Meropenem Monograph - 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

• Meropenem is a bactericidal carbapenem antibiotic. It inhibits bacterial cell wall synthesis by binding to penicillin-binding proteins.\(^{(1-4)}\)

INDICATIONS AND RESTRICTIONS

• Meropenem is a broad spectrum drug active against many resistant enteric Gram-negative rods including *Pseudomonas aeruginosa* and extended-spectrum beta-lactamase enzymes (ESBL) producing isolates and has excellent activity against anaerobes and many Gram-positive organisms.\(^{(5)}\) It is NOT active against *Stenotrophomonas maltophilia* and Methicillin Resistant *Staphylococcus aureus* (MRSA).\(^{(1)}\)

**IV: Monitored (orange) antibiotic**

• If the use is consistent with a standard approved indication, this must be communicated to ChAMP by documenting that indication on all prescriptions (inpatient and outpatient).

• The ChAMP team will review if ongoing therapy is required and/or if the order does not meet ChAMP Standard Indications.

• If use is not for a standard approved indication, phone approval must be obtained from ChAMP before prescribing.

CONTRAINDICATIONS

• Meropenem is generally contraindicated in patients with a history of high risk allergy to carbapenems.

PRECAUTIONS

• Meropenem may be prescribed in selected patients with a high risk allergy to another Beta-lactam sub-class (e.g. some penicillins, cephalosporins) in discussion with immunology.\(^{(1, 3, 4, 6)}\)

• In patients with a previous low risk reaction to meropenem or another carbapenem- (delayed rash [\textgreater{}1hr after initial exposure] without mucosal or systemic involvement) the risk of subsequent reaction is low. Re-challenge may be acceptable in discussion with immunology.

• Avoid use in combination with sodium valproate when possible due to a reduction in the concentration of sodium valproate –
### FORMULATIONS

**Available at PCH:**
- 1 gram powder for injection (Ranbaxy brand)

**Other formulations available:**
- 1 gram and 500 mg powder for injection – multiple generic brands

### 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):
- Please refer to [Neonatal Medication Protocols](#)

#### Children (>1 month to 18 years):
- **Usual dose (including febrile neutropenia):** 20 mg/kg/dose (to a maximum of 1 gram) every 8 hours\(^{(3, 4, 7)}\)
- **Severe infections (including CNS infections) and Cystic Fibrosis:** 40 mg/kg/dose (to a maximum of 2 grams) every 8 hours\(^{(2-4, 7)}\)

#### Extended infusions for HiTH
- In some cases, an extended infusion administered via a CADD pump may be suitable for HiTH patients. Contact Pharmacy for further information.
- **Usual dose:** 30 mg/kg/dose (to a maximum of 1.5 grams) given twice daily via a 12 hour infusion
- **Severe infections:** 60 mg/kg/dose (to a maximum of 3 grams) given twice daily via a 12 hour infusion

### DOSAGE ADJUSTMENT

**Dosage adjustment required in renal impairment:**
- Dosage adjustment may be required in cases of impaired renal function (with creatinine clearance of less than 50 mL/min).
- To calculate the estimated glomerular filtration rate (eGFR) use the following formula:

\[
eGFR \ (mL/\text{min}/1.73\text{m}^2) = \frac{36.5 \times \text{height (in cm)}}{\text{Serum creatinine (micromol/L)}}
\]

- eGFR > 50 mL/minute : normal dose
- eGFR 30 – 50 mL/minute: 100% 12 hourly
- eGFR 10 – 29 mL/minute: 50% 12 hourly
**Meropenem Monograph - Paediatric**

| RECONSTITUTION | • eGFR < 10mL/minute: 50% 24 hourly\(^{(2, 4)}\)  
|                | **Dosage adjustment required in hepatic impairment:**  
|                | • No dosage reductions are required in hepatic impairment.\(^{(3, 4)}\)  
|                |  
| ADMINISTRATION | • Reconstitute 1gram vial with 19.2mL of water for injection to give a 50mg/mL solution.\(^{(8)}\)  
|                | • Reconstitute the 500mg vials with 9.6mL of water for injection to give a 50mg/mL solution.\(^{(8)}\)  
|                |  
| IV injection:  | • Reconstitute to a concentration of 50mg/mL and give via slow IV injection over 3 to 5 minutes.\(^{(2, 6, 8, 9)}\)  
| IV infusion:   | • Dilute to a suitable volume with compatible fluid and infuse over 15 to 30 minutes.\(^{(6, 8, 9)}\)  
|                |  
| Extended infusion via CADD pump:  | • The CADD pump will be prepared by the Pharmacy Compounding Service (PCS) at a final concentration of 10mg/mL and should be set to run as a 12 hour infusion.  
|                | • The CADD pump must be kept cool whilst the solution is being administered. This can be achieved by using ice packs in the supplied bag and changing them every 12 hours.  
|                |  
| MONITORING | • Renal, hepatic and haematological function should be monitored weekly with prolonged therapy (i.e. longer than 7 days).\(^{(1, 2, 4)}\)  
| ADVERSE EFFECTS |  
| Common:  | thrombocytosis, raised liver function tests and lactate dehydrogenase, nausea, vomiting, diarrhoea, headache and injection site reactions, skin reactions, blood dyscrasias.\(^{(1, 10)}\)  
| Rare:  | eosinophilia, paraesthesia, seizures, thrombocytopenia, leucopenia, neutropenia, agranulocytosis, *Clostridium difficile*-associated disease, urticaria, itch, rash (including Stevens-Johnson syndrome and toxic epidermal necrolysis), anaphylaxis, convulsions/seizures, haemolytic anaemia.\(^{(1, 10)}\)  
| COMPATIBLE FLUIDS |  
| • Glucose 5%  
| • Glucose/sodium chloride solutions  
| • Sodium chloride 0.9%\(^{(9)}\)  
| STORAGE |  
| • Store vials below 25°C and protect from light.\(^{(3, 9)}\)  
| • Store syringes prepared by PCS between 2 and 8°C.\(^{(9)}\)  
| INTERACTIONS |  
| Meropenem interacts with other medications; please consult PCH approved references (e.g. Clinical Pharmacology), your ward pharmacist or Pharmacy on 63546 |
for more information

- Probenecid decreases excretion of meropenem increasing meropenem levels and the risk of seizures in certain patients\(^1\)\(^\text{-3}\).
- Carbapenems have been shown to reduce the blood levels of sodium valproate by approximately 60 to 100% within 2 days. Co-administration should be avoided\(^\text{(1-3, 6)}\).
- Meropenem may increase the risk of seizures in certain patients – caution should be taken with patients on medications that may cause seizures or patients with underlying seizure disorders.\(^1\).
- High dose meropenem may inhibit voriconazole metabolism, increasing voriconazole concentration and increase the risk of toxicity. A dose reduction of meropenem and/or voriconazole may be required.\(^1\).

**COMMENTS**

- Each 1gram vial contains 3.92mmol (90.2mg) of sodium.\(^\text{(2, 3, 6, 9)}\)
- If Meropenem is required on HiTH, discuss with Infectious Diseases or Clinical Microbiology if switching to ertapenem is a suitable option.

**MANUFACTURER SAFETY DATA SHEET (SDS)**

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

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

**Related CAHS internal policies, procedures and guidelines**

- Antimicrobial Stewardship Policy
- ChAMP Empiric Guidelines and Monographs
- KEMH Neonatal Medication Protocols

**References and related external legislation, policies, and guidelines**

5. Antibiotic Writing Group. eTG complete. West Melbourne: Therapeutic Guidelines Ltd.

This document can be made available in alternative formats on request for a person with a disability.