דלקת ריאות נרכשת באשפוז

HAP – HOSPITAL ACQUIRED PNEUMONIA

ד"ר מחמוד מחאג'נה

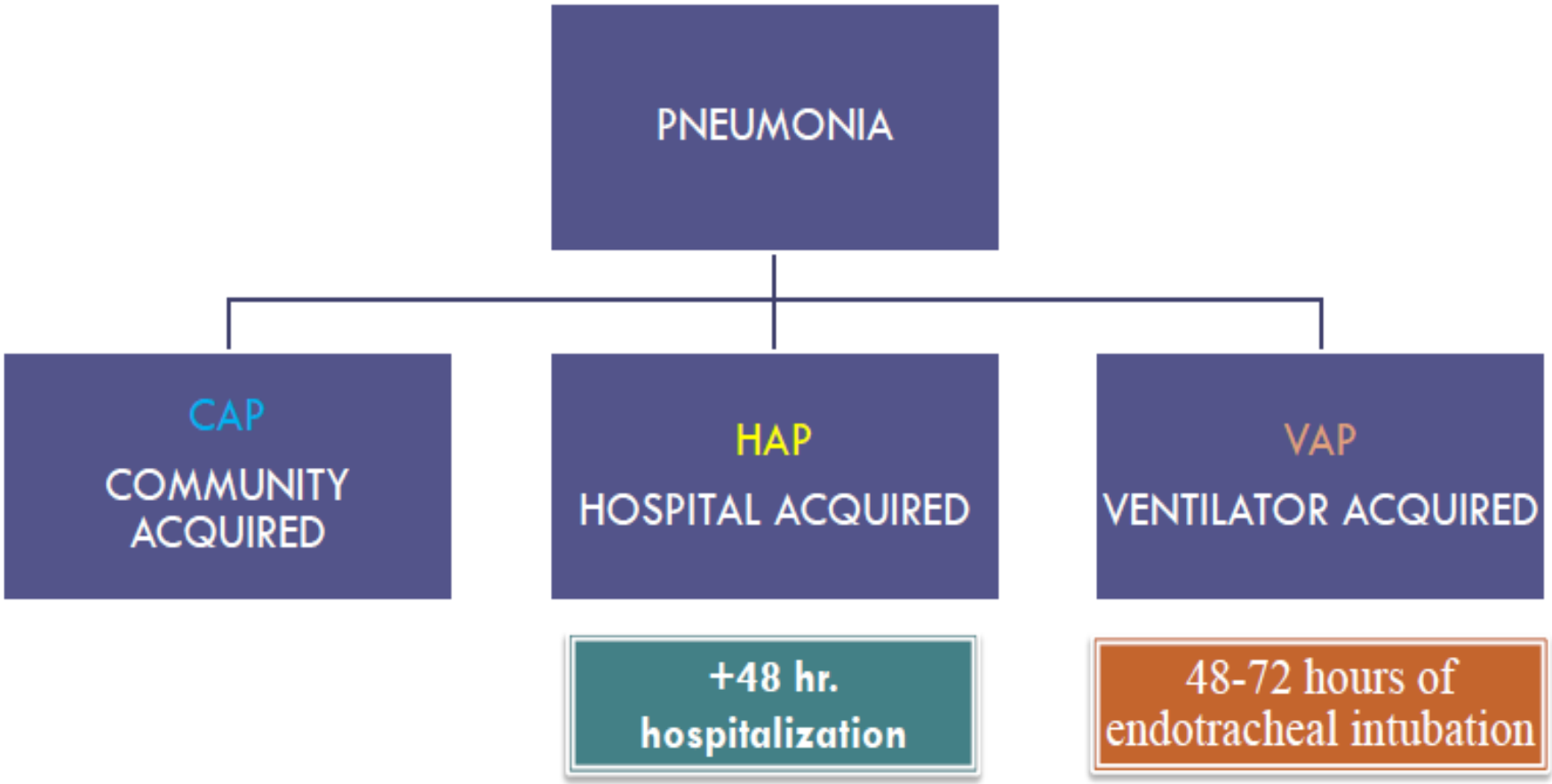
2019

המרכז הרפואי הלל-יפה

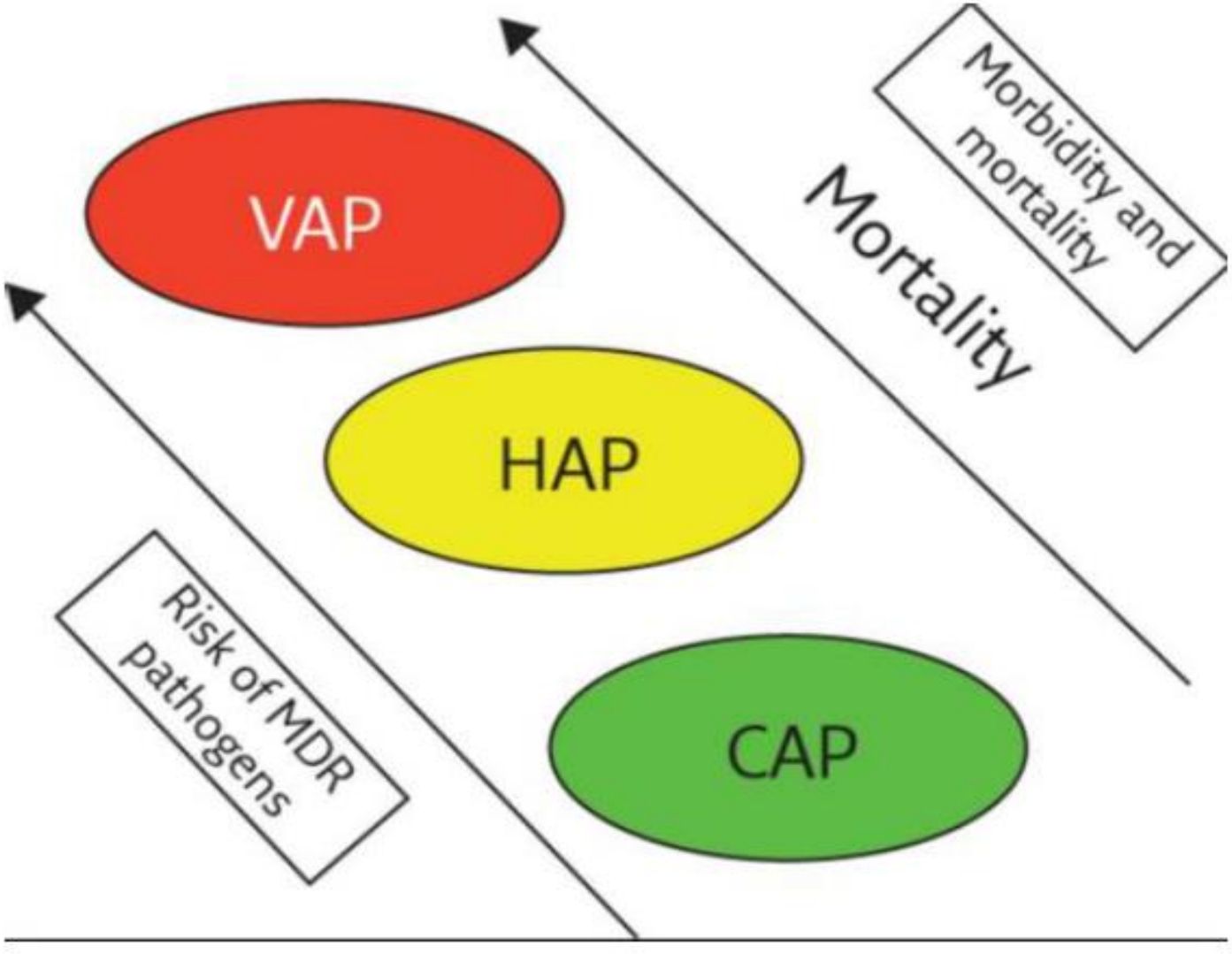
פתופיזיולוגיה

- התפתחות הפנומוניה מצביעה על כשל ב "host defense" , בגלל חשיפה למיקרואורגניזם וירולינטי.
- פנומוניה לאחר מחלת וURT שמאפשרת חדירה של חיידקים, וירוסים, שמהווים טריגר למע׳ החיסון וכך יש דלקת. LRT מתמלאות בWBC, נוזל, שאריות תאים וכך הענות הריאה יורדת ויש חסימה של דרכי אוויר קטנות.
- מיקרואורגניזמים נכנסים למערכת הנשימה התחתונה ב-3 דרכים אפשריות:
  1. נשאפים כחלקיקי אירוסול.
  2. נכנסים לריאה דרך זרם הדם מאזור זיהום אקסטראפולמונארי.
  3. אספרציה של תכולה אורופארנגיאלית (oropharyngeal)

