South Australian Neonatal Medication Guidelines

gentamicin

10mg/mL injection, 80mg/2mL injection

Note

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Checklist

Before administering a dose:

- Check if gentamicin serum level results need to be acted upon prior to the administration of the next dose
- Check if the dose or dosing interval needs amendment as a result of the blood level results
- Check the date and time when the next blood level is required, and
- Document the ongoing plan in the Nursing Care Plan and/or Medication Chart.

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Dose and Indications

Infection Due To Susceptible Gram Negative Organisms

Intravenous

For Neonates <33 weeks Corrected Age

The dosing schedule for gentamicin in neonates < 33 weeks corrected age depends upon the type of monitoring that is available at your institution. Both schedules provide the same dose over a 48-hour period.

Dosing Schedule A applies if your institution measures gentamicin by performing a single **trough level** (i.e. prior to the next dose)

Dosing Schedule B applies if your institution measures gentamicin by performing two post dose levels and estimates the **Area-Under-The-Curve** (AUC) for gentamicin

Corrected Age (weeks) [Gestational Age PLUS Postnatal Age]	Dosing Schedule A (trough levels)		Dosing Schedule B (AUC estimation)	
	Dose (mg/kg)	Dosing Frequency	Dose (mg/kg)	Dosing Frequency
< 33 weeks	3mg/kg	every 24 hours	6mg/kg	every 48 hours

For Neonates ≥33 weeks Corrected Age

Corrected Age (weeks) [Gestational Age PLUS Postnatal Age]	Dose (mg/kg)	Dosing Frequency
33 to 35 weeks	4.5mg/kg	every 24 hours
36 to 41 weeks	5mg/kg	every 24 hours
42 to 44 weeks	7.5mg/kg	every 24 hours

Preparation and Administration

Intravenous

A dilution will be required **only if using gentamicin 80mg/2mL injection**.

Dilute 2mL of the 80mg/2mL gentamicin solution with 6mL of compatible fluid (to a total volume of 8mL). The resulting solution contains 10mg/mL of gentamicin.

The intravenous solution contains 10mg/mL gentamicin

Dose	4mg	8mg	12mg	16mg	20mg
Volume	0.4mL	0.8mL	1.2mL	1.6mL	2mL

Administer over at least 5 minutes

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Compatible Fluids

Glucose 5%, glucose 10% and sodium chloride 0.9%

Adverse Effects

Common

Non-oliguric renal impairment (increase in plasma urea and creatinine), ototoxicity – vestibular and auditory.

Rare

Oliguria, anaphylaxis, respiratory depression.

Monitoring

- Most use of gentamicin is for less than 48 hours and there is often no need for a level to be taken in this situation, particularly when the neonate is >33 weeks gestation
- There are two methods by which gentamicin levels are monitored. Check which method is used by your institution as each will involve a different process:
  - Monitoring by Trough Level; and
  - Monitoring by Area-Under The Curve Estimation

Monitoring Gentamicin by Trough Levels

- Measure the gentamicin level prior to the next dose

Corrected Age (weeks) [Gestational Age PLUS Postnatal Age]	**Monitoring**
<33 weeks	Before the **second** dose
≥33 weeks	Before the **fourth** dose

- Levels should be measured prior to 2nd dose if there is uncertainty of adequate renal clearance, as in renal failure or if the mother has received gentamicin during labour.
- The patient should have adequate renal clearance. A rising urea and creatinine, urine output <2mL/kg/hour and extreme prematurity may be indicators of inadequate clearance.
- If the gentamicin trough level is less than 1mg/L, the risk for toxicity is low.
- If the gentamicin trough level is greater than 1mg/L, the next dose should be delayed until the results of another level taken 12 hours later has been obtained.

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Monitoring Gentamicin by Area-Under-The-Curve (AUC) Estimation

- All gentamicin monitoring by AUC estimation is carried out through the pharmacy department using a validated computer model
- Two plasma gentamicin levels are taken following a dose of the gentamicin and the AUC is estimated from these levels. The timing of these two levels varies depending upon the renal function of the neonate, which is related to their corrected age:

Corrected Age (weeks) [Gestational Age PLUS Postnatal Age]	**Monitoring**	
	First level	**Second level**
<33 weeks	1 hour after the **first** dose	24 hours after the **first** dose
≥33 weeks	1 hour after the **third** dose	6 hours after the **third** dose

- If the AUC is within 70 to 90mg.hr/L, then the dose is therapeutic with low risk of toxicity. Where Pseudomonas aeruginosa infection is known or suspected aim for an AUC of 100mg.h/L
- Adjustments to the dosing regime are made according to the AUC and the half-life
- Each level can be taken several hours late provided that the exact time of the blood sample is clearly noted on the laboratory paperwork.
- If the dose is administered intramuscularly, the AUC method cannot be applied

Practice Points

- Care with administration with any medication that can reduce renal function
- Use with caution in patients with renal impairment and adjust the dose where necessary. In patients with a half-life of greater than 10 hours, it is recommended that the antibiotic coverage be reviewed with the Neonatologist with reference to any known culture results.

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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