

Pulmonary Infections in High-Risk Populations: Pre Patients



Presented by

Audience

Date: / /

General Overview S

Introduction

- Pulmonary infections: major cause of morbidity/mortality in vi
- High-risk populations: pregnant women, chemotherapy patient
- Objectives: epidemiology, etiology, clinical features, imaging,

Epidemiology (Gene

- **WHO 2024:** respiratory infections among top 5 causes
- **2025 surveillance:** ↑ incidence of viral pneumonia in i
- Mortality rates remain high despite advances in therapy



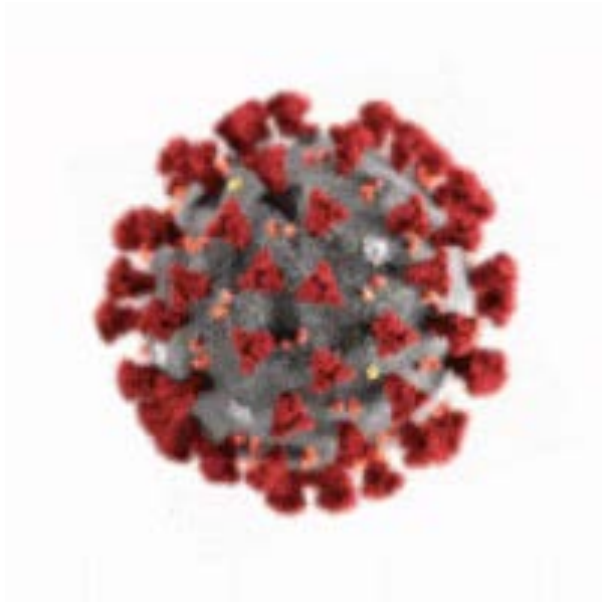
Specific Epidemiologic

- **Pregnant women:** 2–3× higher risk of severe influenza
- **Chemotherapy patients:** 30–40% incidence of pulmonary
- **Seasonal variation:** influenza peaks in winter; fungal i



Etiology (Viruses)

- **Influenza A/B:** severe maternal outcomes.
- **RSV:** rising incidence in oncology patients.
- **SARS-CoV-2:** persistent risk despite vaccination.



tapneumovirus, adenovirus.

Etiology (Bacteria & Fungi)

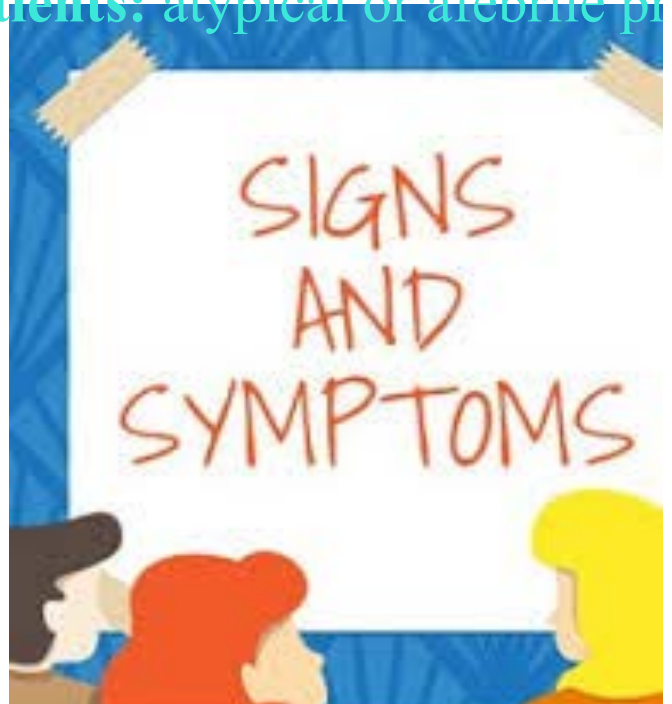
- **Bacteria:** Streptococcus pneumoniae, MRSA, Pseudomonas aeruginosa
- **Fungi:** Aspergillus fumigatus, Candida albicans, Pneumocystis carinii



Immunotherapy patients

Clinical Manifestations (C)

- Fever, cough, dyspnea, pleuritic chest pain.
- Hypoxemia and respiratory failure in severe cases.
- **Immunocompromised patients:** atypical or afebrile pr



Imaging (General

- **Chest X-ray:** consolidation, interstitial infiltrates, pleural effusion
- **CT scan:** ground-glass opacities, halo sign (fungal infection)
- CT preferred in immunocompromised patients.



