Ballarat Health Services

Neonatal Drug Guideline

MIDAZOLAM (Hypnovel®)

DESCRIPTION AND INDICATION FOR USE

Midazolam is a short-acting benzodiazepine which produces central nervous system depression. Midazolam is able to induce sedation, hypnosis, amnesia and anaesthesia, depending on the dose administered, the route of administration and the presence of other medication. Midazolam also has anticonvulsant and muscle relaxant properties.

DOSE

Sedation bolus:
IV bolus: 100 microgram/kg/dose

Conscious sedation in **ventilated** babies:
IV infusion: 0.5 to 4 microgram / kg / minute

Seizures:
IV infusion: 0.15 mg / kg / dose stat then 1 microgram / kg / minute

RECONSTITUTION/DILUTION

Ampoule = 5 mg in 1mL (NB: STORED IN DD SAFE)
NOTE: 1000 micrograms = 1 mg

Use only sodium chloride 0.9% or glucose 5% or 10% as infusion fluids

IV bolus: Add 4mL sodium chloride 0.9% to 1 mL midazolam (5 mg) = 1 mg/mL (5 mg/5mL)

IV infusion: Withdraw ordered dose and make up to 50 mL (total volume) with infusion fluid

Usual order will be as follows:

SINGLE (1) STRENGTH:

DRUG	HOW TO MAKE UP	DOSE EQUIVALENT	DOSE RANGE
Midazolam	**3 mg/kg** in 50 mL (total volume)	**1 mL/hr = 1 microgram/kg/minute**	**0.5 to 4 mcg/kg/min**

DOUBLE (2) STRENGTH:

DRUG	HOW TO MAKE UP	DOSE EQUIVALENT	DOSE RANGE
Midazolam	**6mg/kg** in 50 mL (total volume)	**1 mL/hr = 2 microgram/kg/minute**	**0.5 to 4 mcg/kg/min**

ROUTE AND METHOD OF ADMINISTRATION

IV bolus: Administer over at least 5 minutes

IV infusion: Infuse via syringe driver at prescribed rate.
NOTE: BOLUS DOSES ARE NOT RECOMMENDED

COMPATIBILITY INFORMATION

Please contact your ward pharmacist for information on drugs or fluids not appearing in the table below. Medications that are not routinely used in the Special Care Nursery have not been included in this table and may be incompatible.

	Compatible	Incompatible
Fluids	Glucose 5%, Glucose 10%, Sodium chloride 0.9%	
Drugs	Dopamine, Morphine	Amoxycillin, Ampicillin, Dobutamine, Flucloxacillin, Frusemide, Sodium bicarbonate

SIDE EFFECTS

Side effects are more likely to occur when midazolam is used in conjunction with opiates (eg: morphine), if administered rapidly, if used in high doses, or if the patient has underlying respiratory insufficiency or impaired cardiac function.

- Respiratory depression, apnoea, respiratory arrest, hyper/hypoventilation
- Hypotension, bradycardia, tachycardia
- Seizures, agitation, involuntary movements (including myoclonus)

SPECIAL PRECAUTIONS

- Caution in infants with significant renal or hepatic dysfunction, congestive heart failure or with limited pulmonary reserve – these patients are at greater risk of apnoea or respiratory depression and may require lower doses of midazolam

DRUG INTERACTIONS

Erythromycin:
Inhibits metabolism of midazolam therefore monitor for increased midazolam effect, dose reduction may be necessary

Phenytoin, Rifampicin:
Induces metabolism of midazolam therefore monitor for decreased midazolam effect, dose increase may be necessary

Opioid analgesics:
May have additive effect on sedation and respiratory depression

NURSING RESPONSIBILITIES

- Observations/Monitoring:
  - Monitor heart and blood pressure
  - Monitor respiratory rate and be alert for early signs of under ventilation or apnoea
  - Apply pulse oximeter (and transcutaneous CO_2 monitor if requested by paediatrician)
- Change IV syringe every 24 hours. When changing syringe, ensure line is clamped to prevent administering a bolus
- Check the rate ordered corresponds with the dose required (microgram / kg / minute)

- Avoid extravasation as midazolam solution is very acidic (pH 3.3)
- Protect from light during storage
- Flumazenil is a benzodiazepine antagonist and may be used to rapidly reverse toxicity