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Mycoplasma Pneumoniae: Characteristics, Conditions, Pathogenesis

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Abstract

Mycoplasma pneumoniae is the primary bacterium of the genus Mycoplasma. This species is responsible for causing more than 2 million infections each year in the United States. While infectious mycoplasma pneumoniae is a highly contagious disease, only 3 to 10% of infected people develop symptoms according to bronchopneumonia. However, in most cases it presents with mild clinical manifestations such as pharyngitis, trichomoniasis, bronchiolitis, and croup, while others are asymptomatic. Infection with this bacterium can occur throughout the year, but is most common in late autumn and winter. The infection can appear at any age, but the most sensitive age groups are children over 5 years old, adolescents and young adults. For reasons that are still unknown, children under 3 years of age have an increased risk of respiratory infections, while older children and adults are more likely to get pneumonia.

Key Words: Mycoplasma Pneumoniae, Characteristics, Conditions, Pathogenesis

Introduction:

The strains of mycoplasma pneumoniae are antigenically identical, meaning that only one serotype is known to reproduce by binary phase.

The only known human resource in this species. It is usually isolated from the respiratory tract and its presence is considered pathological.

Nutritional and biochemical properties

This is an essential aerobic microorganism. It promotes culture media including sterols, purines and pyramidines. In vitro, their retention time is very slow, between 4 and 21 days.

From a biochemical point of view, Mycoplasmas ferment glucose with product formulation at the end of pneumonia acid. It does not use arginine and does not break down urea. It has a maximum pH of 6.5 to 7.5.

Classification

Domain: Bacteria

Film: Format.

Class: Mollicutes.

Order: Mycoplasmatiles.

Family: Mycoplasmatosis.

Genus: Mycoplasma.

Species: Pneumonia.

Morphology

Mycoplasma pneumoniae is one of the smallest microorganisms capable of living and regenerating cells. Its size is (150 to 200 nm).

The properties of this bacterium are due to the absence of a cell wall, limited by a triangular membrane that provides elasticity and polymorphic potential, meaning that it can take on a variety of forms.

The absence of a wall means that these microorganisms cannot be stained with gram stains.

They have a much smaller DNA genome (0.58 to 2.20Mb) than other bacteria, with a 4.64Mb genome.

The colonies of Mycoplasma pneumoniae have a granular surface with a dense center, usually buried in agar (in the form of inverted fried eggs).

Wireless element

Mycoplasma pneumoniae is a protein associated with a 169 KDA membrane called P1, which has an adenosine function. It is attached to the adhesive complex oligosaccharides containing sulfuric acid and is found in the pure part of the cells of the bronchial epithelium.

Addison affects the celery process and initiates a process that leads to the destruction of the mucosa and subsequently the inflammatory response and secretion of the excretory system.

Inflammation is characterized by the presence of lymphocytes, plasma cells, and macrophages that can penetrate and thicken the walls of the bronchioles and alveoli.

M. pneumoniae, on the other hand, produce hydrogen peroxide locally, which has a cytopathic effect on the respiratory tract and cilia epithelium, responsible for persistent cough.

No endotoxins or ecotoxins have been found in this species.

Pathogenesis and clinical manifestations of pneumonia

Mycoplasma pneumoniae is spread from person to person through the aerosol of the infected respiratory fluid. Because the transmission shed is attached to the cells, the saliva droplets should be large enough to spread.

The incubation period is long. It varies between two to three weeks.

Pathogen

Infection follows microorganisms with receptors on the surface of epithelial cells or on the cells and microvilli of the cells of the bronchial epithelium and stays on the surface, causing cell excretion and inflammation.

Because the disease is more severe in adults, it is thought that there are clinical manifestations and complications due to the exaggerated immune response to the organism.

The production of a modulated cytokine and lymphocyte activation can minimize the disease, but if it is exaggerated, the disease is exacerbated by the development of immune lesions.

That is, cell-mediated immune response and cytokine stimulation are just as dynamic, clinical disease, and lung injury are just as severe.

On the other hand, immunopathogenic factors may be involved in a number of additional pulmonary complications, leading to cross-reactivity between human antigens and microorganisms.

Medical explanations

wetIt can affect the upper or lower respiratory tract, or both. Symptoms usually appear slowly, over a period of days, and may persist for weeks or months.

During the day and night, the infection is characterized by a false onset, fever, headache, sore throat, hoarseness and persistent cough (tracheo bronchitis).

The cough is premature and dry, with minimal production of saliva, which may later become macropolant and very rarely contain blood.

