

FREQUENCY AND CLINICAL COURSE OF RESPIRATORY COMPLICATIONS IN ADULT PATIENTS WITH MEASLES

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Abstract: Measles remains one of the most contagious viral diseases worldwide despite the availability of effective vaccination programs. In recent years, outbreaks of measles have been increasingly reported among adults, where the disease is often associated with a more severe clinical course and a higher incidence of complications. Respiratory complications are among the most common and clinically significant consequences of measles infection in adults. These complications include pneumonia, bronchitis, laryngotracheitis, and acute respiratory distress syndrome (ARDS), which may substantially increase morbidity and mortality. The present article reviews the frequency, pathogenesis, clinical manifestations, laboratory characteristics, and outcomes of respiratory complications in adult patients with measles. Particular attention is given to the role of measles-induced immunosuppression in the development of secondary bacterial infections and severe pulmonary involvement. Early diagnosis and timely treatment of respiratory complications are essential for improving patient outcomes and reducing the burden of measles-related morbidity.

Keywords: measles, adults, respiratory complications, pneumonia, bronchitis, laryngotracheitis, immunosuppression, pulmonary infection.

Introduction

Measles is an acute viral infection caused by the measles virus, a member of the genus Morbillivirus within the family Paramyxoviridae. Although widespread immunization programs have significantly reduced the global burden of the disease, measles continues to pose a serious public health challenge in many countries. Recent declines in vaccination coverage have contributed to periodic outbreaks, particularly among adolescents and adults.

Adult measles is generally characterized by a more severe clinical presentation compared to childhood infection. Complications occur more frequently and are often associated with prolonged hospitalization and increased mortality. Among these complications, respiratory disorders represent the leading cause of severe illness and death. Pulmonary involvement may result directly from viral replication in respiratory tissues or indirectly through secondary bacterial infections facilitated by transient immune suppression.

Understanding the frequency and clinical course of respiratory complications in adult measles patients is essential for optimizing diagnostic and therapeutic strategies.

Main Part

Epidemiology of Respiratory Complications in Adult Measles

Respiratory complications are reported in approximately 20–50% of hospitalized adult measles patients, depending on population characteristics, vaccination status, and access to healthcare. Pneumonia is considered the most common severe complication and remains the primary cause of measles-associated mortality.

Several factors increase the risk of respiratory complications:

- Absence of prior vaccination;
- Advanced age;
- Chronic pulmonary diseases;
- Smoking;
- Malnutrition;
- Immunodeficiency conditions;
- Delayed diagnosis and treatment.

Studies have shown that adults are more likely than children to develop lower respiratory tract involvement, leading to longer recovery periods and a higher risk of intensive care admission.

Pathogenesis of Respiratory Complications

The measles virus initially infects epithelial cells of the upper respiratory tract and subsequently spreads through the bloodstream to multiple organs. Viral replication within respiratory tissues causes direct epithelial damage and disruption of mucosal barriers.

Respiratory complications may develop through two principal mechanisms:

1. Direct viral injury to the respiratory system;
2. Secondary bacterial superinfection.

These mechanisms frequently coexist, producing severe pulmonary inflammation and respiratory dysfunction.

Pneumonia: The Most Frequent Respiratory Complication

Viral Pneumonia

Primary viral pneumonia develops due to direct invasion of lung tissue by the measles virus. It is often observed in immunocompromised individuals and may occur during the acute phase of infection.

Clinical manifestations include:

- Persistent high fever;
- Severe cough;
- Progressive dyspnea;
- Tachypnea;
- Cyanosis;
- Hypoxemia.

Radiological examination typically reveals diffuse interstitial infiltrates affecting both lungs.

Secondary Bacterial Pneumonia

Secondary bacterial pneumonia commonly develops several days after the onset of the rash. The most frequently isolated pathogens include:

- Streptococcus pneumoniae;
- Staphylococcus aureus;
- Haemophilus influenzae;
- Klebsiella pneumoniae.

Patients usually present with:

- Recurrent fever after initial improvement;
- Productive cough;
- Purulent sputum;
- Chest pain;
- Worsening respiratory symptoms.

