UCSF guideline for management of suspected hospital-acquired or ventilator-associated pneumonia in adult patients

Background/methods:

- This guideline establishes evidence-based consensus standards for management of suspected hospital-acquired bacterial pneumonia (HABP) or ventilator-associated bacterial pneumonia (VABP) in adult patients admitted to UCSF Medical Center. This is pneumonia that develops ≥ 48 hours after admission (HABP) or intubation (VABP) and which was not incubating at the time of admission.
    - This guideline does not cover healthcare-associated pneumonia (HCAP), which is no longer considered a useful definition to guide empiric therapy. For patients presenting with community acquired pneumonia (CAP), please see IDMP Empiric Guidelines for CAP: https://idmp.ucsf.edu/content/community-acquired-pneumonia-0
- This guideline is based on review of national guidelines, primary literature, analysis of local unit-based antibiograms for respiratory cultures from 2018-2023, and ventilator-associated events between 2020-2022. Recommendations vary by unit based on the antibiograms for each unit.
- Practice guidelines are intended to assist with clinical decision-making for common situations but cannot replace personalized evaluation and management decisions based on individual patient factors.
- Guidelines will be updated every 2-3 years with updated antibiogram information
- Guideline task force representation included: Infectious Diseases (ID), Antimicrobial Stewardship, Pharmacy, Critical Care, Hospital Medicine, and Pulmonology

Intended population:

- Inclusion: Hospitalized adult inpatients with suspected HABP or VABP
- Exclusion: Community-acquired/onset infection, cystic fibrosis, chemotherapy-induced neutropenia, patients cared for under Advanced Lung Diseases service.

Microbiologic testing:

- Tracheal aspirate (TA) recommended for all intubated patients with suspected pneumonia
- If not intubated, obtain sputum sample (or induced sputum) if the patient has clear mental status and is able to produce a high-quality sputum (e.g. no or minimal epithelial cells), but do not delay antibiotic treatment
- Consider respiratory viral testing (including COVID) based on immune status, influenza season, and critical illness. See: https://idmp.ucsf.edu/content/influenza-0
- Hospital-acquired Legionella pneumonia is rare. If there is clinical concern for *Legionella spp*. (e.g. immunocompromised host, needing ICU-level of care for respiratory status), recommend testing (ideally of lower respiratory tract specimen; NP swab is an alternative) with legionella culture and legionella DNA PCR, as well as sending legionella urine antigen. See lab manual for more details: https://www.testmenu.com/UCSFClinLab/Tests/812181
    - Consider infectious disease consult, as HABP/VABP empiric coverage may not include

coverage of legionella spp.

- Consider consultation with Pulmonary and/or Infectious Diseases if:
  - The patient is not clinically responding within 48-72 hours of treatment initiation.
  - Chest imaging is concerning for abscess or non-bacterial etiology (e.g. cavity, fungal-appearing nodules)
  - Empyema or complicated parapneumonic effusion is suspected or present
- Stenotrophomonas spp. is a common colonizer that can also rarely cause true infection. Routine coverage is **not** recommended but might be considered in certain situations (e.g. immunocompromised, known colonization). If considering *Stenotrophomonas spp*. coverage, consult with Infectious Diseases.
- In patients with tracheobronchitis (e.g. increased secretions in the absence of chest imaging suggestive of pneumonia), treatment is generally not recommended. Recommend consultation with Infectious Diseases Service if treatment is being considered.
- There is a randomized trial that suggests using Gram stains to guide empiric therapy is non-inferior to guideline-based therapy. We've chosen not to pursue this approach based on the limited data available at the time of updating this guideline.

Empirical Therapy Recommendations by Unit

For patients from one population "overflowing" to another unit, use clinical judgement to determine appropriate empirical antibiotic choice.