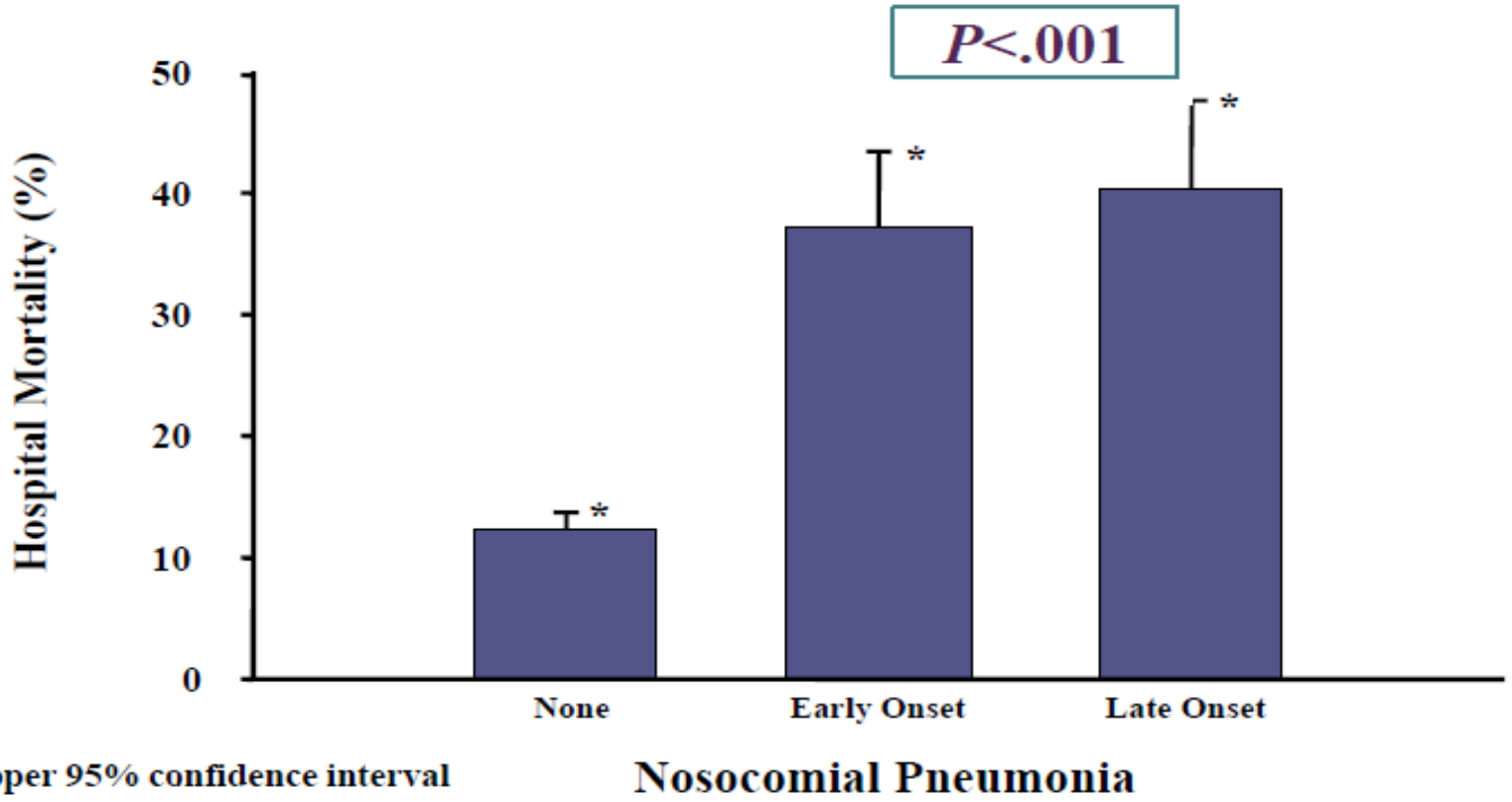
הגדרה


PNEUMONIA
CAP
COMMUNITY ACQUIRED
HAP
HOSPITAL ACQUIRED
VAP
VENTILATOR ACQUIRED
+48 hr. hospitalization
48-72 hours of endotracheal intubation

תחלואה, תמותה, ועמידות...



