

# Adrenaline (EPINEPHrine) intravenous bolus

## Newborn use only

2021

<b>Alert</b>	1:10,000 (1 mg/10 mL) adrenaline <b>acid tartrate</b> ampoule is the preferred preparation for IV bolus.
<b>Indication</b>	Resuscitation of the newborn infant.[1]
<b>Action</b>	Catecholamine with alpha and beta-adrenergic actions.
<b>Drug type</b>	Inotropic vasopressor
<b>Trade name</b>	Aspen Adrenaline 1:10,000 Injection, Adrenaline-Link Injection BP 1:10,000 Ampoule, Min-I-Jet Adrenaline 1:10,000 Injection (Pre-filled Syringe).
<b>Presentation</b>	1:10,000 ampoule [100micrograms/1mL] as adrenaline acid tartrate (Recommended) 1: 10,000 Min-I-Jet pre-filled syringe [100micrograms/1mL] as adrenaline hydrochloride (if ampoules are in short supply)
<b>Dose</b>	10–30 microgram/kg ( <b>0.1–0.3 mL/kg</b> of a 1:10,000 solution) intravenous injection. This dose can be repeated every few minutes if the heart rate remains < 60 beats per minute despite effective ventilation and cardiac compressions.[1-3]
<b>Dose adjustment</b>	Not applicable.
<b>Maximum dose</b>	
<b>Total cumulative dose</b>	
<b>Route</b>	Intravenous.
<b>Preparation</b>	Draw up 10-30 microgram/kg ( <b>0.1–0.3 mL/kg</b> of adrenaline from 1:10,000 ampoule [1 mg/10 mL] undiluted. [1 mL contains 0.1 mg (100 microgram) of adrenaline].
<b>Administration</b>	Intravenous as a rapid bolus ideally through a central venous catheter followed by a sodium chloride 0.9% flush.[1]
<b>Monitoring</b>	Assessment throughout the resuscitation is based on the infant’s heart rate, breathing, tone and oxygenation. A prompt increase in heart rate remains the most sensitive indicator of resuscitation efficacy.[4] For babies requiring resuscitation and/or respiratory support, pulse oximetry is recommended both to monitor heart rate and to assess oxygenation. The sensor should be placed on the infant’s right hand or wrist before connecting the probe to the instrument. Heart rate monitored using an oximeter should be checked intermittently during resuscitation by auscultation.[4] Observe IV site closely for blanching and extravasation.
<b>Contraindications</b>	Nil
<b>Precautions</b>	Infants with arrhythmias, hypertension or hyperthyroidism. Infants with dilated or ischaemic cardiac disease. Intra-arterial and intramuscular administration should be avoided as it may cause local ischaemic damage. Do not use if the injection is pink or brown or contains a precipitate.
<b>Drug interactions</b>	Hypotension may be observed with concurrent use of vasodilators such as glyceryl trinitrate, nitroprusside and calcium channel blockers. Concurrent use of digitalis glycosides may increase the risk of cardiac arrhythmias. Concurrent use of IV phenytoin with adrenaline may result in dose dependent, sudden hypotension and bradycardia. Concurrent use of adrenaline and linezolid may result in increased hypertensive effects.
<b>Adverse reactions</b>	Tachycardia and arrhythmia. Systemic hypertension and lactic acidosis especially at higher doses. Tissue ischaemia and necrosis especially if administered intra-arterially, intramuscularly or with extravasation.
<b>Compatibility</b>	<b>Adrenaline acid tartrate (2,3)</b> Fluids: Solutions of adrenaline (epinephrine) acid tartrate in sodium chloride 0.9% or glucose 5% are commonly used in practice despite the lack of compatibility and stability information. Always inspect solutions closely for signs of incompatibility. Glucose 5% is the preferred fluid in critical care settings. Y-site: Giving other drugs via Y-site may change the infusion rate of adrenaline (epinephrine). A dedicated line is preferred. <b>Adrenaline hydrochloride (2,3)</b> Fluids: Glucose 5%, glucose 10%, sodium chloride 0.9%. Y-site: Giving other drugs via Y-site may change the infusion rate of adrenaline (epinephrine). A dedicated line is preferred. <u>Adrenaline (epinephrine) at 60 microgram/mL: insulin (Novorapid).</u>