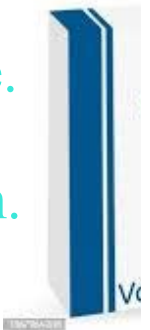
Diagnostic Approach (G

- **Labs:** CBC (neutropenia), CRP, procalcitonin.
- **Microbiology:** sputum culture, BAL.
- **Molecular:** multiplex PCR, NGS for rare pathogens.



Management (General Pr

- *Empiric broad-spectrum antibiotics in severe cases.*
- **Antiviral therapy:** oseltamivir, remdesivir.
- **Antifungal therapy:** voriconazole, posaconazole.
- **Supportive care:** oxygen, mechanical ventilation.
- **Vaccination:** influenza, COVID-19.



Pregnancy Secti

Pregnancy: Pathophys

- ↑ oxygen consumption, ↓ functional residual capacity.
- **Immune modulation:** Th2 shift → ↑ viral susceptibility



ICU admission.

Pregnancy: Epidemiology

- Severe influenza and COVID-19 outcomes.
- Maternal mortality from pneumonia in low-resource set
- Increased risk of preterm labor and fetal distress.



- **Physiologic dyspnea of pregnancy:**

- Gradual onset
- Normal SpO_2 ($\geq 95\%$)
- Normal chest examination
- No fever or cough

- **Pathologic dyspnea (never normal):**

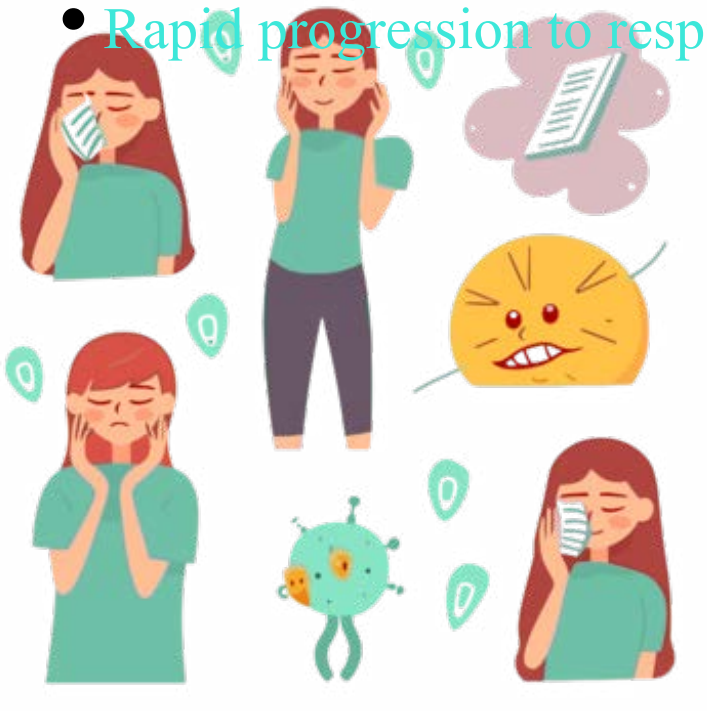
- $\text{SpO}_2 < 95\%$
- Tachypnea or cyanosis
- Fever, productive cough, chest pain



- The overall incidence of respiratory infections in the general population.
- *Pregnant patients experience higher disease severity*
 - Increased hospitalization rates
 - Higher ICU admission rates
- *Viral respiratory infections (e.g., Influenza, COVID-19)*
 - More severe clinical outcomes
 - Increased maternal morbidity

Pregnancy: Clinical Fe

- Dyspnea misattributed to normal pregnancy.
- Fever, cough, hypoxemia.
- Rapid progression to respiratory failure.



Pregnancy: Imaging & Di

- Minimize radiation exposure; shielding required.
- Ultrasound for pleural effusion.
- PCR and serology safe.
- CT only if essential, with fetal protection.