Mortality and Time of Presentation of HAP

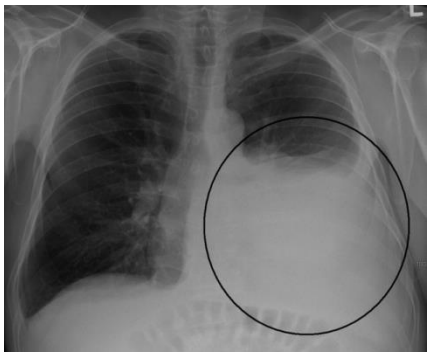


*Upper 95% confidence interval

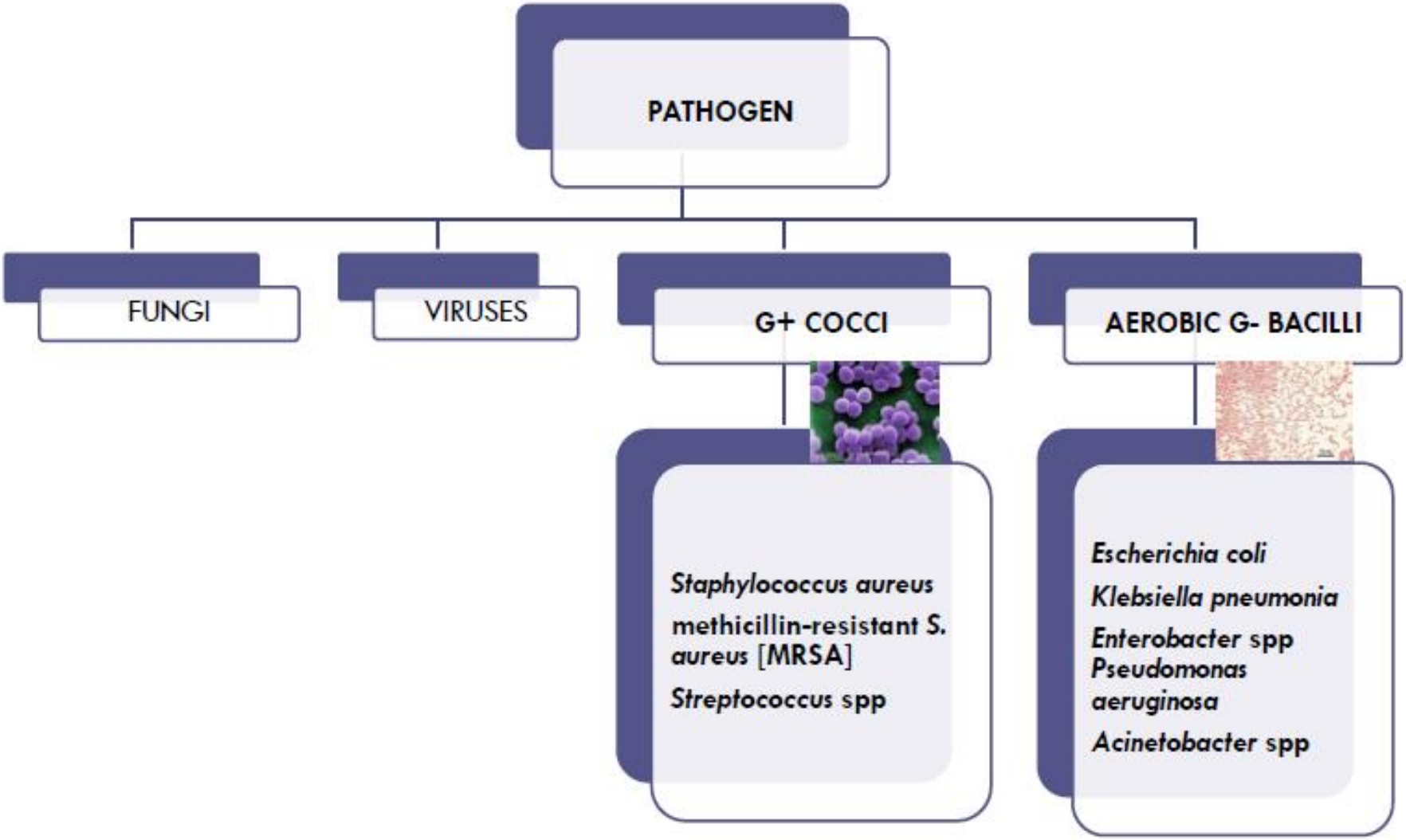
Ibrahim, et al. *Chest.* 2000;117:1434-1442.

