the smallest effective dose (small frequent doses may be preferable, e.g. 0.25 mg/kg q 2–3 hrs; also results in fewer peaks as mannitol “troughs” are smoothed out). Titrating to ICP (instead of dosing at regular intervals) results in less mannitol being given.

The effectiveness of mannitol may be synergistically enhanced when combined with the use of loop acting diuretics (e.g. [furosemide](#)), and alternating these medications has been suggested.

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