South Australian Neonatal Medication Guidelines

insulin - hyperKALAEMIA

100 units/mL injection

This is a High Risk Medication ⚠

Use the term “units” (written in full) as the abbreviation of “u” can be misinterpreted as a “0”

Synonyms

Neutral insulin, soluble insulin

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Dose and Indications

Hyperkalaemia

Intravenous Bolus Injection

.1 unit/kg

Always prescribe with glucose 50% (see Preparation and Administration)

Reserved for the emergency treatment of cardiac arrhythmia due to hyperkalaemia

Intravenous Infusion

0.1 to 0.2 units/kg/hour in conjunction with a 25% intravenous glucose infusion. Take care to avoid hypoglycaemia. Always infuse via a central line.

Preparation and Administration

Intravenous Bolus Injection

Dilute 0.5mL of the 100units/mL soluble insulin with 9.5mL of compatible fluid (to a total of 10mL).The solution now contains 5 units/mL.

Dose	0.05 units	0.1 units	0.15 units	0.2units	0.3 units	0.4units	0.5units
Volume	0.01 mL	0.02 mL	0.03 mL	0.04 mL	0.06 mL	0.08 mL	0.1 mL

Further dilute dose with 2mL/kg glucose 50% and administer as a push over at least 5 minutes

Discard the diluted 5 unit/mL solution.

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Continuous Intravenous Infusion

Insulin adsorbs to PVC: new intravenous tubing should be flushed/primed with 5mL of a diluted insulin solution (use same strength as infused) prior to intravenous administration (no filter required).

Select the strength required based on the weight of the infant in the context of any fluid restrictions. Insulin Concentration Selection Tables can be found on the following pages of this guideline to assist prescribers to gauge which strength is best for the patient.

A double dilution will be required.

STEP ONE: Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin

STEP TWO: Dilute the appropriate volume of the 5unit/mL insulin solution using compatible fluid; and administer by continuous infusion. Diluted preparation is stable for 24 hours at room temperature.

The three standard concentrations to select from are:

- Insulin 0.05 units/mL
- Insulin 0.1units/mL
- Insulin 0.2units/mL

Formulae

To calculate infusion rate (mL/hr):

$$\text{Rate (mL/hour)} = \frac{\text{dose (units/kg/hour) x weight(kg)}}{\text{Infusion Strength(units/mL)}}$$

To calculate the dose (units/kg/hour):

$$\text{Dose (units/kg/hour)} = \frac{\text{Rate(mL/hr) x Strength (units/mL)}}{\text{Weight (kg)}}$$

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Insulin Concentration Selection Table for 25mL syringes

Double Dilution for Insulin 0.1units/mL

STEP ONE: Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

Step TWO: Dilute 0.5mL insulin (5 units/mL) with 24.5mL of compatible fluid (total of 25mL)

Rate (mL/hr)	0.2		0.4		0.6		0.8		1	Rate (mL/hr)
Weight (kg)	Approximate units/kg/hour						Weight (kg)			
1	0.02	##	0.04	#	0.06	#	0.08	#	0.1	1
1.5	0.01	##	0.03	#	0.04	#	0.05	#	0.07	1.5
2	0.01	##	0.02	#	0.03	#	0.04	#	0.05	2
2.5	0.008	##	0.02	#	0.02	#	0.03	#	0.04	2.5
3	0.007	##	0.01	#	0.02	#	0.03	#	0.03	3
3.5	0.006	##	0.01	#	0.02	#	0.02	#	0.03	3.5

Discard remaining solution

Double Dilution for Insulin 0.2 units/mL

STEP ONE: Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

STEP TWO: Dilute 1mL insulin (5 units/mL) with 24mL of compatible fluid (total of 25mL)

Rate (mL/hr)	0.2		0.4		0.6		0.8		1	Rate (mL/hr)
Weight (kg)	Approximate units/kg/hour						Weight (kg)			
2	0.02	##	0.04	#	0.06	#	0.08	#	0.1	2
2.5	0.02	##	0.03	#	0.05	#	0.06	#	0.08	2.5
3	0.01	##	0.03	#	0.04	#	0.05	#	0.07	3
3.5	0.01	##	0.02	#	0.03	#	0.05	#	0.06	3.5
4	0.01	##	0.02	#	0.03	#	0.04	#	0.05	4
4.5	0.01		0.02		0.03		0.04		0.04	4.5