Clinical Presentation and Diagnosis

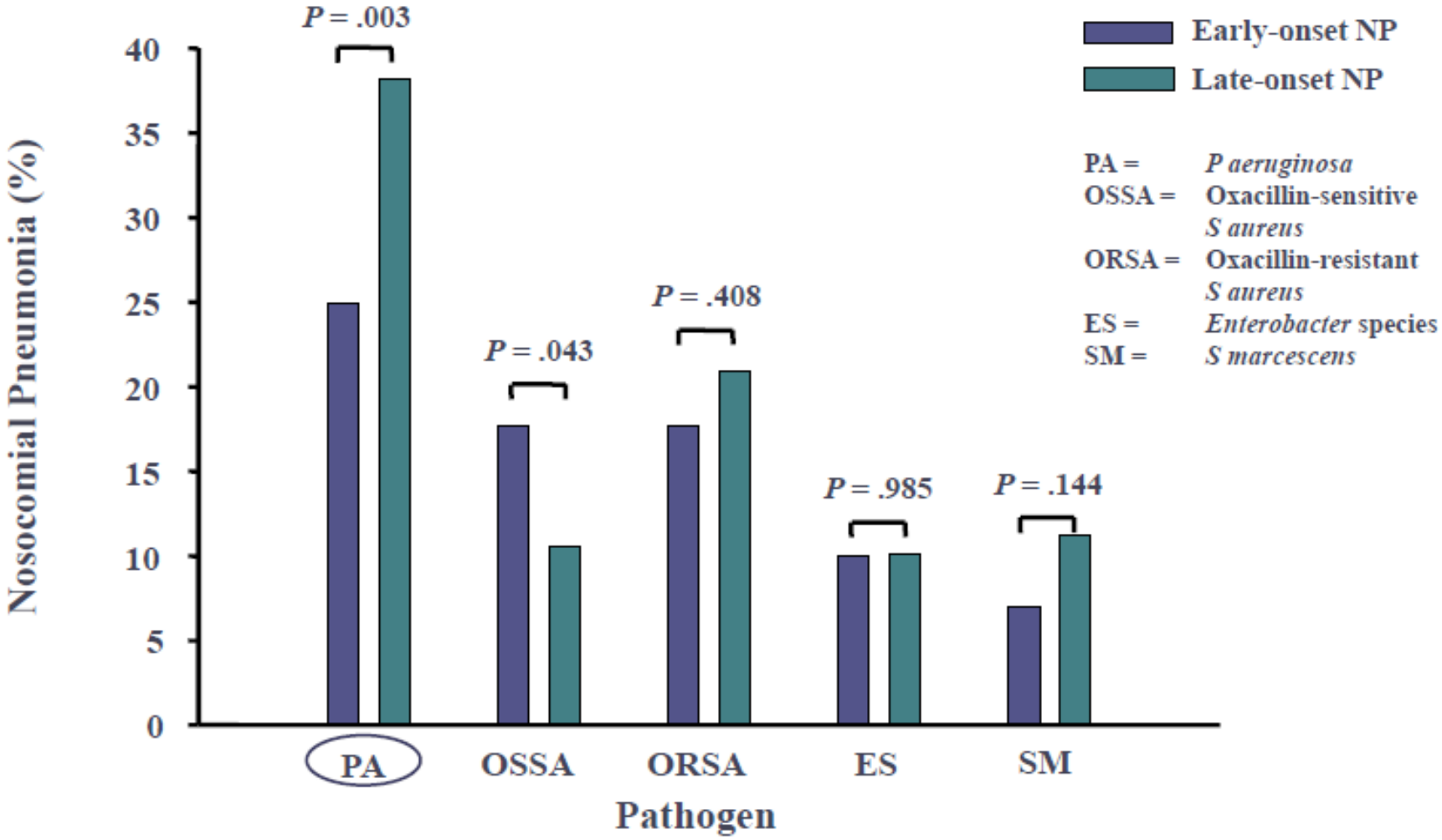
- Not necessarily easy to accurately diagnose HAP
- Criteria frequently include:
  - **Clinical**
    - fever ; cough with purulent sputum,
  - **Radiographic**
    - new or progressive infiltrates on CXR,
  - **Laboratorial**
    - WBC - leukocytosis or leukopenia
    - CRP
  - **Microbiologic**
    - positive cultures of sputum
    - BAL
    - pleural fluid or blood cultures



