

<b>Alert</b>	High-alert medication: High risk of causing significant patient harm when used in error. This drug should be administered in the presence of personnel trained in advanced airway management. Suggest regular cessation of infusion for a few to several hours, possibly every 24 hours (commonly referred to as 'drug holiday' <sup>7</sup> ) to assess the need for continued paralysis and adequacy of sedation or analgesia. Line should be adequately flushed to avoid unintended paralysis during later use of the line.				
<b>Indication</b>	1. Skeletal muscle relaxation or paralysis in mechanically ventilated infants 2. For elective endotracheal intubation.				
<b>Action</b>	Long acting non-depolarising muscle relaxant that competitively antagonises acetylcholine antagonist at nicotinic acetylcholine receptors at neuromuscular junctions. Also has autonomic anticholinergic effect resulting in increase in heart rate. Onset of action: 1–2 minutes. Duration of action: 45–60 minutes.				
<b>Drug Type</b>	Long acting non-depolarising neuromuscular blocking agent.				
<b>Trade Name</b>	Pancuronium Bromide Injection BP – Astra Zeneca				
<b>Presentation</b>	Ampoules (Polyamp DuoFit), 4 mg/2 mL.				
<b>Dosage/Interval</b>	<b>Intubation</b> IV bolus: 0.1 mg/kg.  <b>Muscle relaxation</b> IV bolus: 0.1 mg/kg followed by (1) Either IV infusion 0.05 mg/kg/hour (0.025–0.075 mg/kg/hour) <b>OR</b> (2) Intermittent IV bolus 0.05 mg/kg (0.05–0.1 mg/kg) every 1–2 hours. Note: IV infusion dose can be increased or decreased by 0.01 mg/kg/hour to a maximum of 0.1 mg/kg/hour.				
<b>Maximum dose</b>	IV bolus: 0.1 mg/kilogram/dose.				
<b>Route</b>	IV				
<b>Preparation/Dilution</b>	<b>IV bolus:</b> Draw up 2 mL (4 mg of pancuronium) and add 6 mL water for injection to make a final volume of 8 mL with a concentration of 0.5 mg/mL  <b>IV infusion:</b> <table border="1" data-bbox="411 1279 1485 1357"> <thead> <tr> <th>Infusion rate</th> <th>Prescribed amount</th> </tr> </thead> <tbody> <tr> <td>1 mL/hour = 50 microgram/kg/hour</td> <td>2.5 mg/kg of pancuronium and make up to 50 mL</td> </tr> </tbody> </table> Draw up 1.25 mL/kg (2.5 mg/kg of pancuronium) and add sodium chloride 0.9% to make a final volume of 50 mL. Infusing at a rate of 1 mL/hour = 50 microgram/kg/hour.	Infusion rate	Prescribed amount	1 mL/hour = 50 microgram/kg/hour	2.5 mg/kg of pancuronium and make up to 50 mL
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<b>Administration</b>	IV bolus: Administer as a rapid intravenous injection over several seconds. Line should be adequately flushed to avoid unintended paralysis during later use of the line.				
<b>Monitoring</b>	Continuous cardio-respiratory and pulse oximetry monitoring. Close monitoring of neuromuscular function, sedation and blood pressure (invasive or non-invasive) is essential. Monitoring of fluid balance is essential due to of risk of fluid retention. Monitor hepatic and renal function with prolonged use.				
<b>Contraindications</b>	Known hypersensitivity to pancuronium bromide or to the bromide ion.				
<b>Precautions</b>	Avoid prolonged usage. Suggest regular cessation of infusion, possibly every 24 hours (commonly referred to as 'drug holiday') to assess the need for continued paralysis and adequacy of sedation or analgesia. Pre-existing tachycardia, hypertension (including that associated with renal failure or pheochromocytoma)—consider an alternative agent. Renal: Prolonged neuromuscular blockade may occur in renal impairment; reduction in maintenance dose may be necessary. Hepatic: Increased onset time and prolonged duration of action may occur in impairment; consider using alternative agent. Myasthenia gravis—prolongs paralysis; avoid neuromuscular blocking agents if possible. Neuromuscular diseases (e.g. dystrophia myotonica, history of polio), severe obesity—unpredictable effect; use cautiously and monitor neuromuscular function closely.				

