MONOGRAPH

Benzathine Benzylpenicillin (Benzathine Penicillin G) Paediatric

Scope (Staff): Clinical Staff – Medical, Nursing, Pharmacy
Scope (Area): Perth Children’s Hospital (PCH)

This document should be read in conjunction with this DISCLAIMER

DESCRIPTION

Benzathine benzylpenicillin (also known as benzathine penicillin or BPG) is a long-acting penicillin administered via intramuscular injection.

It interferes with bacterial cell wall synthesis by binding to penicillin binding proteins resulting in cell lysis.\(^1,2\)

Benzathine penicillin is mainly active against Gram positive organisms and is inactivated by beta-lactamases.\(^3\)

INDICATIONS AND RESTRICTIONS

Benzathine penicillin is predominantly used in the treatment and secondary prevention of acute rheumatic fever/rheumatic heart disease and in the treatment of infections susceptible to prolonged, low concentrations of benzylpenicillin (e.g. early or latent syphilis).\(^1\)

- It may also be used in the treatment of impetigo and Group A Streptococcal Tonsillitis/Pharyngitis.\(^2,4\)
- May be used as a second line agent for invasive Group A Streptococcal (iGAS) contacts unable to tolerate oral antibiotics.

IM: Unrestricted (green) antibiotic

- This is not a restricted agent. Follow standard ChAMP guidelines where appropriate.

CONTRAINDICATIONS

- Previous hypersensitivity reaction to any of the penicillins, cephalosporins or carbapenems.\(^2,5\)
- Hypersensitivity reactions may include immediate, IgE-mediated urticaria, angioedema, bronchospasm or anaphylaxis or serious delayed reactions (non IgE-mediated) such as Stevens-Johnson syndrome, DRESS or serum sickness.\(^1,2\)

PRECAUTIONS

- Care should be taken with administration of cephalosporins and carbapenems as cross reactivity may occur between penicillins, cephalosporins and carbapenems.\(^1,5\)
- Care must be taken with intramuscular administration of benzathine benzylpenicillin to avoid intravenous or intra-arterial administration or injection in or near major peripheral nerves or
blood vessels due to the risk of neurovascular damage.\(^{(1,5)}\)

### FORMULATIONS

**Available at PCH:**

- 1,200,000 units benzathine benzylpenicillin / 2.3mL in aqueous solution (Bicillin L-A\(^{6}\)), pre-filled syringe for IM injection.
- This is equivalent to 900mg / 2.3mL and 1016.6mg benzathine benzylpenicillin tetrahydrate / 2.3mL.\(^{(1,2)}\)

**Note:** The manufacturer has recently changed the dosing from mg to international units. This update occurred in March 2019.

**Other formulations available:**

- Nil

### DOSAGE

The doses listed below fall within the standard range. Higher doses may be prescribed for certain situations in consultation with an infectious diseases or clinical microbiology consultant.

**Neonates (less than 30 days of age):**

Not routinely used in neonates, contact Infectious Disease or Microbiology consultants for advice.

**Congenital Syphilis:**

- Low-risk, children <3kg: contact Infectious Diseases for advice, benzyl penicillin may be appropriate.
- Low-risk, children ≥3kg: 200,000 units IM as a single dose\(^{(6,7)}\)
- High-risk: treatment with benzyl penicillin required.\(^{(6)}\)

**Children:**

**Impetigo:**

In remote Indigenous communities *S. pyogenes* is usually the pathogen, even if *S. aureus* is isolated.\(^{(4)}\)

- Child 3-6kg: 300,000 units IM (0.6mL) as a single dose
- Child 6-10kg: 450,000 units IM (0.9 mL) as a single dose
- Child 10-15kg: 600,000 units IM (1.2mL) as a single dose
- Child 15-20kg: 900,000 units IM (1.7mL) as a single dose
- Child ≥20kg: 1,200,000 units IM (2.3mL) as a single dose.\(^{(4)}\)

**Presumed Streptococcus pyogenes** (Group A Streptococcus) tonsillitis or pharyngitis, scarlet fever:

- < 20kg: 600,000 units IM (1.2mL) as a single dose
- ≥ 20kg: 1,200,000 units IM (2.3mL) as a single dose.\(^{(2)}\)

**Rheumatic fever:**

**Acute episode:**

- < 20kg: 600,000 units IM (1.2mL) as a single dose
### Prevention of recurrence:

- **≥ 20kg:** 1,200,000 units IM (2.3mL) as a single dose.\(^{(2, 3)}\)
- **< 20kg:** 600,000 units IM (1.2mL) injection every 3 to 4 weeks for at least 10yrs.
- **≥ 20kg:** 1,200,000 units IM (2.3mL) injection every 3 to 4 weeks for at least 10yrs.\(^{(2, 3)}\)

Duration of antibiotic prophylaxis for prevention of rheumatic fever recurrence depends on patient factors such as age, likelihood of ongoing exposure to *S. pyogenes* and time since last episode of acute rheumatic fever.