Etiology


PATHOGEN
FUNGI
VIRUSES
G+ COCCI
AEROBIC G- BACILLI
Staphylococcus aureus
methicillin-resistant S. aureus [MRSA]
Streptococcus spp
Escherichia coli
Klebsiella pneumonia
Enterobacter spp
Pseudomonas aeruginosa
Acinetobacter spp

Bacterial pathogens associated with HAP



Ibrahim, et al. *Chest.* 2000;117:1434-1442.

Type of pneumonia & Organisms

Organisms isolated	Type of pneumonia	
	Hospital-acquired pneumonia (%)	Ventilator-acquired pneumonia (%)
Klebsiella pneumoniae	4 (57.1)	46 (45.09)
Pseudomonas	3 (42.8)	23 (22.54)
Acinetobacter	0	12 (11.7)
Escherichia coli	0	9 (8.8)
Mixed	0	6 (5.8)
Staphylococcus aureus	0	4 (3.9)
Streptococcus pneumoniae	0	2 (1.9)
Total	7 (100)	102 (100)

טיפול אמפירי- HAP

Table 4. Recommended Initial Empiric Antibiotic Therapy for Hospital-Acquired Pneumonia (Non-Ventilator-Associated Pneumonia)

Not at High Risk of Mortality[a] and no Factors Increasing the Likelihood of MRSA[b,c]	Not at High Risk of Mortality[a] but With Factors Increasing the Likelihood of MRSA[b,c]	High Risk of Mortality or Receipt of Intravenous Antibiotics During the Prior 90 d[b,c]
One of the following:	One of the following:	Two of the following, avoid 2 β-lactams:
Piperacillin-tazobactam[d] 4.5 g IV q6h	Piperacillin-tazobactam[d] 4.5 g IV q6h	Piperacillin-tazobactam[d] 4.5 g IV q6h
OR	OR	OR
Cefepime[d] 2 g IV q8h	Cefepime[d] or ceftazidime[d] 2 g IV q8h	Cefepime[d] or ceftazidime[d] 2 g IV q8h
OR	OR	OR
Levofloxacin 750 mg IV daily	Levofloxacin 750 mg IV daily	Levofloxacin 750 mg IV daily
	Ciprofloxacin 400 mg IV q8h	Ciprofloxacin 400 mg IV q8h
	OR	OR
Imipenem[d] 500 mg IV q6h	Imipenem[d] 500 mg IV q6h	Imipenem[d] 500 mg IV q6h
Meropenem[d] 1 g IV q8h	Meropenem[d] 1 g IV q8h	Meropenem[d] 1 g IV q8h
	OR	OR
	Aztreonam 2 g IV q8h	Amikacin 15–20 mg/kg IV daily
		Gentamicin 5–7 mg/kg IV daily
		Tobramycin 5–7 mg/kg IV daily
		OR
		Aztreonam[e] 2 g IV q8h
	Plus: Vancomycin 15 mg/kg IV q8–12h with goal to target 15–20 mg/mL trough level (consider a loading dose of 25–30 mg/kg × 1 for severe illness)	Plus: Vancomycin 15 mg/kg IV q8–12h with goal to target 15–20 mg/mL trough level (consider a loading dose of 25–30 mg/kg IV × 1 for severe illness)
	OR	OR
	Linezolid 600 mg IV q12h	Linezolid 600 mg IV q12h
		If MRSA coverage is not going to be used, include coverage for MSSA. Options include: Piperacillin-tazobactam, cefepime, levofloxacin, imipenem, meropenem. Oxacillin, nafcillin, and cefazolin are preferred for the treatment of proven MSSA, but would ordinarily not be used in an empiric regimen for HAP.
