

Physiological Process Of Pneumonia Disease

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Causes for the development of pneumonia are intrinsic and extrinsic. Extrinsic factors include exposure to the causative agents and pulmonary injury. Whereas intrinsic are related to the host. Bacteria from the upper airways spread into the lung's parenchyma, thereby invading delicate lung tissues. As a result, air sacs become inflamed, causing coughs, fever, chills, and breathing problems in the host. Because of this, patient immunity is minimized, disabling the system to fight diseases like HIV. This is why most of the HIV Positive die of pneumonia.

Pneumonia develops in the human system once neutrophils from capillaries find their way into the lung's air sacs. This leads to the formation of a neutrophil pool, which in turn kills microbes using the reactive oxygen species and antimicrobial proteins. This produces chromatin meshwork, which thereafter traps and kills extracellular bacteria known as Neutrophil Extracellular Trap. NET is known as the immune system's first line of defense against infection. It invades pathogens through engulfing and secretion of anti-microbial. Therefore, when it is killed, pathogens' invasion of the host is maximized. (Centers for Disease Control and Prevention, n.d.)

Bacterial pneumonia is the most common and affects adults the most. It is divided according to anatomic or radiological factors, which include lobar (focal pneumonia), mechanism of acquisition, and pathogen present. In adults, however, the main bacteria causing pneumonia is *Streptococcus Pneumonia*. This bacterial pneumonia can be prevented by Prevnar, pneumococcal conjugate vaccines.

VIRAL INFECTION: It plays a role in the acquisition of bacterial infection by causing disruption of respiratory epithelium, which provides an opportunistic environment for the bacteria. Another suggestion supporting this is that viral infection reduces hosting immune defense in the expression of receptors compatible with bacteria, hence the inflammation process. Further, Host Resistance and inflammation responses can dispose of patients to diseases early due to reduced neutrophils quantity, deficit neutrophils quality, and lack of complement and deficiencies of immune globin.

Symptoms

Symptoms include Persistent cough at night, Shortness of breath, Chest pain, especially after coughing, loss of appetite, and tiredness. Cough, accompanied by the production of sputum, is considered the bacterial MOST symptom. If caused by *Streptococcus pneumonia*, the sputum is rust-colored; if caused by *Pseudomonas*, it appears green. If it's anaerobic, the sputum produces a foul smell. Furthermore, Physical findings may include dullness to percussion, breathing sounds such as rales, and tracheal deviation, among others.

Risk Factors

General risk factors include Co-infection with H1N1 influenza, which increases the chances of obtaining secondary bacterial pneumonia, lung pathologies, gingivitis, smoking, alteration of the sensorium, or stroke that reduces gag reflex, hence aspiration pneumonia.

The Various Pneumonia Types

Community-acquired pneumonia is developed in an outpatient setting or within 48 hours of admission to the hospital. Institutional-acquired pneumonia includes HCAP AND NHAP. HCAP is that which develops in outpatient. Its risk factors include

- Under care facility for 90 days in the hospital.
- Antibiotics and wound care within 30 days
- Home nursing care and Contact with infected family members due to MDR bacteria

Hospital-acquired pneumonia is that which develops 48 hours after admission. Occurs as a result of increased exposure to MDR organism. Risk Factors are:

- Antibiotic Therapy within 90 days
- Hospitalization is five days or more,
- immunosuppressive disease or therapy,
- High frequency of antibiotic resistance in the local area.

Ventilation-associated pneumonia is a condition that develops more than 48 hours after endotracheal intubation. Its risk factors are those applying to HAP (Hospital Acquired Pneumonia).

Aspiration Pneumonia is the development of infectious infiltrates in the patient experiencing a high risk of or pharyngeal aspiration. It develops after the inhalation of pharyngeal secretions due to poor cough, increased volume of secretions, and impaired immune response, which form its risk factors.

Diagnosis

While pneumonia is a medical diagnosis, a nursing diagnosis Administered to the patient is required since it helps the patient recover beyond treatments. This nursing diagnosis includes

- ineffective airway clearance,
- risk for imbalanced nutrition,
- risk for infection transmission,
- activity intolerance

Nursing Diagnosis One: Deficient Knowledge about the Condition and the Need for Action. This is related to less exposure to information and misinterpretation. It is revealed in the repeated mistakes, requests for information, etc. As a result, expected outcomes include understanding the disease processes and treatment conditions. Nursing intervention can be done first by reviewing normal lung functions, emphasizing the importance of continuing effective cough, provision of written and verbal forms.

Nursing Diagnosis Two: Risk for Deficient Fluid Volume as a result of excessive loss of fluids. The nursing diagnosis's expected outcome is achieving fluid balance. Nursing interventions, in this case, include noting the color of urine, calculation of fluid balance, provision of additional IV fluids, and assessment of mucous membrane moisture.

Third Nursing Diagnosis Includes Pain Acute Or Chronic. This is linked to inflammatory lung parenchyma, and the patient experiences chest pains, headaches, restlessness, etc. Once this nursing diagnosis is made, the pain is expected to disappear or reduce, and the body attains its state of relaxation. For the intervention, one needs to determine the characteristics of pain and teach relaxation techniques that can be used by the patient to control the chest during coughing.

Medication And Treatment

The main drug therapy for pneumonia bacteria is antibiotic treatment. Antibiotics can kill any form of bacteria, though Vaccination can as well kill some bacteria. Antibiotics stop growth or kill bacteria, while Penicillin antibiotics stop or kill specific bacteria, cough medication is used to calm coughing, and Fever Reducers (Aspirin) to reduce fever. Moreover, there are supportive care and other measures as far as treatment is concerned. Supportive care includes (World Health Organization, n.d.) oral rehydration therapy, which involves administering fluid by the mouth to treat dehydration caused by diarrhea. Secondly, Oxygen therapy is done for patients experiencing breathing problems and IV Fluids, which are delivering fluids or medication directly into the vein. Additionally, Treatment always depends on the type and severity of pneumonia, age, and overall health.

Respiratory Support: patients with bronchospasm with infection benefit from inhaled bronchodilators inhalation. If the patient is experiencing mild breathing shortness, supplemental oxygen with a nasal cannula is recommended. However, if Supplemental oxygen seems insufficient, ventilators are used. On the other hand, if it involves Moderate dyspnea where high oxygen concentration is required, the use of a Vento mask, Ventilation, and endotracheal intubation is considered.

Glucocorticoids and Corticosteroids: Community-acquired pneumonia patients can be administered using corticosteroids, which are believed to reduce hospitalization time by one day and result in a 5% reduction in risk and mechanical ventilation. Moreover, it is believed that patients with severe pneumonia who used corticosteroids had a mortality advantage over the severe patients who never used this at all. Glucocorticoids reduce pulmonary inflammation; still, it is believed that

glucocorticoids can impair the immune system.

Moreover, Macrolide is known as the best medication for Community-Acquired Pneumonia. It binds to ribosomes and carries mutations that alter macrolide binding, hence rendering it bacteria-resistant. Nevertheless, the Use of macrolides is linked to various serious side effects, which include allergic reactions and cholestasis hepatitis. It has a drug interaction and thereby can affect the heart. Other minor effects include nausea, diarrhea, vomiting, and gastrointestinal upset. To determine inpatient care and mortality, one is advised to use the pneumonia severity index PSI. PSI, however, does overestimate mortality in the higher-risk patient.

Patient Education: Patients should be encouraged and warned against smoking and avoid taking alcohol, and patients at risk should be immunized from influenza and pneumococcal. One should seek early vaccination so as to prevent pneumonia. Prevention for pneumonia is better than its Cure.

References

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