	<p>Neonates are generally more sensitive to non-depolarising neuromuscular blocking agents; duration of action may be prolonged; monitor neuromuscular function closely.</p> <p>Acidosis, dehydration, hypokalaemia, hypermagnesaemia, hypocalcaemia—enhances effects of neuromuscular blocking drugs; where possible correct before administration, reduce dose and monitor neuromuscular blockade.</p> <p>Hypothermia—decreases effect of pancuronium (unlike the rest of the neuromuscular blockers); reduce dose and monitor neuromuscular blockade.</p> <p>Anaphylactic reaction to neuromuscular blocking agents—allergic cross-reactivity has been reported; refer to specialist for skin testing for sensitivity to other neuromuscular blockers.</p>
<b>Drug Interactions</b>	<p><u>Drugs that potentiate the effect of pancuronium:</u><sup>14</sup></p> <ol style="list-style-type: none"> <li>1. Anaesthetics: Halothane, ether, enflurane, isoflurane, methoxyflurane, thiopentone, methohexitone, ketamine and fentanyl.</li> <li>2. Other drugs: neomycin, streptomycin, kanamycin, gentamicin, bacitracin, polymixins, tetracyclines, piperacillin, diazepam, propranolol, thiamine (high dose), intravenous lignocaine (high dose), magnesium sulfate, lithium carbonate, monoamine oxidase inhibitors (MAOIs), quinine, quinidine, protamine, diuretics, phenytoin, alpha-adrenergic blocking agents, beta-adrenergic blocking agents, calcium channel blockers, imidazoles, metronidazole and magnesium salts, magnesium ions and citrate anticoagulated blood</li> <li>3. Drugs which are associated with a significant risk of hypokalaemia (e.g. amphotericin B, cisplatin, corticosteroids, loop diuretics, thiazide diuretics)</li> <li>4. Suxamethonium—prior administration can potentiate the effect of pancuronium</li> </ol> <p><u>Drugs that decrease the effect of pancuronium</u></p> <ol style="list-style-type: none"> <li>1. Neostigmine, edrophonium, adrenaline (epinephrine), azathioprine, theophylline (high dose), potassium chloride, sodium chloride and calcium chloride</li> <li>2. Hydrocortisone and prednisone can decrease the effect of pancuronium</li> </ol> <p>Cardiac glycosides—pancuronium increases the risk of developing arrhythmias.</p>
<b>Adverse Reactions</b>	<p><b>Respiratory:</b> May result in prolonged apnoea or respiratory depression.</p> <p><b>Cardiovascular:</b> After administration, approximately 10% of patients may exhibit mild to moderate increases in blood pressure and/or pulse rate. Dysrhythmias may occasionally occur and increased cardiac output is frequently noted.</p> <p><b>Hypersensitivity:</b> Hypersensitivity reactions occur rarely (&lt; 1%). Bradycardia, bronchospasm, hypotension and cardiovascular collapse have been reported. An occasional transient rash has been reported. Pruritus can occur, as well as rare cases of flushing, oedema and wheezing.</p> <p><b>Skin:</b> A few case reports of local reactions including pain and burning at the site of injection.</p> <p><b>Ocular:</b> Pancuronium decreases intraocular pressure and induces miosis.</p> <p><b>Neuromuscular:</b> Prolonged paralysis, disuse atrophy and areflexia have been reported with prolonged use of pancuronium.</p> <p><b>Other:</b> Hypersalivation may occur, especially if no anticholinergic premedication is given.</p>
<b>Compatibility</b>	<p>Fluids: Glucose 5%, glucose 5% in sodium chloride 0.9%, glucose 5% in sodium chloride 0.45%, Hartmann's, sodium chloride 0.9%.<sup>10</sup></p> <p>Compatible via Y-site : Adrenaline (epinephrine), aminophylline, cefazolin, dobutamine, dopamine, esmolol, fentanyl, fluconazole, gentamicin, glyceryl trinitrate, heparin, hydrocortisone sodium succinate, lorazepam, midazolam, milrinone, morphine, ranitidine, sodium nitroprusside, trimethoprim-sulfamethoxazole, vancomycin.<sup>10</sup></p>
<b>Incompatibility</b>	<p>Incompatible fluids : No information</p> <p>Incompatible via Y site : Barbiturates, caspofungin, furosemide, quinine, thiopentone.<sup>10</sup></p>
<b>Stability</b>	<p>Dilutions are stable for 48 hours.<sup>9</sup></p> <p>The stability of pancuronium bromide can be extended if refrigerated. Pancuronium stored at room temperature (15–30°C) will maintain its full clinical potency for 6 months. However, if refrigerated (2–8°C), pancuronium bromide will be stable for up to 3 years or until its expiration date, whichever comes first.</p>
<b>Storage</b>	<p>Store at 2–8°C. Do not freeze. Refrigeration is unnecessary during normal periods of use in operating theatres.</p>
<b>Special Comments</b>	<p>Dose should be individualised for each patient as there is wide variation in individual response. Inhalation agents or prior administration of suxamethonium enhance the intensity of action of pancuronium.</p>

	Therapeutic: It is recommended that a peripheral nerve stimulator be used to monitor response to pancuronium to minimise the risk of overdose.
<b>Evidence summary</b>	Refer to full version
<b>References</b>	Refer to full version.

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