Health PEI

ANTIMICROBIAL STEWARDSHIP SUBCOMMITTEE

Hospital Acquired Pneumonia in Adults

Definition

- **Hospital Acquired Pneumonia (HAP):** pneumonia that develops 48 hours or more after admission to hospital.
- **Ventilator Associated Pneumonia (VAP):** Pneumonia that develops 48 hours or more after endotracheal intubation.

Most Common Organisms

- *S. aureus* (MSSA or MRSA), Gram-negative bacilli (e.g., *E. coli*, *H. influenzae, K. pneumoniae*, *Enterobacter spp., P. aeruginosa*), or *S. pneumoniae.*
- *Enterococcus* and *Candida* are commonly isolated in sputum cultures of hospitalized patients; however, these organisms are generally considered colonizers and do not warrant antimicrobial therapy

Diagnostic Considerations

- A diagnosis of HAP generally requires:
  - Demonstration of an infiltrate on chest imaging AND
  - Compatible signs or symptoms, such as dyspnea/tachypnea/hypoxia, cough, purulent sputum, or fever
- **Microbiological analyses:** Blood cultures x 2 sets PLUS sputum culture, and ± Legionella urinary antigen.

Treatment Considerations

- **Empiric double coverage of *Pseudomonas aeruginosa***:
  - Consider only for patients who are critically ill (i.e. septic shock or requiring ventilatory support) (see empiric treatment table)
  - Used to maximize the likelihood of having at least one active antimicrobial (due to increased risk of resistance with *Pseudomonas*).
  - Re-evaluate use after 48 hours. If *Pseudomonas* is isolated, step-down to monotherapy (according to susceptibility data).
    - Maintaining double coverage once susceptibilities are known is not required
  - Use of aminoglycosides (e.g., tobramycin and gentamicin) as monotherapy for the treatment of pneumonia is NOT recommended (even if susceptibility is confirmed).
- DO NOT use DAPTOmycin to treat pneumonia; DAPTOmycin is inactivated by pulmonary surfactant. If MRSA infection, use vancomycin (or linezolid if vancomycin is ineffective or inappropriate).

Duration of Therapy

- Usual duration of therapy is 7 days
- Longer duration indicated for abscess, empyema, or severely immunocompromised

IV-to-PO Conversion

- **Evaluate for IV-to-PO conversion within 48 hours** of initiating treatment.
- Consider oral antibiotics when patient is clinically improving (i.e. tolerating oral intake, hemodynamically stable, afebrile for at least 24 hours) – see Health PEI IV-to-PO Guideline for more details.

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Empiric Treatment

Risk Factors	Empiric Treatment Regimen∞
NO Risk Factors	amoxicillin-clavulanate 875 mg PO q12h* **OR** ceftriaxone 1 g IV q24h **OR** levofloxacin 750 mg IV/PO q24h*§
Presence of ANY ONE of the following risk factors for Multi-drug resistant Gram-negative pathogens or poor outcomes: – Requiring ICU care: septic shock and/or mechanic intubation – In ICU when symptoms appear, or transferred from ICU in the last 48 hours – Prior intravenous antibiotic use within 90 days – Immunosuppression – Structural lung disease (e.g., bronchiectasis, cystic fibrosis) – Colonization or recent prior infection with *Pseudomonas* or other resistant Gram-negative bacilli (e.g., Extended spectrum beta-lactamases (ESBL) or AmpC)	piperacillin-tazobactam 4.5 g IV q6h* **<u>If true immediate penicillin allergy▲ OR history of ESBL or Amp C:</u>** meropenem 500 mg IV q6h* (consider 2 g IV q8h if septic shock) **<u>If severe delayed reaction‡ to a beta-lactam:</u>** levofloxacin 750 mg IV q24h*§ **PLUS** tobramycin** 7 mg/kg IV q24h* **PLUS** vancomycin IV* α
Consider risk factors for the following:	**Regimen Adjustment**
MRSA: Prior respiratory isolation or known/suspected colonization with MRSA	**ADD** vancomycin IV* α to empiric regimen
Pseudomonas: Consider double coverage for *Pseudomonas aeruginosa* if critically ill (i.e. septic shock or requiring ventilatory support)	**<u>ADD to either piperacillin-tazobactam or meropenem (not necessary if already receiving levofloxacin plus tobramycin), options include:</u>** tobramycin** 7 mg/kg IV q24h* **OR** ciprofloxacin 400 mg IV q8h*

∞ If microbial cause of infection known, treat according to culture and sensitivity.

* Dose adjustment required in renal impairment.

** If obese (20% greater than IBW); dosing weight = IBW + 0.4 (ABW-IBW). See Health PEI IV manual or Firstline app for more information

α See Health PEI IV manual or firstline app for dosing

§ Special authorization required from PEI Pharmacare

▲ Immediate, IgE mediated allergies include, but are not limited to, anaphylaxis, urticaria, angiœdema, hypotension, bronchospasm, stridor, and pruritic rash. Refer to the Health PEI Beta-Lactam Allergy guidelines to determine which beta-lactams share similar side chains.

‡ Severe delayed hypersensitivity reactions to beta-lactams are caused by mechanisms that are not well known and require that subsequent use of beta-lactams be avoided. Severe delayed hypersensitivity reactions can include interstitial nephritis, immune hepatitis, hemolytic anemia, serum sickness, severe cutaneous reactions such as Stevens-Johnson syndrome, toxic epidermal necrolysis, and drug rash with eosinophilia and systemic symptoms (DRESS).

These guidelines are an adaptation of New Brunswick Anti-infective Stewardship Committee

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References:

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