L1 (Adult Respiratory cases)

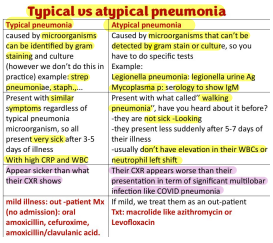
- Case 1: A 45-year-old previously healthy woman presents to the emergency department with a 5-day history of fever (up to 39.5°C), productive cough, and shortness of breath. She reports no other chronic medical conditions.
- Physical Examination:

- Appears unwell with increased work of breathing (RR: 40 breaths/min, PR: 110 beats/min, Temp: 39°C).

- Subcostal and intercostal retractions.

- Decreased air entry on the right lower side, bronchial breathing, increased tactile vocal fremitus, and inspiratory crackles.

- Dull to percussion.

Symptoms and signs	Diagnostic tool	Diagnosis	Management
High grade fever (febrile), productive cough, shortness of breath, RR is increased (tachypnea), PR is increased (tachycardia), subcostal and intercostal retraction (indicate that she is in respiratory distress), inspiratory crackles and dull to percussion.	**1. Complete Blood Count (CBC):** - Increased WBCs and neutrophils: Common in bacterial pneumonia. - Decreased WBCs: Seen in Mycoplasma pneumonia (causing hemolytic anemia via IgM cold agglutination) or in severe sepsis. **2. Blood Culture:** - Indicated for febrile patients or those not responding to treatment. - Low diagnostic yield (20–30%) but helps guide therapy in specific cases. **3. Inflammatory Markers**: - Elevated CRP: Suggests infection. - Normal/mild elevated CRP: May indicate alternative diagnoses, such as pulmonary embolism, where fever is low-grade or absent.	Pneumonia, likely bacterial (Strep. pneumoniae or Staph. aureus).  	You need to start antibiotics ASAP, once symptoms appear and new infiltration on CXR, you don't need to wait for culture or blood test. **Typical Pneumonia:** - Oral antibiotics: Amoxicillin, cefuroxime, or amoxicillin/clavulanic acid. **Atypical pneumonia**: - Macrolide like azithromycin or levofloxacin. **Severe or hospitalized cases**: - Parenteral cefuroxime. - Vancomycin or clindamycin (if Staph. aureus is suspected).

	4. Chest X-Ray: **Patchy opacity** involving the mid and lower zones of the right lung.  Lobar infiltration is more characteristic to pneumonia		

- Pneumonia is an inflammation of the parenchyma of the lungs (alveoli and terminal airspaces in response to invasion by an infectious agent introduced into the lungs through hematogenous spread or inhalation).

• Causes:

1-Infectious, mostly (Strept Pneumonia, staph aureus, Mycoplasma.p)

2-Noninfectious: less likely cause:

A-aspiration of food or gastric juice: especially in patients who drink alcohol, have stroke, or neurological disorders, and are unable to stay conscious at all.

B-hypersensitivity reactions. C-foreign bodies (children)

D-Hydrocarbons and lipoid substances: like cigarettes and vapes (also they are well-known to cause hypersensitivity pneumonia).

E-radiation-induced pneumonitis (in cancer patients).

Complications of pneumonia:

1. Pleural effusion (comes with worsening dyspnea, fever recurrence, chest pain, and inflammatory markers will go up after being down in the first few days. In addition to physical findings including dull percussion note and absent TVF).

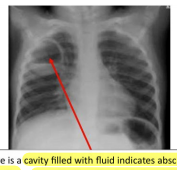
2. Direct invasion: Empyema and pericarditis (causes infection in the pleural space by the microorganisms or the infectious process).

3. Hematogenous spread: Meningitis, suppurative arthritis and osteomyelitis (**rare**, because most patients of pneumonia complain early and because pneumonia treatment is established empirically).

Pleural effusion

Red arrow =collection of fluid in the pleural space with a sign called: Meniscus sign: Fluid rises higher along the edge of pleural effusion, producing an upside down "U" or meniscus shape

Necrotizing pneumonia: cavitation



There is a cavity filled with fluid indicates abscess formation, a complication of untreated or delayed treatment of pneumonia.

-there is only one study that shows that mortality increases significantly if you start Abx after 6 hrs of presentation to ED, so txt should be initiated before 6hrs because all what is needed is PE, history, CXR, and sometimes blood test - which should take less than 6hrs

➢ Case 2: A 45-year-old male police officer with a 40-pack-year smoking history presents with 6 months of progressive dyspnea and a minimally productive cough. There is no significant past medical history of asthma, atopy, or familial respiratory disease.

➢ Physical Examination:

- Afebrile, RR: 35 breaths/min, PR: 100 beats/min, SpO2: 89% on room air.

- Intercostal and subcostal retractions.

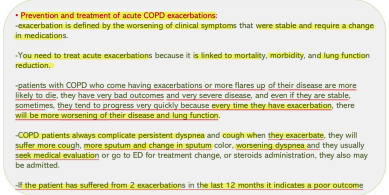
- Diffuse expiratory wheezing, prolonged expiratory phase, and decreased air entry.

- No clubbing or peripheral signs of cyanosis.

- CVS: normal and liver not palpable.

