Northwestern Medicine®

CLINICAL PROTOCOL

Subject: **ANTIBIOTIC DOSING PROTOCOL**	Page **1 of 4**	Protocol # **NMH CCP 07.0046** Version: **2.0**
Title: **INTRAVENTRICULAR (CENTRAL NERVOUS SYSTEM) & INTRATHECAL ANTIBIOTIC DOSING PROTOCOL**	Revision of: **05/15/2015**	Effective Date: **07/20/2018** Removal Date:

SCOPE: Applies to entities indicated below as well as their subsidiaries and affiliates

☒ **NM – Northwestern Memorial Hospital**	☐ **NM – Lake Forest Hospital**
☐ **NM – Northwestern Medical Group**	☐ **NM – Central DuPage Hospital**
☐ **NM – Regional Medical Group**	☐ **NM – Delnor Hospital**
☐ **NM – Kishwaukee Hospital**	☐ **NM – Valley West Hospital**
☐ **NM – Marianjoy Rehabilitation**	☐ **NM – Kishwaukee Physician Group**
☐ **NM – Marianjoy Medical Group**	☐ **NM – Home Health & Hospice**
☐ **NM – Other **See "Persons Affected Section below"**	

I. PURPOSE:

To provide a safe and standardized approach to the treatment of infectious diseases necessitating the use of intrathecal or intraventricular antibiotics.

II. CLINICAL PROTOCOL:

A. Nosocomial meningitis and ventriculitis are serious medical complications associated with neurosurgical intervention.

B. Mortality rates in nosocomial bacterial meningitis are reported to be high.

C. Antimicrobial penetration into the cerebrospinal fluid and ventricles can be limited and complicate treatment.

D. One approach to treating nosocomial central nervous system (CNS) infections includes a combination of intravenous and intraventricular/intrathecal antibiotics.

E. Combination therapy can ensure optimal drug exposure while minimizing systemic adverse effects.

III. PROCEDURE AND THERAPEUTIC GUIDELINES:

Indications

A. Multi-drug resistant (MDR) organisms necessitating treatment with antibiotics with poor CNS penetration.

B. Enterococcus spp., *Staphylococcus aureus*, *Pseudomonas aeruginosa, Klebsiella pneumoniae, Acinetobacter baumannii, Enterobacter cloacae, Escherichia coli*, and other MDR Gram-negative organisms.

C. Failure to clear CSF despite systemic therapy for at least 5-7 days of active therapy.

Antibiotic Dose Protocol and Order Set

Antimicrobial Agent	Standard Daily Intrathecal / Intraventricular Dose	High Dose – Daily Intrathecal / Intraventricular Dose	Diluent (preservative-free)	Syringe Volume	Beyond-Use Date
Colistin (CMS)	**10 mg or 125,000 units**	**--**	**Normal Saline**	**3 mL**	**3 hours**
Polymyxin B	**5 mg or 50,000 units**	**--**	**Normal Saline**	**3 mL**	**3 hours**
Amikacin	**20 mg**	**30 mg**	**Normal Saline**	**3 mL**	**3 hours**
Gentamicin	**4 mg**	**8 mg**	**Normal Saline**	**3 mL**	**3 hours**
Tobramycin	**4 mg**	**8 mg**	**Normal Saline**	**3 mL**	**3 hours**
Vancomycin	**10 mg**	**20 mg**	**Normal Saline**	**3 mL**	**3 hours**
Daptomycin	**5 mg**	**--**	**Normal Saline**	**5 mL**	**3 hours**
Tigecycline	**5 mg**	**--**	**Normal Saline**	**5 mL**	**3 hours**

Operative

Antimicrobial Dose Preparation

A. Preservative-free drug will be utilized unless unavailable and the risk of untreated infection outweighs the risk of toxicity.

B. The dispensing pharmacist will prioritize obtaining preservative-free product if available but should not delay preparation for timely administration in cases where such products are not readily available.

C. Drugs will be diluted in preservative-free normal saline when possible.

D. Intraventricular medications must be picked up at the pharmacy window by a physician, nurse, or clinical pharmacist given the short beyond-use dating.

Antimicrobial Dosing and Administration

A. An orderable in EPIC searchable by “Intraventricular Antimicrobials (intrathecal)” should be utilized to order each of the above antibiotics.

B. Patients should be initially treated with the standard daily intraventricular or intrathecal dose.

C. Utilization of the high daily intraventricular or intrathecal dose must be evaluated in conjunction with a NSICU pharmacist (1-8069) or ID pharmacist (5-5955).

D. Intraventricular or intrathecal antibiotic doses may be administered through an external ventricular drain (EVD) or lumbar drain, or possibly via an Ommaya reservoir.

1. Intraventricular or intrathecal doses must be administered by a Neurosurgery physician (resident, fellow, or attending), however, when dose administration is to be through an Ommaya reservoir, the ID Service will consult with the Neurosurgery Service to work out administration responsibilities.

E. The intraventricular device must be clamped for at least 1 hour or as long as possible after administration.

F. The bedside nurse will chart when medication doses have been given in the electronic medical record, specifying the name of the physician who administered the dose in the comments field.

Intraventricular/Intrathecal Amphotericin B

A. Amphotericin B is rarely described in literature for the treatment of cryptococcal meningitis, coccidioidomycosis, or invasive CNS fungal infections that would otherwise likely fail with systemic therapy.

B. Consensus intrathecal/intraventricular amphotericin B dosing is lacking in human patients.

C. Due to limitations in available literature, please page an infectious diseases pharmacist to discuss appropriate dose titration at 5-5955.

Therapeutic Drug Monitoring

If CSF antibiotic concentrations are desired please page an infectious diseases pharmacist to discuss the indication, logistics, and interpretation at 5-5955.

IV. CLINICAL PROTOCOL UPDATE SCHEDULE:

Every 3 years or more if appropriate.

V. REFERENCES:

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VI. APPENDICES:

None