Mannitol-ICU

What is Mannitol?	▪ Osmotic diuretic ➢ 6-carbon sugar; "manna sugar"; isomer of sorbitol
Indication for Use	▪ Decrease intracranial pressure (ICP) and cerebral edema ▪ May be used in the treatment of oliguria ▪ Decrease intraocular pressure
Proposed Mechanism of Action	▪ Mannitol does not significantly penetrate the brain or eye, making it an ideal agent to decrease cerebral and ocular fluid levels. For example, to decrease intracranial pressure, it creates an osmotic gradient between the brain tissue and vascular compartment such that water moves from the brain tissue into the blood vessels (low concentration ⇒ high concentration). This lowers the cerebrospinal fluid pressure resulting in decreased intracranial pressure (↓ cerebral edema). ▪ Accompanied by an increase in urine output (as a result of fluid shifts).
Dosage Form	▪ Mannitol 25% (12.5 g/50 ml) single dose vial ▪ Pre-filled 20% Mannitol 250 ml IV bags (50 g/250 ml)
Storage	▪ Solutions containing >15% Mannitol may crystallize during storage and particularly at low temperatures. ▪ Temperature crucial to prevent crystallization
Usual Dosage & Administration for Decreasing ICP/cerebral edema	▪ 0.25 - 2 g/kg IV q 4-8 hours or as needed (weight based) ▪ Administer **intravenously** over 10-60 minutes ➢ Rapid IV infusion over a few minutes is adequate practice in order to achieve maximal effects and decrease ICP ▪ Higher doses produce a higher peak concentration resulting in a more substantial lowering of ICP ▪ Loop diuretics (i.e. furosemide, bumetanide) are not effective as monotherapy but can produce a synergistic effect when given after Mannitol ➢ Administer 15 minutes after Mannitol ▪ For pre-filled bags: prior to administration please check IV bag for crystallization. ➢ Do not administer if crystals are present[1]! ➢ Call pharmacy to deliver Mannitol to the unit! ▪ For vials: If crystals are apparent then warm the solution to 70-80^{o} (to dissolve the crystals) and cool to room temperature prior to administration. ▪ **An in-line filter should always be used when infusing the drug into the patient.** ➢ **Filter does not need to be used when removing it from the vial**
Onset of Action	▪ 20 minutes (range: 15-30 minutes) from the start of infusion
Duration of Action	▪ 4 hours (range: 2-8 hours) ▪ Rapid renal elimination (80% renally eliminated) ➢ Contraindicated with chronic renal failure
Monitoring Parameters	▪ Serum hyperosmolality (>320 mOsm) ➢ Significant overdiureses can occur with large, frequent doses and can cause kidney damage, hyperkalemia, fluid and electrolyte imbalances, pulmonary edema, and/or acidosis ▪ Use with caution in cardiovascular and renal disease patients since fluid and electrolyte disturbances are common.
Compatibility	▪ Sterile Water ▪ D_5W ▪ 0.9% Normal Saline[2]

[1] Mannitol usually precipitates as a result of contact with the PVC surface. Attempts to resolubilize the precipitate via heating is not recommended (for pre-filled solutions), since crystallization may recur in a short time.

[2] One source claims 20% Mannitol solutions and 0.9% Normal Saline may precipitate.

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