WINDSOR REGIONAL HOSPITAL
OUTSTANDING CARE – NO EXCEPTIONS!

mannitol

OTHER NAMES	CLASSIFICATION	
Osmitrol	Osmotic diuretic – irritant at conc greater than 5%	pH 4.5 to 7

INDICATIONS FOR IV USE

HEALTH CANADA APPROVED: [1-3]

- Reduce intracranial pressure associated with cerebral edema
- Reduce intraocular pressure refractory to other means
- Promote diuresis in the prevention/treatment of oliguria in acute renal failure – *not routinely recommended*[4]
- Promote urinary excretion of toxins – *not routinely recommended*[5]

NON HEALTH CANADA APPROVED BUT SUBSTANTIATED IN THE LITERAURE:

- Mannitol diuresis with CISplatin[6,7]

CONTRAINDICATIONS

- *Hypersensitivity to mannitol or any component of the formulation*[2]
- Established anuria due to severe renal disease[1-3]
- Severe pulmonary congestion/edema, progressive heart failure, severe dehydration [1-3]
- Active intracranial bleeding except during craniotomy[1-3]

CAUTIONS

- Fluid and electrolyte imbalances[1-3]
- Patients being treated for cerebral edema, mannitol may accumulate in brain (causing rebound increases in intracranial pressure) if circulating for long periods of time as with continuous infusion; intermittent boluses preferred[4]
- Sepsis or pre-existing renal disease; may cause renal dysfunction especially with high doses. To minimize adverse renal effects, adjust to keep serum osmolality less than 320 mOsm/L[4]

DRUG INTERACTIONS: Nephrotoxic agents: mannitol may cause renal dysfunction especially with high doses[4]
PREGNANCY/BREAST FEEDING: Contact pharmacy for most recent information.

ADMINISTRATION

MODE	DIRECT INTO IV TUBING	INTERMITTENT INFUSION	CONTINUOUS INFUSION
	YES	YES	YES
WHO MAY GIVE	All registered nurses	All registered nurses	All registered nurses
ADULT	Doses of 0.2 g/kg; over 3 to 5 minutes[2]	Infusion rate varies depending on indication. See DOSE	As ordered
PEDIATRIC	Doses of 0.2 g/kg; over 3 to 5 minutes[2]	Infusion rate varies depending on indication. See DOSE	As ordered
NEONATE	No information	No information	No information
REQUIREMENTS	Direct into tubing: withdraw through filter needle. Do not use if crystals present. Administer into a running IV Infusion: administer through a filter (size not critical 0.22 to 260 micron can be used). Do not use if crystals present Infusion: central line preferred for conc greater than 5% (5 g/100mL)		

MONITORING

REQUIRED

- Intermittent infusion: monitor peripheral IV site for pain, redness or swelling prior to initiating infusion and every 15 minutes until completion of infusion

RECOMMENDED

- Advise patients to report burning/stinging/pain at IV site promptly
- Serum creatinine, electrolytes and fluid balance
- Assess for signs and symptoms of congestive heart failure in patients at risk of circulatory overload

RECONSTITUTION

- None required. Available as 20% (100 g/500 mL) supplied by stores department and 25% (12.5 g/50 mL) solutions supplied by pharmacy

COMPATIBILITY/STABILITY

- Compatible with D5W, D5-NS, NS, Ringer's and lactated Ringer's solutions[4]
- Solutions of volumes 150 mL or greater can be warmed in their plastic over-pouches to temperatures not exceeding 40°C and for a period no longer than 14 days. After 14 days, the containers should be removed from the warming cabinet and identified as having been warmed. They should not be subsequently returned to the warmer. The containers may continue to be used until the labelled expiration date, provided they have not been warmed more than once. Cool to body temperature before use[8]

- Solutions in glass vials can be placed in a plastic bag and warmed in hot water. Cool to body temperature before use
- For drug-drug compatibility contact pharmacy

ADVERSE EFFECTS[1-3]

- Incidence of adverse effects is low. Those that have been reported are listed below
- Of greater clinical significance are a variety of events that are related to inappropriate recognition and monitoring of fluid and/or electrolyte shifts. These shifts can produce pulmonary congestion, acidosis, electrolyte loss, dehydration, dry mouth, thirst, edema, headache, blurred vision, convulsions and congestive cardiac failure

CARDIOVASCULAR

- Hypotension, hypertension, tachycardia, angina-like chest pains (chest constriction or pain)

GASTROINTESTINAL

- Nausea, vomiting

RENAL

- Acute renal failure, acute tubular necrosis (adult dose greater than 200 g/day; serum osmolality greater than 320 mOsm/L)[4]

EXTRAVASATION

- **Irritant** at conc greater than 5%: thrombophlebitis, local pain at injection site, tissue necrosis[4]
- **Treatment**: discontinue drug immediately and notify physician. Apply cold intermittent compresses. Red cell aggregation and crenation (deformation) if given IV direct too fast
- Hypersensitivity eg chills, urticaria, fever, rhinitis
- Urinary retention

