

MONTEFIORE MEDICAL CENTER

MONTEFIORE



DEPARTMENT OF PHARMACY

SUBJECT: Aerosolized Antimicrobials

MANUAL CODE:

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Background:

Aerosolized delivery of antimicrobials agents is an option for prevention and adjunctive treatment of pulmonary infections. This method of delivery has been utilized and studied for a variety of patient populations. Aerosolized antimicrobials have been administered safely and effectively in patients with cystic fibrosis who are colonized with *Pseudomonas*.^{1,2,3} The 2016 clinical practice guideline of hospital-acquired and ventilator-associated pneumonia established by the Infectious Diseases Society of America and the American Thoracic Society recommends an aerosolized antibiotic as adjunctive therapy (i.e. colistin) in addition to intravenous (IV) antibiotics for multidrug resistant organisms such as *Acinetobacter* (weak recommendation).⁴ Additionally, several small studies demonstrated that nebulized amphotericin B was associated with a decreased risk for developing aspergillosis in lung transplant patients,^{5,6} however, larger studies are needed to further support the routine use of aerosolized antifungals.

Purpose:

To provide guidance in prescribing and administering aerosolized antimicrobials as prophylaxis or adjunctive therapy in pulmonary infections.

Instructions for respiratory therapists and nurses (key points):

- Aerosolized antimicrobials will be administered by respiratory therapists for patients requiring mechanical ventilation. For non-intubated patients, aerosolized antimicrobials are to be administered by nursing.
- An additional expiratory bacterial filter must be placed in the inline ventilator circuit during the nebulizer treatment. Remove filter when treatment is completed.
- Aerosolized antimicrobials must not be used with NIPPV due to the bi-directional flow of the circuit.
- If wheezing or bronchospasm occurs, consider pre-treatment with albuterol.
- Masks must be worn at all times when aerosolized antibiotics are being administered.

****See Respiratory Therapy Patient Care Manual for additional details as needed****

Aerosolized Antimicrobials⁷

Please note: aerosolized antimicrobials require ID or Antimicrobial Stewardship approval

Medication	Indication	Dose/Frequency	Duration	Adverse Effect
Amikacin (Formulary)	-Treatment of pulmonary infection with Mycobacteria in combination with other agents	500mg q12h via nebulizer	Approximately 20 minutes	Bronchospasm, cough, wheezing, dyspnea, tinnitus (reversible upon discontinuation), BUN and Cr for long-term therapy, trough concentrations when systemic accumulation is suspected.
Liposomal Amphotericin B (Ambisome) (Formulary)	-Prophylaxis and treatment in post lung transplant patient (i.e. anastomosis site infection)	25-50mg daily or 50mg 3 times a week via nebulizer	Approximately 20 minutes	Cough, chest tightness, taste disturbance, nausea and vomiting.
Aztreonam (Cayston) (Nonformulary)	-Prophylaxis in cystic fibrosis patient due to <i>Pseudomonas aeruginosa</i> colonization	75mg q8h via Altera Nebulizer System (<i>Do NOT administer via ventilator</i>) Mix by nurses for immediate administration (Patient's own med-28-day kit)	Approximately 2-3 minutes	Cough, nasal congestion, wheezing.
Colistimethate (Colistin) (Nonformulary)	-Adjunctive treatment of multidrug resistant Gram-negative organisms in addition to IV antimicrobials for HAP and VAP	150mg q12h via nebulizer Once colistimethate is prepared, it must be stored in the refrigerator for use within 24 hours. Solution must be discarded beyond 24 hours to avoid fatal pulmonary toxicity. ⁸	Approximately 20 minutes	Bronchospasm and nephrotoxicity. Higher rate and severity of pulmonary effects compared with aminoglycosides.
Tobramycin (Tobi) (Formulary)	-Prophylaxis in cystic fibrosis patient due to <i>Pseudomonas aeruginosa</i> colonization - Anastomotic site infections in post-lung transplant patients	300mg q12h via nebulizer	Approximately 15 minutes	Bronchospasm, cough, wheezing, dyspnea, tinnitus (reversible upon discontinuation), BUN and Cr for long-term therapy, trough concentrations when systemic accumulation is suspected.

Concentration and Storage:

Medication	Concentration/Storage
Amikacin	250mg/ml, 2ml Stability: 24 hours in Room temperature
Liposomal Amphotericin B (Ambisome)	4mg/ml, 12.5ml (50mg), 6.25ml (25mg) (Reconstitute 50mg vial with 12ml of sterile water for injection, use filter needle) Stability: 24 hours under refrigeration
Aztreonam (Cayston)	1 Cayston vial (75mg/2ml) + 1 ampule of 0.17% sodium chloride (1ml) (commercially available) Use Cayston immediately upon mixing with saline
Colistimethate	25mg/ml, 6ml (150mg), 3ml (75mg) (Reconstitute 150mg vial with 6ml of sterile water for injection) Stability: 24 hours under refrigeration
Tobramycin (Tobi)	300mg/5ml solution (commercially available) Refrigerate

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