	If patient has severe penicillin allergy and aztreonam is going to be used instead of any β-lactam–based antibiotic, include coverage for MSSA.	

טיפול אמפירי – VAP

Table 3. Suggested Empiric Treatment Options for Clinically Suspected Ventilator-Associated Pneumonia in Units Where Empiric Methicillin-Resistant *Staphylococcus aureus* Coverage and Double Antipseudomonal/Gram-Negative Coverage Are Appropriate

A. Gram-Positive Antibiotics With MRSA Activity	B. Gram-Negative Antibiotics With Antipseudomonal Activity: β-Lactam–Based Agents	C. Gram-Negative Antibiotics With Antipseudomonal Activity: Non-β-Lactam–Based Agents
Glycopeptides[a] Vancomycin 15 mg/kg IV q8–12h (consider a loading dose of 25–30 mg/kg × 1 for severe illness)	Antipseudomonal penicillins[b] Piperacillin-tazobactam 4.5 g IV q6h[b]	Fluoroquinolones Ciprofloxacin 400 mg IV q8h Levofloxacin 750 mg IV q24h
OR	OR	OR
Oxazolidinones Linezolid 600 mg IV q12h	Cephalosporins[b] Cefepime 2 g IV q8h Ceftazidime 2 g IV q8h	Aminoglycosides[a,c] Amikacin 15–20 mg/kg IV q24h Gentamicin 5–7 mg/kg IV q24h Tobramycin 5–7 mg/kg IV q24h
	OR	OR
	Carbapenems[b] Imipenem 500 mg IV q6h[d] Meropenem 1 g IV q8h	Polymyxins[a,e] Colistin 5 mg/kg IV × 1 (loading dose) followed by 2.5 mg × (1.5 × CrCl + 30) IV q12h (maintenance dose) [135] Polymyxin B 2.5–3.0 mg/kg/d divided in 2 daily IV doses
	OR	
	Monobactams[f] Aztreonam 2 g IV q8h	

Ventilator Associated Pneumonia – טיפול באשפוז

קו ראשון	אלטרנטיבה כאשר לא ניתן להשתמש תרופות הקו הראשון (כגון: אלרגיה או כישלון טיפולי)	הערות
IV PIPERACILLIN-TAZOBACTAM (TAZOCIN) 4.5 gram X 3/day במידה ונראים סטאפילוקוקים בצביעת גרם יש להוסיף: IV VANCOMYCIN 15-20mg/kg x 2/d בחשד ללגיונלה: IV AZITHROMYCIN 500 mg, once daily או IV LEVOFLOXACIN (TAVANIC) 750 mg , once daily	ביעוץ מומחה למחלות זיהומיות	האבחנה של דלקת ראות נרכשת הקשורה להנשמה מבוססת על הממצאים הבאים: ממצא רנטני (רנטגני) חדש/ החמרה בממצא רנטגני בחולה המונשם ≤ 48 שע' בלווית לפחות 2 שניים (מחיקת 2) מהמצאים הקלינים הבאים: • החמרה במדדי הנשמה • כיח מוגלתי • חם $\leq 38^{o}c$ • לויקוציטוזיס/ לויקופניה • עלית CRP קודם להתחלת טיפול יש לקחת תרבית כיח – רצוי משטיפה עמוקה למשטח גרם ולתרבית. בחשד לזיהום ב legionella – יש לקחת אנטיגן בשתן ובאם שלילי, לשלוח סרולוגיה בדם ו PCR מהכיח.