Empirical therapy for HABP or VABP[a,b,c,d,e]					
ICU	**Septic shock**	**Stable, negative MRSA nasal swab culture within 7 days**		**Stable, positive MRSA nasal swab culture within 7 days or none available**[f]	
	Early or late	**Early**[g] **(48 hours-≤5 days)**	**Late (> 5 days)**	**Early**[g] **(48 hours-≤5 days)**	**Late (> 5 days)**
6/10 ICU	Vancomycin + Meropenem + Ciprofloxacin	Piptazo[h]	Piptazo + Ciprofloxacin	Piptazo + Vancomycin	Piptazo + Ciprofloxacin + Vancomycin
8/11 ICU	Vancomycin + Piptazo + Ciprofloxacin	Piptazo	Piptazo	Piptazo + Vancomycin	Piptazo + Vancomycin
9 ICU	Vancomycin + Meropenem + Ciprofloxacin	Piptazo	Piptazo + Ciprofloxacin	Piptazo + Vancomycin	Piptazo + Ciprofloxacin + Vancomycin
13 ICU	Vancomycin + Meropenem + Ciprofloxacin	Piptazo	Piptazo + Ciprofloxacin	Piptazo + Vancomycin	Piptazo + Ciprofloxacin + Vancomycin
Mission Bay ICU	Vancomycin + Meropenem + Ciprofloxacin	Piptazo	Piptazo + Ciprofloxacin	Piptazo + Vancomycin	Piptazo + Ciprofloxacin + Vancomycin
Mt Zion ICU	Vancomycin + Meropenem + Ciprofloxacin	Piptazo	Piptazo + Ciprofloxacin	Piptazo + Vancomycin	Piptazo + Ciprofloxacin + Vancomycin
Non-ICU HABP	Transfer to the ICU and follow treatment for appropriate ICU above	Piptazo		Piptazo + Vancomycin	

a. If a patient has known multidrug resistant organism (MDRO) respiratory colonization within 30 days: Include coverage for the known organism unless an organism not associated with respiratory infection (e.g. enterococcus, coagulase-negative staphylococcus, candida). Patients colonized with MDRO susceptible to a novel agent (e.g. ceftazidime-avibactam) may consider using these agents for empiric therapy. Please see process for ordering restricted antimicrobials at https://idmp.ucsf.edu/notations/id-r-ucsf

b. For patients with significant antibiotic exposure within the past 30 days, consider broader empiric therapy (e.g. dual gram-negative therapy and/or adjunctive aminoglycoside instead of ciprofloxacin). For patients with significant fluoroquinolone exposure (e.g. patients with hematological malignancies receiving fluoroquinolone prophylaxis or patients receiving fluoroquinolone SBP prophylaxis), consider tobramycin as a secondary gram-negative agent instead of ciprofloxacin

c. Penicillin or cephalosporin allergic patients: See UCSF Beta-lactam Allergy Guidelines: https://idmp.ucsf.edu/content/allergy-beta-lactam

d. True vancomycin allergy: Linezolid is an acceptable alternative. Daptomycin is not effective for pneumonia.

e. For dosing information, refer to http://idmp.ucsf.edu/antimicrobial-dosing-guidelines; if patient on continuous renal replacement therapy or ECMO, recommend consultation with ICU Pharmacy; consider extended infusion beta-lactam therapy in those meeting inclusion criteria (e.g. critically ill ICU patients with sepsis): https://idmp.ucsf.edu/extendedinfusion

f. For patients without a MRSA swab or MRSA swab > 7 days ago, consider obtaining a MRSA swab.

g. Early versus late refers to time from initial hospital admission (i.e. if patient is an external transfer, count days from admission at the transferring hospital)

