

Louth: Antimicrobial Guidelines - Louth Hospitals: Antimicrobial Guidelines: Neonatal - Benzylpenicillin IV

Neonatal - BENZYLpenicillin sodium **IV** (Penicillin G)

Bactericidal beta-lactamase sensitive penicillin

MEDICATION SAFETY ISSUES

- A fatal neonatal medication error has been reported after confusion between BENZYLpenicillin and benzATHINE benzylpenicillin [1]. A series of errors led to the IV administration of benzATHINE benzylpenicillin which should only be administered IM.
- Anaphylaxis has been rarely reported in neonates after exposure to beta-lactam antibiotics. [2]

USES

Empiric treatment of suspected neonatal sepsis. Treatment of mild to moderately severe infections such as pneumonia and cellulitis, as well as more severe infections such as endocarditis and meningitis due to penicillin susceptible organisms.

PRESENTATION

BENZYLpenicillin is available as Crystapen®. Each vial contains 600mg BENZYLpenicillin sodium.

Doses are expressed in terms of the sodium salt. Each vial contains 1.68 mmol sodium.

DOSAGE [3,4,7]

Dose and frequency of BENZYLpenicillin	Neonatal sepsis (LP not done)	Group B Strep Meningitis [3]	Endocarditis (seek advice, combination therapy may be needed) [4]
Dose			
All ages	50mg/kg	75mg/kg	50mg/kg
Frequency			
Neonate under 7 days	Every 12 hours		-
Neonate 7-28 days	Every 8 hours		-
Child > 28 days	Every 4 - 6 hours		Every 4 hours

Renal Impairment [4]

Dose reduction may be required in renal impairment refer to BNFC and seek advice on assessment of renal function.

RECONSTITUTION [5,7]

Reconstitute the 600mg amp with 5.6mL of water for injection (displacement volume = 0.4mL) to give a solution containing 100mg/mL [5]. May be diluted with sodium chloride 0.9% or glucose 5% if an infusion is required.

ADMINISTRATION

Give by IV infusion over 15 - 30 minutes. Longer administration time is particularly important when using doses of 50mg/kg or greater to avoid CNS toxicity [4].

SAMPLE CALCULATION

2.8kg neonate under 7 days with suspected meningitis. Dose: 75 mg/kg every 12 hours = 210mg every 12 hours. Reconstitute 600mg vial with 5.6mL water for injections = 100mg/mL.

Withdraw 2.1mL of the resultant solution and dilute to an appropriate volume for that baby (e.g. 10mL) with sodium chloride 0.9% or glucose 5% and administer over 15-30 minutes.

STORAGE

Store at room temperature below 25 ° C. Degradation or transformation of BENZYLpenicillin occurs rapidly and may be responsible for sensitisation. Reconstituted solutions should be used immediately [6].

MONITORING

Electrolyte balance, blood counts and renal functions should be monitored if treatment is prolonged (more than 5 days) [7]. Hypernatraemia and hypokalaemia may occur with high doses.

ADVERSE EFFECTS [4]

Hypersensitivity reactions including urticaria, fever, joint pains, rashes, angioedema, anaphylaxis, serum sickness-like reactions; rarely CNS toxicity including convulsions (especially with high doses or in severe renal impairment), interstitial nephritis, haemolytic anaemia, leucopenia, thrombocytopenia and coagulation disorders; also reported diarrhoea (including antibiotic-associated colitis).

REFERENCES

1. Institute for Safe Medication Practices, *A case riddled with latent and active failures*. ISMP Medication Safety Alert!, 1998(February 11): p. URL: http://www.ismp.org/newsletters/acutecare/articles/19980211_2.asp?ptr=y . Accessed: 23rd April 2014.
2. [Soyer, O.U., et al., *Anaphylaxis in a neonate caused by ceftazidime*. *Allergy*, 2010, **65** \(11\): p. 1486-1487.](#)
3. [Health Protection Surveillance Centre, *Guidelines for the Early Clinical and Public Health Management of Bacterial Meningitis \(including Meningococcal Disease\)* . 2012, updated 2016. Dublin: HPSC.](#)
4. [British Medical Association, et al., *BNF for Children*. Accessed via \[www.medicinescomplete.com\]\(http://www.medicinescomplete.com\) , 17/11/2020 . 2020, BMJ Group and Pharmaceutical Press: London.](#)
5. [Gray, A., et al., *Injectable Drugs Guide- Accessed via www.medicinescomplete.com , 16/11/2020*. 2020, Pharmaceutical Press: London.](#)
6. [Phelps, S.J., E.B. Hak, and C.M. Crill, *Pediatric Injectable Drugs. 9th ed. Accessed via www.medicinescomplete.com March 31st 2014* . 2010, American Society of Health-System Pharmacists: Bethesda.](#)
7. [Genus Pharmaceuticals Ltd., *Summary of Product Characteristics- Crystapen 600mg Powder for Solution for Injection or Infusion*. 2019. Available from \[www.hpra.ie\]\(http://www.hpra.ie\) , accessed: 17/11/2020.](#)

Summary of Changes from Previous Versions

Date	Change
Feb 2021: Rev. No. 1	Updated based on Rotunda BENZYLpenicillin Sodium Monograph Feb 2019. Changes to OLOL monograph: <ul style="list-style-type: none">• Dosage: Section for Child 1 month – 18 years changed to Child > 28 days• Frequency of BENZYLpenicillin sodium for child > 28 days for neonatal sepsis (LP not done) and for Group B Strep Meningitis changed from 4 hourly to 4 to 6 hourly as per BNFc and Rotunda• Administration: Removed information that dose < 50mg/kg can be given as an IV bolus over 3 minutes as this is not relevant – all doses in monograph are at least 50mg/kg.• Sample calculation: Appropriate volume for infusion changed from 5mL to 10mL as per sample calculation in Rotunda.• References updated.
Nov 2014	This is the first version of this guideline. It is based on the Rotunda Hospital Neonatal Monograph for Benzylpenicillin, Doc. No. 2, Revision No. 0, date of issue 19/5/14. There is one change in the OLOL monograph compared to the Rotunda monograph – Administration of 50mg/kg dose of benzylpenicillin as an IV infusion as per BNF for Children 2014. Additional references have also been added to the dosing section (no change to dose).