DOSE

ADULT

- **Reduction of intracranial pressure:** 0.25 to 1 g/kg every 4 to 6 hours, or as needed[9]. Administer over 20 to 30 minutes.[4] Maintain serum osmolality less than 320 mOsm/kg[9]
- **Reduction of intraocular pressure:**[1-3] 0.25 to 2 g/kg over 30 to 60 min. May be used 60 to 90 minutes before surgery
- **Mannitol diuresis with CISplatin**:[6] see specific protocol for prescribing details

ELDERLY

- Refer to adult dosing. Consider initiation at lower end of dosing range[4]

PEDIATRIC

- **Reduction of intracranial pressure:** [10] 0.25 to 1 g/kg/dose infused over 20 to 30 minutes; repeat as needed to maintain serum osmolality less than 320 mOsm/kg. **Note:** The manufacturer's labelling allows for higher single doses up to 2 g/kg/dose
- **Mannitol diuresis with CISplatin**: 6 to 10 g/m^2/dose prior to and with CISplatin[7]

NEONATE

- No information available at this time

RENAL IMPAIRMENT ADJUSTEMENTS

- Contraindicated in severe renal impairment. Use caution in patients with underlying renal disease[4]

HEPATIC IMPAIRMENT ADJUSTMENTS

- No adjustment required[4]

HEMO/PERITONEAL DIALYSIS

- Removed during dialysis procedures

MISCELLANEOUS

- Subcutaneous/IM administration: do not administer by either route[2]
- Mannitol 20% has an ~ osmolarity of 1100 mOsm/L and mannitol 25% has an ~osmolarity of 1375 mOsm/L[4]

MANNITOL (grams)	VOLUME	
	20% solution	25% solution
12.5	62.5 mL	50 mL
25	125 mL	100 mL
50	250 mL	
100	500 mL	

mannitol - references

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9. Hemphill JC, Phan N. Management of acute severe traumatic brain injury. In: UpToDate, Basow, DS (Ed), UpToDate, Waltham, MA, 2013. [cited 2013 Sep].
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Mannitol (Osmitrol)

Recommended Dose: 0.25 – 2.0 g/kg
Mannitol 20% is supplied in **20 g/100mL concentration = 0.2 g/mL**

Dosing for Mannitol 20% premixed solution (20g/100 ml)

Drug Dose ⇒	0.25 g/kg		0.5 g/kg		1 g/kg		1.5 g/kg		2 g/kg	
Pt Kg Weight ⇓	Drug Dose in Grams	Dose Volume in mL	Drug Dose in Grams	Dose Volume in mL	Drug Dose in Grams	Dose Volume in mL	Drug Dose in Grams	Dose Volume in mL	Drug Dose in Grams	Dose Volume in mL
30 kg	7.5 g	37.5 mL	15 g	75 mL	30 g	150 mL	45 g	225 mL	60 g	300 mL
35 kg	8.75 g	44 mL	17.5 g	87.5 mL	35 g	175 mL	52.5 g	262.5 mL	70 g	350 mL
40 kg	10 g	50 mL	20 g	100 mL	40 g	200 mL	60 g	300 mL	80 g	400 mL
45 kg	11.25 g	57.5 mL	22.5 g	112.5 mL	45 g	225 mL	67.5 g	337.5 mL	90 g	450 mL
50 kg	12.5 g	62.5 mL	25 g	125 mL	50 g	250 mL	75 g	375 mL	100 g	500 mL
55 kg	13.75 g	69 mL	27.5 g	137.5 mL	55 g	275 mL	82.5 g	412.5 mL	110 g	550 mL
60 kg	15 g	75 mL	30 g	150 mL	60 g	300 mL	90 g	450 mL	120 g	600 mL
65 kg	16.25 g	81mL	32.5 g	162.5 mL	65 g	325 mL	97.5 g	487.5 mL	130 g	650 mL
70 kg	17.5 g	87.5 mL	35 g	175 mL	70 g	350 mL	105 g	525 mL	140 g	700 mL
75 kg	18.75 g	94 mL	37.5 g	187.5 mL	75 g	375 mL	112.5 g	562.5 mL	150 g	750 mL
80 kg	20 g	100 mL	40 g	200 mL	80 g	400 mL	120 g	600 mL	160 g	800 mL
85 kg	21.25 g	107.5 mL	42.5 g	212.5 mL	85 g	425 mL	127.5 g	637.5 mL	170 g	850 mL
90 kg	22.5 g	112.5 mL	45 g	225 mL	90 g	450 mL	135 g	675 mL	180 g	900 mL
95 kg	23.75 g	119 mL	47.5 g	237.5 mL	95 g	475 mL	142.5 g	710 mL	190 g	950 mL
100 kg	25 g	125 mL	50 g	250 mL	100 g	500 mL	150 g	750 mL	200 g	1000mL

Example: Administer 0.5 g/kg of Mannitol 20% to a 75 kg patient

0.5 g X 75 kg = 37.5 g

$\frac{37.5\ g}{0.2\ g/mL} = 187.5\ mL$

ICU Practice Team/Mannitol Calculation
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