AB באנהילציה

ROLE OF INHALED ANTIBIOTIC THERAPY

XIV. Should Patients With VAP Due to Gram-Negative Bacilli Be Treated With a Combination of Inhaled and Systemic Antibiotics, or Systemic Antibiotics Alone?

Recommendation

1. For patients with VAP due to gram-negative bacilli that are susceptible to only aminoglycosides or polymyxins (colistin or polymyxin B), we suggest both inhaled and systemic antibiotics, rather than systemic antibiotics alone *(weak recommendation, very low-quality evidence)*.

   Values and Preferences: This recommendation places a high value on achieving clinical cure and survival; it places a lower value on burden and cost.

   Remarks: It is reasonable to consider adjunctive inhaled antibiotic therapy as a treatment of last resort for patients who are not responding to intravenous antibiotics alone, whether the infecting organism is or is not multidrug resistant (MDR).

משך טיפול

LENGTH OF THERAPY

XXI. Should Patients With VAP Receive 7 Days or 8–15 Days of Antibiotic Therapy?

Recommendation

1. For patients with VAP, we recommend a 7-day course of antimicrobial therapy rather than a longer duration *(strong recommendation, moderate-quality evidence).*

Remarks: There exist situations in which a shorter or longer duration of antibiotics may be indicated, depending upon the rate of improvement of clinical, radiologic, and laboratory parameters.

XXII. What Is the Optimal Duration of Antibiotic Therapy for HAP (Non-VAP)?

Recommendation

1. For patients with HAP, we recommend a 7-day course of antimicrobial therapy *(strong recommendation, very low-quality evidence).*

Remarks: There exist situations in which a shorter or longer duration of antibiotics may be indicated, depending upon the rate of improvement of clinical, radiologic, and laboratory parameters.

Vancomycin vs Linezolid

- **Vancomycin** dosing should be adjusted to achieve target trough levels.
- Nephrotoxicity occurred more commonly with **Vancomycin** than **linezolid**

- **Linezolid** is particularly preferred in hospitals in which a substantial proportion of MRSA isolates have a **Vancomycin** **MIC** ≥2 mcg/mL.

- An alternative to **linezolid** and **Vancomycin** is **Clindamycin** (600 mg IV or orally three times daily), provided that the isolate is known to be susceptible

Vancomycin vs. Linezolid – Cont.

- Certain antibiotics, including the **aminoglycosides** and **vancomycin**, have problems when it comes to penetration into the lung tissue. Linezolid, on the other hand, appears to have the ability to penetrate from the intervascular compartment into the interstitium of the lung as well as into the airway.

Other antibiotic considerations

- **Daptomycin cannot** be used to treat pneumonia because it does not achieve sufficiently high concentrations in the respiratory tract.

- In ICU settings in which extended-spectrum beta-lactamase (ESBL)-producing Enterobacteriaceae are found, **cephalosporins** should be avoided as monotherapy - The most reliable agent in this setting is a **carbapenem**

- Anaerobes — Patients who have aspirated or had recent abdominal surgery may warrant coverage for anaerobes (**clindamycin**, beta-lactam-beta-lactamase inhibitor, or a **carbapenem**).

Routes of Infection – Cont.

- The stomach - an important reservoir of gram-negative bacilli that can ascend and colonize the respiratory tract.

- acid-suppressive medications like proton pump inhibitors and histamine 2–blocking agents were more likely to develop hospital-acquired pneumonia than were patients who did not (5% vs 2%).