Respiratory Syncytial Virus (RSV)

By Jamie Meier

Transmission

RSV spreads through direct contact, droplet, and fomite transmission. The virus can survive on inanimate objects for several hours.\(^1\)\(^2\)\(^3\)

Reservoirs

Humans are the reservoir for RSV. An RSV infected individual is generally contagious for 3-8 days, but in rare cases can shed virus for up to 4 weeks.\(^2\)

Although individuals of any age can be infected, RSV frequently occurs in young children. Most individuals will acquire RSV before age two.\(^2\) In recent years the virus has been recognized as an emerging problem in elderly patients as it spreads easily in care facilities and can cause severe complications.\(^3\)\(^2\)

General Characteristics of MO

RSV is an enveloped, single-stranded RNA virus. It is classified in the *Paramyxoviridae* family, *Pneumovirus* subfamily. Like other members of the order Mononegavirales, the virus can cause syncytia formation.\(^4\)

RSV has two strains, A and B, which circulate simultaneously. The virus enters the upper respiratory tract and may spread to the lower respiratory tract by aspirating nasal secretions, migration of macrophages, or the formation of syncytium (fused epithelial cells).\(^4\)

Key Tests for Identification

RSV can be detected through multiple methods: antigen detection, serology, molecular detection, and cell culture.\(^5\) The CDC recommends RT-PCR testing for adults as their overall viral load may be lower. Antigen testing via ELISA or immunofluorescence is appropriate for children.\(^2\)

Signs and Symptoms of Disease

RSV affects the upper respiratory tract. In healthy individuals, the symptoms mimic the common cold. Symptoms include runny nose, cough, sneezing, and fever.\(^2\) Symptoms generally begin 4-6 days after infection and can last approximately one week.\(^2\)\(^6\)

Most individuals experience only mild symptoms. However, the very young, very old, and immunocompromised can experience severe infections and complications.\(^6\) Severe infections can lead to lower respiratory disease including bronchiolitis and pneumonia.\(^2\)
Virulence Factors

Several envelope proteins enhance RSV's ability to invade host cells. G glycoprotein has a mucin-like structure that is thought to help the virus evade host defenses. F protein assists with penetration of the host cell and formation of syncytia.\(^7\)

Two accessory proteins, NS1 and NS2 are thought to modulate host's immune response.\(^7\)

Historical Information

RSV was first isolated in 1956 from a chimpanzee who had acquired the human infection.\(^7\)

RSV infection during the first 6 months of life can increase the risk of developing asthma.\(^6\)

Control/Treatment

In healthy children and adults, at-home treatment with fever reducers and fluids is sufficient. However, infants and the elderly may need hospitalization to address breathing issues.

Ribavirin a synthetic nucleoside aerosol is approved to treat children hospitalized with RSV of the lower respiratory tract. Its antiviral mechanism of action is unclear.\(^4\)

Unfortunately, infection with RSV does not confer lifetime immunity. Repeated infections are possible.\(^6\) It is unclear whether short-lived immunity is due to viral evasion or inefficiencies of the host immune response.\(^7\)

Vaccine/Prevention

There is currently no vaccine for RSV. An inactivated, formalin based vaccine was developed in the 1960s. The virus stimulated antibody production; however, the antibodies could not effectively neutralize the virus. Individuals who received the vaccine tended to develop more severe cases of RSV.\(^7\)

The National Institute of Allergy and Infectious Diseases is currently developing a nasal spray vaccine. This method would directly stimulate the respiratory tract and could be less traumatic for young children.\(^8\)

Good hygiene practices such as hand washing, avoiding sick individuals and washing children’s’ toys regularly are recommended.\(^1\)

A prophylactic medicine, palivizumab, is available for premature infants and others with diminished lung or immune function. Palivizumab consists of pooled RSV antibodies and is injected monthly during RSV season. The drug prevents infection by neutralizing the virus.\(^3\)\(^6\)

Local Cases

RSV is not a legally reportable disease in the State of Texas. Of service providers who reported data, there were over 2,000 cases of confirmed RSV from late 2016 to late 2017.\(^8\)
Global Cases

Each year, RSV affects approximately 64 million people worldwide.\(^8\) In 2015 alone, there were an estimated 33.8 million cases of RSV associated lower respiratory tract infections.

References


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