

INSULIN - HYPERGLYCAEMIA

This drug must be guardrailed
No filters on the line

Trade Name	Actrapid (Human) (Novo-Nordisk)										
Class	Neutral rapid acting insulin										
Mechanism of Action	<p>Binds to cell membrane insulin receptors and promotes protein, lipid and glycogen synthesis as well as peripheral glucose uptake.</p> <p>Insulin is a major fetal growth factor and treatment of preterm infants with insulin may improve weight gain and glucose tolerance</p>										
Indications	Hyperglycaemia - BSL of 10mmol/L or more, for two consecutive levels four hours apart. Usually associated with glycosuria										
Contraindications	<p>Hypoglycaemia</p> <p>Hypersensitivity to human insulin</p>										
Supplied As	100 unit/mL 10mL vial										
Dilution *Two dilution steps required*	<p>See Insulin for hyperglycaemia infusion sheet</p> <table border="1"> <thead> <tr> <th>Drug</th> <th>0.9% Saline Added</th> <th>Total Volume</th> <th>Concentration</th> </tr> </thead> <tbody> <tr> <td>0.5mL (50 unit)</td> <td>49.5mL</td> <td>50mL</td> <td>1 unit/mL</td> </tr> </tbody> </table> <p>Then further dilute by taking (5 x weight in kg) in mL and make up to 20mL with normal saline: 0.2mL/hr = 0.05 unit/kg/hr</p> <p>If baby is >4kg the max concentration will be exceeded and the infusion will need to be made half strength</p>			Drug	0.9% Saline Added	Total Volume	Concentration	0.5mL (50 unit)	49.5mL	50mL	1 unit/mL
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Dosage *Must chart guardrail and use Alaris pump*	<p>0.03 – 0.3 unit/kg/hr</p> <p>Changes in dosing to be by the Insulin Computer</p>										
Guardrails	<p>Concentration: Min - 0.07unit/mL Max – 1 unit/mL</p> <p>Concentration can only be entered up to 2 decimal points so use Swedish rounding. Occasionally the rate requested by the computer may be different from what the pump provides ie: 0.21 vs 0.2 mL/hr – not clinically relevant</p> <p>Soft Alert Min: 0.03 unit/kg/hr Hard Alert Max: 0.3 unit/kg/hr Soft Alert Max: 0.2 unit/kg/hr Default Setting: 0.05 unit/kg/hr</p>										
Interval	Continuous intravenous Infusion										

Administration	<p>Flush the tubing with 10mL of solution to ensure that plastic receptor binding occurs.</p> <p>Filters are not be used on the insulin line and if present must be removed as they absorb the insulin</p> <p>Infuse through the same iv line as continuous TPN or 10% dextrose and do not give any boluses through this iv to avoid the baby receiving any boluses of insulin</p>
Compatible With	Heparin, dextrose, sodium chloride, TPN, lipids, dobutamine, morphine, midazolam, potassium chloride, ranitidine, vancomycin, sodium bicarbonate
Incompatible With	Chlorothiazide, phenobarbitone, phenytoin, thiopentone, Dopamine (data from higher concentrations than we use for both infusions). We have used insulin in combination with dopamine without detectable problems for several years. If concerned change to dobutamine which is compatible at any concentration.
Monitoring	<p>Check blood sugars 1-2 hourly initially then 3-4 hourly</p> <p>Measure blood glucose concentrations frequently after starting insulin infusion and after changes are made to the infusion rate.</p> <p>If the baby is on enteral feeds and these are not absorbed then the insulin requirement will fall due to a lower glucose intake</p>
Stability	<p>Single use vial only</p> <p>Change continuous infusions after 24 hrs</p>
Storage	<p>Store Actrapid insulin vials in the refrigerator at 2 – 8 °C.</p> <p>Do not freeze</p> <p>Do not use any insulin solution that is cloudy, unusually viscous, precipitated, or even slightly coloured</p>
Adverse Reactions	<p>Hypoglycaemia</p> <p>Over supplementation of insulin once euglycaemia has been achieved may cause metabolic acidosis</p>
Metabolism	<p>Liver, more than 50% (Paterson et al, 1983).</p> <p>Kidney, 30% (Paterson et al, 1983).</p> <p>Adipose tissue/muscle, about 20% (Paterson et al, 1983).</p>
Comments	<p>It is Christchurch Neonatal Service policy that all Actrapid Insulin vials should be used and then discarded after opening*.</p> <p>*This is because Actrapid doesn't contain preservative and is a potential cause of infection for neonates who most commonly receive insulin by IV infusion (rather than subcutaneous injection which is the most common route of administration for insulin in older patients).</p>
References	<ol style="list-style-type: none"> 1. Paterson KR, Paice BJ & Lawson DH: Undesired effects of insulin therapy. Adverse Drug React Acute Poisoning Rev 1983; 2:219-234. 2. Trissell Handbook of injectable Drugs 10th Edition.

	3. NZHPA Notes on injectable Drugs 5th Edition 4. Micromedex 5. Rennie JM, Robertson NRC, Textbook of Neonatology 3 rd Ed1999										
Updated By	<table> <tr> <td>P Schmidt, B Robertshawe</td> <td>December 2005</td> </tr> <tr> <td>A Lynn, B Robertshawe</td> <td>Oct 2007</td> </tr> <tr> <td>A Lynn, B Robertshawe</td> <td>July 2009, September 2009, June 2010</td> </tr> <tr> <td>A Lynn, B Robertshawe</td> <td>October 2012 (re-order profile)</td> </tr> <tr> <td>A Lynn</td> <td>May 2013 (max conc and weight)</td> </tr> </table>	P Schmidt, B Robertshawe	December 2005	A Lynn, B Robertshawe	Oct 2007	A Lynn, B Robertshawe	July 2009, September 2009, June 2010	A Lynn, B Robertshawe	October 2012 (re-order profile)	A Lynn	May 2013 (max conc and weight)
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