midazolam

Warnings	Classification	Alternate Names
	anxiolytic-sedative	VERSED midazolam hydrochloride

Indications

- pre-operative sedation
- induction of anesthesia
- procedural sedation prior to diagnostic and endoscopic procedures
- palliative sedation as determined by palliative care physician
- refractory status epilepticus
- Indications and/or prescribing restrictions apply.

Reconstitution and Stability

- store vials at room temperature; protect from light

Compatibility

- compatible with dextrose 5%, sodium chloride 0.9%

Preparation and Administration

Administration Route	Approved	Preparation and Administration Instructions	Required Monitoring
Subcutaneous	YES		Advanced Monitoring ***or*** Palliative Monitoring See site-specific restrictions
Continuous Subcutaneous Infusion	YES	**standard solution concentrations:** 1 mg/mL: [prepare bags using 5 mg/mL vial] ○ remove 10 mL from NS 50 mL bag, then add 50 mg to the bag **or** ○ remove 20 mL from NS 100 mL bag, then add 100 mg to the bag 5 mg/mL: transfer 250 mg into empty sterile bag (obtain bag from stores or pharmacy) *rate must be controlled with a subcutaneous infusion pump*	Advanced Monitoring ***or*** Palliative Monitoring See site-specific restrictions
Intramuscular	YES	deeply into large muscle	Advanced Monitoring See site-specific restrictions
IV direct	YES	undiluted; administer slowly over 2 to 3 minutes	Advanced Monitoring ***or*** Palliative Monitoring See site-specific restrictions
IV intermittent	NO		
Continuous IV infusion	YES	**standard solution concentrations:** 1 mg/mL: [prepare bags using 5 mg/mL vial] ○ remove 10 mL from NS 50 mL bag, then add 50 mg to the bag **or** ○ remove 20 mL from NS 100 mL bag, then add 100 mg to the bag 5 mg/mL: transfer 250 mg into empty sterile bag (obtain bag from stores or pharmacy) *rate must be controlled with an IV infusion pump*	Full Monitoring ***or*** Palliative Monitoring See site-specific restrictions

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Dosage

pre-operative sedation: 0.07 to 0.1 mg/kg (usual dose 5 mg) IM 30 to 60 minutes pre-op.

procedural sedation:
- 0.5 mg to 2.5 mg IV direct. May increase subsequent doses in small increments, every 2 minutes up to 0.1 mg/kg until desired effect *(elderly or debilitated*: 1 to 1.5 mg IV direct; maximum 0.07 mg/kg), or
- 1 to 5 mg IM or subcutaneous repeated every 2 to 4 hours as needed, or
- 2 to 2.5 mg IV direct then 2 mg/hour continuous IV infusion. May increase rate in increments of 25 to 50% of initial rate every 30 minutes.

palliative sedation: 2.5 to 10 mg IV direct or subcutaneous, then 1.25 to 10 mg/hour continuous IV or subcutaneous infusion. May increase rate in increments of 25 to 50% of initial rate every 30 minutes. Usual dosage range is 1 to 20 mg/hour.

palliative sedation for major hemorrhage or acute respiratory distress:
5 to 10 mg IV direct or subcutaneous every 10 to 15 minutes until patient is sedated or symptoms resolved.

induction of anesthesia: 0.3 to 0.35 mg/kg IV direct (elderly or debilitated patient: 0.2 to 0.3 mg/kg IV direct)

refractory status epilepticus:
- loading dose: 5 to 20 mg (0.2 mg/kg) IV direct; may repeat every 3 to 5 minutes as needed
- continuous IV infusion: initial rate of 5 to 100 mg/h; adjust infusion by 1 to 10 mg/h (0.05 to 0.1 mg/kg/h) every 3 to 4 hours; usual dosing range 0.05 to 2 mg/kg/h (maximum suggested dose 3 mg/kg/h)

Dose reduction:
- reduce dose in patients with renal or hepatic dysfunction
- reduce dose by 30 to 60% if used with other CNS depressants (e.g. opioids)

Potential Hazards of Parenteral Administration

- pain on injection, local irritation, thrombophlebitis
- severe hypotension, bradycardia, respiratory depression and cardiac arrest may follow too rapid IV administration

Important Implications

Contraindications/Cautions
- contraindicated: hypersensitivity to benzodiazepines
- caution: respiratory depression, hypotension and apnea occur more frequently in patients who have been pre-medicated with opioids or other CNS depressants
- caution: when treating patients with myasthenia gravis
- Pregnancy/Lactation: refer to Lexicomp or Micromedex

Monitoring
- notify physician if respiratory rate falls below 8 per minute
- when discontinued, recovery from sedation may be prolonged (more than10 hours) if the infusion duration exceeds 24 hours
- anterograde amnesia may persist for up to 2 hours, although usual duration is 20 to 30 minutes

Other
- midazolam is 1.5 to 2 times more potent than diazepam
- onset of action following IV direct: 1 to 5 minutes; duration of activity: less than 2 hours (range 2 to 6 hours)