- Chest X-ray (CXR) with abdominal shielding is safe throughout pregnancy
- CT scan, when clinically indicated:
 - Lowest teratogenic risk after 8–10 weeks gestation
 - Radiation dose from chest CT is well below teratogenic threshold
- **Maternal hypoxia poses a greater risk than diagnostic radiation**

Pregnancy: Risk Factors and

- **Key risk factors for severe respiratory infection in p**
 - **Asthma or chronic lung disease** → reduced pulmonary res
 - **Obesity** → impaired ventilation and reduced diaphragmatic
 - **Anemia** → decreased oxygen delivery ($\downarrow\text{DO}_2$)
 - **Smoking** → impaired mucociliary clearance and immune d
 - **Diabetes mellitus** → immune dysfunction and increased in
- *Each factor increases vulnerability through distinct pa*

Pregnancy: Manager

- **Safe antibiotics:** beta-lactams, macrolides.
- **Antivirals:** oseltamivir considered safe.
- **Avoid teratogenic drugs:** fluoroquinolones, tetracyclines
- **Multidisciplinary approach:** obstetric + pulmonary + ID



Pregnancy: Case Studies (2)

- **Case 1:** Influenza pneumonia in 2nd trimester → treated
- **Case 2:** COVID-19 ARDS in late pregnancy → ICU and corticosteroids.
- ***Lessons: early diagnosis and safe drug selection critical***

Pregnancy: Vaccinat

- **Recommended vaccinations during pregnancy:**

- Influenza vaccine (any trimester)
- COVID-19 vaccine
- Tdap (recommended at 27–36 weeks)
- Pneumococcal vaccine (selected high-risk patients)

- **Vaccination reduces:**

- Maternal morbidity
- Hospitalization and ICU admission
- Neonatal infection via passive immunity

Chemotherapy

Chemotherapy: Pathophysiology

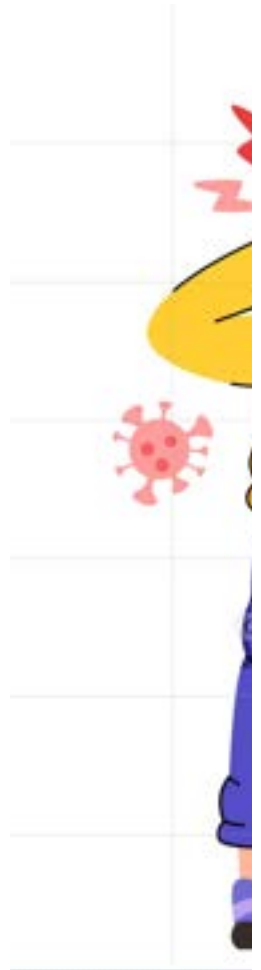
- Neutropenia, mucosal barrier injury, impaired humoral immunity
- High risk of opportunistic infections.
- Altered microbiome increases susceptibility.

Chemotherapy: Epidemiology

- 30–40% incidence of pulmonary infections during treatment
- Mortality up to 50% in fungal pneumonia.
- **Risk factors:** prolonged neutropenia, HSCT, corticosteroids

Chemotherapy: Clinical]

- Neutropenic fever often sole sign.
- Rapid progression to sepsis.
- Atypical radiological findings.



Chemotherapy: Imaging & Biomarkers

- **CT chest:** gold standard for opportunistic infections.
- **Findings:** halo sign, cavitary lesions.
- **Biomarkers:** galactomannan, beta-D-glucan.



Chemotherapy: Management &

- **Empiric therapy:** carbapenems + antifungal coverage.
- **Prophylaxis:** TMP-SMX (for Pneumocystis), posaconazole
- **Emerging therapies:** monoclonal antibodies, immunotherapy
- **Vaccination:** influenza, COVID-19.



Chemotherapy: Case Studies

- **Case 1:** Pneumocystis jirovecii pneumonia in lymphoma patients
- **Case 2:** invasive aspergillosis post-chemotherapy → treat with voriconazole
- ***Lessons: prophylaxis and early CT essential.***

A collection of colorful stars and confetti in red, blue, green, and brown, scattered around the text.

Thank You