Discard remaining solution

Double Dilution for Insulin 0.4 units/mL

STEP ONE: Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

STEP TWO: Dilute 2mL insulin (5 units/mL) with 23mL of compatible fluid (total of 25mL)

Rate (mL/hr)	0.2		0.4		0.6		0.8		1	Rate (mL/hr)
Weight (kg)	Approximate Units/kg/hour						Weight (kg)			
2.5	0.03	##	0.06	#	0.1	#	0.13		0.16	2.5
3	0.03	##	0.05	#	0.08	#	0.1		0.13	3
3.5	0.02	##	0.05	#	0.07	#	0.09		0.11	3.5
4	0.02	##	0.04	#	0.06	#	0.08	#	0.1	4
4.5	0.02	##	0.04	#	0.05	#	0.07	#	0.09	4.5
5	0.02	##	0.03	#	0.05	#	0.06	#	0.08	5

Discard remaining solution

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Insulin Concentration Selection Table for 50mL syringes

Double Dilution for Insulin 0.1units/mL

STEP ONE: Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

Step TWO: Dilute 1mL insulin (5 units/mL) with 49mL of compatible fluid (total of 50mL)

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate units/kg/hour				Weight (kg)	
1	0.02	0.04	0.06	0.08	0.1	1
1.5	0.01	0.03	0.04	0.05	0.07	1.5
2	0.01	0.02	0.03	0.04	0.05	2
2.5	0.008	0.02	0.02	0.03	0.04	2.5
3	0.007	0.01	0.02	0.03	0.03	3
3.5	0.006	0.01	0.02	0.02	0.03	3.5

Discard remaining solution

Double Dilution for Insulin 0.2 units/mL

STEP ONE: Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL solution.

STEP TWO: Dilute 2mL insulin (5 units/mL) with 48mL of compatible fluid (total of 50mL)

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate units/kg/hour				Weight (kg)	
2	0.02	0.04	0.06	0.08	0.1	2
2.5	0.02	0.03	0.05	0.06	0.08	2.5
3	0.01	0.03	0.04	0.05	0.07	3
3.5	0.01	0.02	0.03	0.05	0.06	3.5
4	0.01	0.02	0.03	0.04	0.05	4
4.5	0.01	0.02	0.03	0.04	0.04	4.5

Discard remaining solution

Double Dilution for Insulin 0.4 units/mL

STEP ONE: Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

STEP TWO: Dilute 4mL insulin (5 units/mL) with 46mL of compatible fluid (total of 50mL)

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate units/kg/hour				Weight (kg)	
2.5	0.03	0.06	0.1	0.13	0.16	2.5
3	0.03	0.05	0.08	0.1	0.13	3
3.5	0.02	0.05	0.07	0.09	0.11	3.5
4	0.02	0.04	0.06	0.08	0.1	4
4.5	0.02	0.04	0.05	0.07	0.09	4.5
5	0.02	0.03	0.05	0.06	0.08	5

Discard remaining solution

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Compatible Fluids

Glucose 5%, glucose 10%, glucose5%/sodium chloride 0.45%, sodium chloride 0.9%

Glucose 25% (MUST be administered via central line)

Glucose 50% (MUST be administered via central line)

Adverse Effects

Hypoglycaemia

Monitoring

- Frequent blood and urine glucose levels as guided by the prescriber. Document in nursing care plan
- Electrolytes, particularly potassium.

Practice Points

- The original vial of insulin may be reused for the same patient for up to 28 days
- Unopened vials to be stored in the fridge. Opened vials may be kept at room temperature
- If ceasing insulin or changing the strength, be careful to remove and replace the previous line and T-piece to avoid flushing through any insulin remaining in the tubing
- Insulin is incompatible with many drugs.

References

1. RPA Newborn Care Drug Database. Viewed 3 August 2011, http://www.sswahs.nsw.gov.au/rpa/neonatal/html/listview.asp?DrugID=69
2. Royal Children's Hospital Pharmacopeia. Viewed 31 August 2011, http://www.rch.org.au/pharmacopoeia/pages/insulin.html

Version control and change history

PDS reference: OCE use only

Version	Date from	Date to	Amendment
1.0	November 2012	current	Original version

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