The infection affects the trachea, bronchi, bronchioles, and peribronchial tissue and can spread to the alveoli and alveolar walls.

In uncomplicated cases, the period of severe Fabril lasts for about a week, while coughing and lethargy can last for two weeks or more.

Children under the age of five have a higher risk of chorea and wheezing.

Chest x-ray

Chest radiographs show a monoclastic cell infiltration around the bronchi and bronchi. However, radiographic patterns can vary widely. They may show peri-bronchial pneumonia, atherosclerosis, nodular infiltration and Hiller lymphadenopathy.

In 25% of cases, there may be minor fluctuations.

In general, the infection is usually severe in patients with immunosuppressed, scale cell or Down syndrome, because it is not the latter.

Pulmonary complications

Complications are rare, some of them are:

Plurites,

Pneumothorax,

Shortness of breath syndrome,

Lung abscess

On the other hand, Mycoplasma pneumoniae can exacerbate other lung diseases such as asthma and chronic lung disease.

Extraordinary complications

The extrapulmonary complications are described as follows:

Skin conditions: acute erythema multiforme, erythema nodosum, maculopapular or urinary eruptions, Stevens-Johnson syndrome, toxic epidermal necrolysis, and pityriasis pink.

Peripheral vasospasm: Renaud's tendency

Hemolytic anemia and jaundice: hemolytic antibodies, caused by paraximal cold hemoglobinia.

Cardiovascular disorders: pericarditis, myocarditis.

Involvement of the central nervous system: encephalitis, myelitis, meningoencephalitis, neuropathy, motor deficits, Gillian Berry syndrome.

Joint involvement: myalgia, arthralgia, arthritis.

Eye Disorders: Inflammation of the papilla, atrophy of the optic nerve, retinal exudation and hemorrhage.

Kidney disorders (these are rare) are: membranoproliferative glomerulonephritis, nephrotic syndrome, transient massive proteinuria, severe intraestral nephritis, acute renal failure, hemolytic uremic syndrome, isolated hematuria, cystitis or urethritis.

Infectious Mycoplasma Pneumonia In Immune Patients

In the case of individuals and / or individuals with cellular immunodeficiency, they are more likely to develop severe disease due to this microorganism.

Patients with hypogammaglobulinemia usually present with severe upper and lower airway symptoms, with little or no infiltration of the chest radiograph, which is accompanied by complications such as rash, joint pain, and arthritis.

Mycoplasma pneumoniae can cause severe illness in HIV-positive patients who have depressed cellular immunity.

It is important to note that pneumonia is a rare disease that can be spread by infection but can occur in these patients.

Appraisal

Microorganisms are able to recover in cultures during and after the disease in the incubation stage, even in the presence of specific antibodies.

Mycoplasma pneumoniae they grow in special media such as PPLO (Pluru pneumoniae like organism) at 96 ° C for 96 hours to 96 hours or more.

However, because culture is so slow and salivary gland stains do not help, it is diagnosed primarily by serological methods or by conventional or real-time molecular biological tests (PCR).

At the serological level, determination of specific IgG and IgM antibodies is available.

Further M. pneumoniae colds stimulate the formation of aglutinins, rheumatoid antibodies that increase human erythrocytes. These antibodies help diagnose when they grow into instability.

Treatment

Early symptoms usually resolve within 3 to 10 days without antimicrobial treatment, while recovery from radiological abnormalities is usually slow (3 to 4 weeks or more).

However, fatal events are rare, that is to say, their evolution is usually benign and self-limiting. However, with proper treatment, its improvement can be accelerated.

However, although the treatment improves the signs and symptoms of the infection, the microorganism cannot be eliminated by inhalation, as it has become possible to isolate Mycoplasma pneumoniae 4 months after recovery from infection despite this appropriate treatment. Explain recurrence and recurrence.

All mycoplasmas are naturally resistant to beta-lactams and glycopeptides, as they do not have a cell wall. Target site of these antibiotics.

Sulfonamides, trimethoprim, polymexins, nalidixic acid, and rifampicin are also inactive.

Mycoplasma pneumoniae is sensitive to antibiotics that interfere with protein or DNA synthesis, such as tetracycline, macrolides, and some quinone.

Of the macrolides, azithromycin is the most usefulBecause it has fewer side effects.

Prevention and control

Immunity to mycoplasma is temporary, which is why it has not been possible to develop a vaccine, and as a result, recurrence occurs.

As a precautionary measure, patient isolation and biological protection

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