Laboratory findings often demonstrate leukocytosis and elevated inflammatory markers.

Acute Bronchitis

Bronchitis is a common respiratory manifestation among adults with measles. Inflammation of the bronchial mucosa results in:

- Persistent dry or productive cough;
- Retrosternal discomfort;
- Wheezing;
- Increased sputum production.

Although generally less severe than pneumonia, bronchitis can significantly prolong recovery and predispose patients to lower respiratory tract infections.

Laryngotracheitis

Laryngotracheitis develops due to inflammation of the laryngeal and tracheal mucosa. Adult patients may experience:

- Hoarseness;
- Barking cough;
- Sore throat;
- Inspiratory stridor.

Severe cases can lead to upper airway obstruction requiring emergency intervention.

Acute Respiratory Distress Syndrome

Acute respiratory distress syndrome (ARDS) represents one of the most severe respiratory complications associated with measles. It is characterized by widespread alveolar injury, severe hypoxemia, and respiratory failure.

Clinical signs include:

- Rapidly progressive dyspnea;
- Severe oxygen desaturation;
- Bilateral pulmonary infiltrates;
- Need for mechanical ventilation.

Mortality rates among patients with measles-associated ARDS remain high despite advances in intensive care management.

Clinical Characteristics

Respiratory complications in adult measles patients are typically associated with the following symptoms:

- High-grade fever;
- Persistent cough;
- Dyspnea;

Physical examination frequently reveals:

- Fine crackles;
- Coarse crackles;
- Bronchial breath sounds;
- Diminished air entry in affected lung regions.

The severity of respiratory manifestations often correlates with the extent of pulmonary involvement and the patient's immune status.

Laboratory Findings

Laboratory evaluation plays an important role in assessing disease severity.

Common findings include:

Complete Blood Count

- Leukopenia during the early viral phase;
- Lymphopenia;
- Elevated erythrocyte sedimentation rate (ESR);
- Leukocytosis in cases of secondary bacterial infection.

Inflammatory Markers

- Elevated C-reactive protein (CRP);
- Increased procalcitonin levels;
- Elevated fibrinogen concentration.

Arterial Blood Gas Analysis

Severe respiratory involvement may lead to:

- Hypoxemia;
- Respiratory alkalosis;
- Reduced oxygen saturation.

Radiological Findings

Chest radiography remains the primary imaging modality.

Typical findings include:

- Interstitial infiltrates;

- Patchy consolidations;
- Bilateral pulmonary involvement;
- Lobar infiltrates in bacterial pneumonia.

Computed tomography (CT) may demonstrate:

- Ground-glass opacities;
- Alveolar consolidation;
- Diffuse inflammatory changes.

CT imaging is particularly useful in identifying early pulmonary lesions and assessing disease severity.

Treatment and Prognosis

Management of respiratory complications includes:

- Supportive therapy;
- Oxygen supplementation;
- Adequate hydration;
- Antipyretic treatment;
- Antibiotic therapy when bacterial infection is suspected;
- Mechanical ventilation in severe respiratory failure.

The prognosis largely depends on early diagnosis, prompt treatment, and the presence of comorbid conditions. Most patients recover completely; however, severe pneumonia and ARDS may result in prolonged hospitalization or death.

Prevention

Vaccination remains the most effective strategy for preventing measles and its respiratory complications.

Preventive measures include:

- Administration of two doses of measles-containing vaccine;
- Early recognition of measles cases;
- Isolation of infected individuals;
- Monitoring high-risk adult populations;
- Public health education regarding vaccination.

Conclusion

Respiratory complications are among the most frequent and clinically significant consequences of measles infection in adult patients. Pneumonia, bronchitis, laryngotracheitis, and acute respiratory distress syndrome contribute substantially to disease severity and mortality. Measles-induced immunosuppression plays a central role in the development of pulmonary complications, particularly secondary bacterial pneumonia. Clinical manifestations are characterized by fever, cough, dyspnea, and laboratory evidence of systemic inflammation. Early diagnosis, appropriate respiratory support, and timely antimicrobial therapy are essential for improving outcomes. Widespread vaccination remains the cornerstone of measles prevention and the most effective measure for reducing respiratory complications in adults.

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