

Background

Extended infusion of beta-lactam antibiotics is aimed at achieving microbiological eradication and clinical resolution of complicated bacterial infections. For meropenem, the best predictor of bacterial killing is the percentage of time over which free-drug concentration (fT) exceeds 4-6 x MIC of the microorganism (desirable 40% fT > MIC)

Purpose

To describe the course and monitoring of prolonged treatment with meropenem by extended infusion of 4 hours in a neonate with ventriculitis due to ESBL-producing *Klebsiella pneumoniae*.

Material and Methods

- Patient description: a 25 weeks' preterm newborn, who presented with a septic episode with clinical, laboratory and ultrasonographic signs of ventriculitis at 93 days of age
- CSF cultures: ESBL-producing *Klebsiella pneumoniae* sensitive to carbapenems (MIC Meropenem <1mg/L)
- Treatment: meropenem 40mg/kg/8h, in an extended infusion of 4 hours
- Concentrations of meropenem in plasma and CSF: determined before the administration of a dose (C_{min}), once steady-state was reached, using HPLC validated techniques

Results

From the beginning of meropenem treatment, CSF showed progressive improvement in inflammatory parameters, and the microorganism was not isolated after two days of treatment

Meropenem pre-dose levels (4 weeks of treatment)

Plasma: 7.6 mg/L

CSF: 4.7 mg/L



- excellent penetration in CSF (CSF/plasma ratio 0.62)
- time above MIC > 100% in plasma and CSF
- no potentially toxic levels

The patient showed progressive improvement of the neurological status and completed 8 weeks of treatment. An external ventricular drain was placed at 100 days of age, and replaced by a ventriculo-peritoneal shunt after 62 days. In view of the risk of neurodevelopmental impairment, the infant is currently under outpatient follow-up.

Conclusion

- ✓ With the dosing strategy used, optimal concentrations of meropenem were achieved, which allowed reaching the PK/PD index of time > 4 times the MIC during 100% of the dose interval, both in plasma and in CSF.
- ✓ The extended infusion of meropenem in 4h in our patient showed criteria of efficacy and safety in prolonged treatment.

