FMOLHS Respiratory Agent Review

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Respiratory Agent	Dose/Frequency	Indication	Evidence	Approved on Respiratory Agent List?	Administration/ Special Considerations
Amikacin (injectable solution)	Pneumonia: 400mg q12h for 10 days NTM-LD: 250mg once daily and titrated every 2 weeks up to 500mg BID	Gram-negative pneumonia *NTM-LD *as an alternative to Amikacin liposomal inhalation solution (ALIS)*	The INHALE 1 and 2 trials (n=712) evaluated the use of inhaled amikacin in patients with gram-negative lung pneumonia and an APACHE II score of at least 10. However, there was no observed difference in survival compared to placebo.[1] A retrospective chart review (n=20) with treatment refractory NTM-LD found that 40% of patients had at least one negative culture and smear at follow up and symptom scores improved in 45%.[2]	**Yes**	-Vial size is 1000mg/4mL -Draw 1.6mL (400mg) from vial and dilute with 3.2mL saline; -synchronized inhalation system (for intubated patients) and hand-held nebulizer plus spacer chamber (for extubated patients); Non-humidified nebulization increases particle deposition in the lungs NTM-LD: -Draw 1mL (250mg) from vial and dilute with 3mL of saline
Ampicillin/Sulbactam	3 g every 8 h	Gram-negative pneumonia	In a small case series (n=20) conducted in patients *with A. baumannii* pneumonia. Ten patients received IV ampicillin-sulbactam alone, compared to 10 who received both IV and inhaled ampicillin-sulbactam After 2 to 3 days of therapy, patients who received both IV and inhaled therapy had reductions in viable counts of bacteria to <102 CFU/ml, compared to no reduction in CFU/mL for those who received IV monotherapy.[4]	**No**	-3 g in 3 mL of sterile water administered via nebulizer

Ciprodex	4-5 drops BID for 1 week, repeated every other week	Tracheal cartilaginous sleave, Tracheal stenosis	One study (n=4) patients with TCS evaluated the efficacy of nebulized *Ciprodex*. The study found that the number of hospitalizations and number of infections decreased for each patient upon follow up in an ENT clinic.[5] However, the actual dose of ciprofloxacin with each nebulization is negligible and the perceived benefit is likely due to the more substantial doses of dexamethasone (the steroid component). Yokoi and colleagues evaluated the efficacy of inhaled budesonide in patients with CTS for the treatment of postoperative granulation tissue. Patients that received inhaled budesonide showed significant improvement on bronchoscopy in the development of postoperative granulation tissue. In addition to this, no patients in the budesonide group required subsequent stenting.[6]	**No** (An inhaled corticosteroid, such as budesonide, should be used instead)	-Typically administered in about 5mL of solution
Colistin **MRN: 403527**	150mg q8h for 14 days	VAP	A prospective, observational, comparative study in VAP patients (n=122) with *P. aeruginosa* and *A. baumannii* (susceptible to β-lactams, aminoglycosides, or quinolones and treated with intravenous antibiotics for 14 days) found that nebulized colistin was noninferior to intravenous antibiotic therapy. 28 patients received nebulized colistin as monotherapy; whereas the remaining patients received it in conjunction with a 3-day intravenous aminoglycoside course.[7]	**Yes** (EPIC build already available)	-Vial size is 150mg/4mL -Draw 4mL from vial and administer via nebulization (may add normal saline based on nebulizer volume limits) Consider use of a bronchodilator prior to administration

Furosemide	4 ml of furosemide as a 10 mg/ml solution	Dyspnea	A double-blind, randomized, crossover study compared the effect of inhaled furosemide on dyspneic sensation in COPD patient during exercise vs placebo. There was significant improvement in mean FEV1 and FVC after inhalation of furosemide ($p = 0.038$ and 0.005, respectively) but not after placebo. The mean dyspneic visual analog scale score was lower after inhalation of furosemide compared with placebo (33.7 ± 25.2 vs. 42.4 ± 24.0 mm, respectively, $p = 0.014$).[9]	**No** Standard inhaled therapy for the treatment of dyspnea in COPD should be used (i.e., Duoneb)	-Administered via jet nebulizer and nebulized to dryness
Milrinone	50 mcg/kg	Pulmonary hypertension	Singh et al. (n=40) performed a three-way comparison of nebulized NTG, nebulized milrinone, and 100% inspired oxygen in children with left-to-right intracardiac shunt and elevated mPAP (>30 mmHg) undergoing right heart catheterization. Both nebulized NTG and nebulized milrinone lowered mPAP (−15%) while keeping other hemodynamic variables stable and it was concluded that the three treatments had comparable effect.[10]	**No**	-The milrinone dose was dissolved with normal saline to a volume of 3mL and they were nebulized with a jet nebulizer using 8 L/min of 50% air-oxygen mixture
Tranexamic Acid (TXA)	500mg q8h (up to 5 days)	Hemoptysis	In one small case series (n=4) and one randomized control trial (n=47), tranexamic acid inhalation reduced expectorated blood volume in patients receiving treatment. Additionally, fewer procedures were performed (bronchoscopies, embolization) and hospital length of stay was reduced.[11,12]	**Yes**	-Vial size is 1000mg/10mL -Draw 5mL from syringe and administer undiluted

FMOLHS Approved Respiratory Agent List

1. Amikacin injectable solution
2. Colistin injectable solution
3. Tranexamic acid injectable solution

References:

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