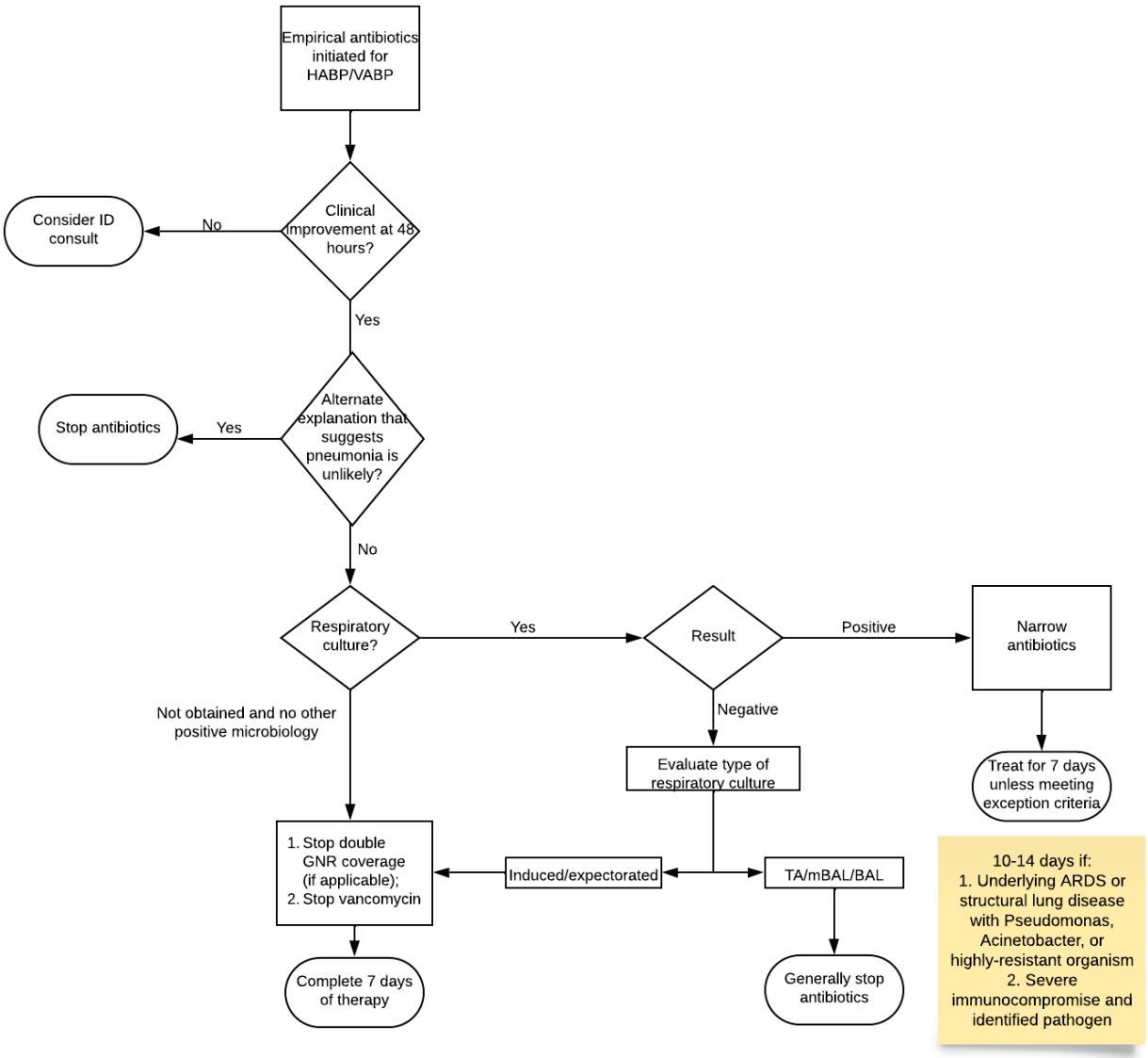
h. Piptazo refers to piperacillin/tazobactam throughout

Definitive therapy

- Duration of therapy: 7 days from initiation of active therapy for most patients
- Durations of therapy should be individualized in the following groups:
    - Patients with underlying ARDS or significant structural lung disease who have *Pseudomonas aeruginosa*, *Acinetobacter spp*., or highly-resistant bacterial infections: 10-14 days
    - Severe immunocompromise (e.g. recent organ transplantation or treatment for rejection within 3 months, congenital immunodeficiency, etc) and identified pathogen: 10-14 days
    - Associated bacteremia
    - Lack of clinical improvement at 48 hours (ongoing fevers or need for vasopressors): Recommend consultation with ID or Pulmonology
    - Empyema
- Review flowchart below for management recommendations based on clinical improvement and culture results.
- Definitive therapy should be directed at the organism(s) isolated on culture based on susceptibility testing. Consult Antimicrobial Stewardship or ID if assistance is desired.
    - If dual gram-negative therapy was initiated, streamline to one agent once

susceptibilities are known.
    - If vancomycin was initiated, but MRSA was not isolated from clinical cultures (including negative cultures) or subsequent MRSA swab was negative, then stop vancomycin.
- Inhaled antibiotics should be reserved for unique scenarios (e.g. GNRs only susceptible to aminoglycosides and/or colistin). Please consult with ID for recommendations.

UCSF Antibiotic Management of HABP/VABP in Adults



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