The minimum recommended duration is 10 years after the most recent episode of acute rheumatic fever or until age 21 years (whichever is longer).\(^{(1, 8)}\)

### Syphilis

- 50,000 units/kg IM (to a maximum of 2.4 million units) as a single dose.\(^{(9)}\)
- Early latent syphilis requires a single dose, for late latent syphilis, 3 doses given at one week intervals is required. Contact Infectious Diseases for advice.\(^{(9)}\)

### DOSAGE ADJUSTMENT

**Dosage adjustment required in renal impairment:**

- No dosage adjustment is necessary in renal impairment.\(^{(1, 10)}\)

**Dosage adjustment required in hepatic impairment:**

- No dosage adjustment is necessary in hepatic impairment.\(^{(1, 10)}\)

### RECONSTITUTION

Not applicable

### ADMINISTRATION

- Benzathine penicillin must only be administered via intramuscular injection into the mid-lateral aspect of the thigh (preferred in children) or upper, outer quadrant of the buttock.\(^{(2)}\)
- It should be administered at a slow, steady rate preferably over 2-3 minutes to avoid blockage of the needle and to minimise pain.\(^{(5)}\)
  - The injection site should be rotated for subsequent doses.\(^{(5)}\)
- After insertion of the needle, aspiration is recommended and the barrel should be observed for any blood or discolouration.
- If there is any discolouration, the needle should be withdrawn and the syringe discarded. Stop injection immediately if there is severe pain at the injection site.\(^{(5)}\)

The pain of administration can be reduced by:

- Allowing the alcohol from the alcohol swab to dry before injection
- Applying pressure with thumb for 10 seconds before injection
- Warming the syringe to room temperature immediately prior to the injection
**MONITORING**

- Using a 21 gauge needle.\(^{(8)}\)

**ADVERSE EFFECTS**

- Inadventent intravascular administration may result in neuromuscular hyperirritability, seizures, cardiac arrest and/or severe, and potentially permanent, neurovascular damage.

**Common:** pain and inflammation at the injection site, rash, urticaria, skin eruptions (most commonly maculopapular), nausea, diarrhoea, fever, fatigue, Jarisch-Herxheimer reaction (fever, chills, headache, hypotension due to the release of pyrogens from the organism at the time of first administration e.g. syphilis).\(^{(1, 2, 11)}\)

**Rare:** Clostridium difficile-associated disease, anaphylaxis or other immediate hypersensitivity reactions, black tongue, electrolyte disturbances, neurotoxicity with high doses (including anxiety, agitation, hallucinations), blood dyscrasias, bleeding.\(^{(1, 2)}\)

**COMPATIBLE FLUIDS**

- **Not applicable:** Benzathine benzylpenicillin must only be administered via intramuscular injection.\(^{(1, 5)}\)

**STORAGE**

- Store between 2-8°C. Refrigerate, do not freeze. \(^{(2)}\)

**INTERACTIONS**

- Benzathine benzylpenicillin has few drug interactions; please consult PCH approved references (such as *Clinical Pharmacology*), your ward pharmacist or Pharmacy for more information

- Tetracyclines may antagonise the bactericidal effect of penicillin; concurrent use of these drugs should be avoided. \(^{(1, 2)}\)

**COMMENTS**

**MANUFACTURER SAFETY DATA SHEET (SDS)**

- To access to the Manufacturer SDS for this product, use the following link to ChemAlert.

**Related internal policies, procedures and guidelines**

- **Antimicrobial Stewardship Policy** (Medication Management Manual)
- **ChAMP Empiric Guidelines and Monographs** (ChAMP Manual)

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\*Please note: The information contained in this guideline is to assist with the preparation and administration of benzathine penicillin. Any variations to the doses recommended should be clarified with the prescriber prior to administration*
## References


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