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	<p><u>Adrenaline (epinephrine) hydrochloride at 60 microgram/mL (or higher)</u>: amikacin, amiodarone, atracurium, cefazolin, cefotaxime, ceftazidime, ceftriaxone, clindamycin, dexamethasone, dobutamine, dopamine, ephedrine sulfate, esmolol, fentanyl, fluconazole, gentamicin, glyceryl trinitrate, heparin sodium, labetalol, lidocaine, magnesium sulfate, methylprednisolone sodium succinate, metoclopramide, midazolam, milrinone, morphine sulfate, phenylephrine, potassium chloride, ranitidine, sodium nitroprusside, tobramycin, verapamil.</p>
<b>Incompatibility</b>	<p>Fluids (2): No information.</p> <p>Y-site (2): Aciclovir, aminophylline, azathioprine, cefalotin, ganciclovir, hyaluronidase, indometacin, micafungin, phenobarbital, sodium bicarbonate, thiopental.</p> <p>The product information for adrenaline (epinephrine) <b>acid tartrate</b> injection states that it is incompatible with noradrenaline (norepinephrine), however several studies have demonstrated compatibility of adrenaline (epinephrine) <b>hydrochloride</b> and noradrenaline (norepinephrine) at various concentrations.(2)</p>
<b>Stability</b>	Not for dilution.
<b>Storage</b>	Store below 25°C. Protect from light.
<b>Excipients</b>	<p>Aspen Adrenaline: Tartaric acid, sodium metabisulfite, sodium chloride, water for injections.</p> <p>Adrenaline-Link: Sodium metabisulfite, sodium chloride, sodium citrate dihydrate and citric acid monohydrate, water for injections and dilute hydrochloric acid.</p> <p>Min-I-Jet Adrenaline: Water, sulfur dioxide (not more than 0.2% from an equivalent amount of sodium metabisulfite as an antioxidant), sodium chloride, sodium citrate, citric acid monohydrate and hydrochloric acid.</p>
<b>Special comments</b>	Onset of action is 1 to 2 minutes, duration of effect is short and half-life is 5 minutes.
<b>Evidence</b>	<p>ILCOR 2020 recommendations: (1) Establishing ventilation is the most important step to correct low heart rate. However, if heart rate remains less than 60 beats/min after optimal ventilation with 100% oxygen (preferably through an endotracheal tube) and chest compressions, it may be reasonable to administer intravascular epinephrine (0.01 to 0.03 mg/kg); (2) While vascular access is being obtained, it may be reasonable to administer endotracheal epinephrine at a larger dose (0.05 to 0.1 mg/kg); (3) If endotracheal epinephrine is given before vascular access is available and response is inadequate, it may be reasonable to give an intravascular (intravenous or intraosseous) dose as soon as access is obtained, regardless of the interval; (4) It may be reasonable to administer further doses of epinephrine every 3 to 5 min, preferably intravascularly, if the heart rate remains less than 60 beats/min.</p>
<b>Practice points</b>	
<b>References</b>	<ol style="list-style-type: none"> <li>1. Aziz K, Lee HC, Escobedo MB, Hoover AV, Kamath-Rayne BD, Kapadia VS, Magid DJ, Niermeyer S, Schmölder GM, Szylid E, Weiner GM. Part 5: neonatal resuscitation: 2020 American heart association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. <i>Circulation</i>. 2020 Oct 20;142(16_Suppl_2):S524-50.</li> <li>2. Australian injectable drugs handbook. Adrenaline (epinephrine). Accessed on 4 May 2021.</li> <li>3. Micromedex. Epinephrine. Accessed on 4 May 2021.</li> </ol>

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