Symptoms and signs	Diagnostic tool	Diagnosis	Management
Progressive dyspnea for 6 months. Chronic minimally productive cough. History of heavy smoking. Tachypnea, tachycardia, hypoxia, diffuse expiratory wheeze and prolonged expiratory phase.((indicative to an obstructive disease). Intercostal and subcostal retractions indicating respiratory distress. **No clubbing or cyanosis.**	1. Chest X-Ray: **Hyperinflation** (≥9 posterior ribs visible, flattened diaphragm and small heart).  - Extra: Normally we should see 6 ribs anteriorly, and 8 ribs posteriorly, anything more indicates overinflation. 2. Spirometry: **FEV1/FVC <70%**. There is more explanation from doctor on spirometry in modified slides (ألقوا نظرة عليه اذا حابين 🙃)	Chronic Obstructive Pulmonary Disease (COPD)	1. Smoking cessation and vaccination. 2. **Start** with inhaled bronchodilators: Long-acting anticholinergic **(LAMA)** ± long-acting beta-agonist **(LABA).** 3. **Add inhaled corticosteroids (ICS)** if exacerbations occur (≥2/year), peripheral eosinophilia is present or FEV1 is less than 50%. 4. Methylxanthine: Like theophylline, is indicated in special cases but in general, we don't use them because of their toxicities. 5. Phosphodiesterase-4 inhibitor: Have been used recently for exacerbation management, so it is added to inhaled bronchodilators. - There are Inhaled B2 agonist short acting (SABA) and Inhaled anticholinergic short acting (SAMA) --> used in exacerbations.

! important


• Prevention and treatment of acute COPD exacerbations:
-exacerbation is defined by the worsening of clinical symptoms that were stable and require a change in medications.

-You need to treat acute exacerbations because it is linked to mortality, morbidity, and lung function reduction.

-patients with COPD who come having exacerbations or more flares up of their disease are more likely to die, they have very bad outcomes and very severe disease, and even if they are stable, sometimes, they tend to progress very quickly because every time they have exacerbation, there will be more worsening of their disease and lung function.

-COPD patients always complicate persistent dyspnea and cough when they exacerbate, they will suffer more cough, more sputum and change in sputum color, worsening dyspnea and they usually seek medical evaluation or go to ED for treatment change, or steroids administration, they also may be admitted.

-If the patient has suffered from 2 exacerbations in the last 12 months it indicates a poor outcome

- COPD is **a common, preventable and treatable disease**. It is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. **(FEV1/FVC < 70%).**
- It is caused by a mixture of small airways disease (e.g., obstructive bronchiolitis) and parenchymal destruction (emphysema).

➢ Case 3: A 64-year-old woman with a history of type 2 diabetes and breast cancer (recently treated) presents to the emergency department with fever, cough, and dyspnea. She tested positive for COVID-19.

➢ Physical Examination:
BP: 130/70, RR: 18 breaths/min, HR: 98 beats/min, SpO2: 86% on room air.
Bilateral inspiratory crackles, bronchial breath sounds, increased tactile vocal fremitus, and dullness on percussion.

Symptoms and signs	Diagnostic tool	Diagnosis	Management
History of type 2 diabetes and breast cancer (recently treated), fever, cough, dyspnea and positive for COVID-19. Bilateral inspiratory crackles and bronchial breath sounds on auscultation. Increased tactile vocal fremitus and dullness on percussion. PF Ratio: 190, indicating moderate ARDS.	1. Chest X-Ray: Bilateral patchy opacities involving most lung fields, normal heart.  2. ABG: PaO2: 40 mmHg, SpO2: 80% (on room air), PF ratio: 190 (indicating moderate ARDS).	Acute Respiratory Distress Syndrome (ARDS)	1. **Oxygen therapy** to maintain SpO2 >92%. 2. **Initiate mechanical ventilation** for severe hypoxemia or respiratory distress. 3. Treat underlying cause: **Anti-viral therapy for COVID-19.** **Corticosteroids for severe ARDS.** 4. Supportive care: **IV fluids to maintain perfusion.**

- ARDS is a clinical syndrome characterized by an acute, diffuse, inflammatory form of lung injury resulting from diffuse injury to the alveolo-capillary membranes. Characterized by increased pulmonary vascular permeability, and loss of aerated tissue, increased work of breathing and impaired gas exchange).

ETIOLOGIES AND PREDISPOSING FACTORS

-ARDS is related to inflammatory cytokines releasing and systemic response from the body

DIRECT LUNG INJURY	INDIRECT LUNG INJURY
Pneumonia	Sepsis
Aspiration of gastric contents	Multiple trauma
Pulmonary contusion	Cardiopulmonary bypass
Fat, amniotic fluid, or air emboli	Drug overdose
Near-drowning	Acute pancreatitis
Inhalational injury	Transfusion of blood products
Reperfusion pulmonary edema	

Pulmonary contusion:
Caused by trauma, blunt injury

Inhalation injury:
CO inhalation = chemical pneumonitis,
Inhalation to flames of burn

Reperfusion pulmonary edema:
Seen usually when we drain pleural effusion that has been there for long time or drain too much fluid at the same time, so the lung that has just expanded is reperfused-->increasing alveolar capillaries permeability(ARDS cause)

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Done By: Mays Qashou 😊