Summer 7-27-2017

Group A Strep (GAS)

Kimberly Hyatt
kimberly.hyatt@otterbein.edu

Follow this and additional works at: https://digitalcommons.otterbein.edu/stu_msn

Part of the Family Practice Nursing Commons

Recommended Citation
https://digitalcommons.otterbein.edu/stu_msn/254

This Project is brought to you for free and open access by the Student Research & Creative Work at Digital Commons @ Otterbein. It has been accepted for inclusion in Master of Science in Nursing (MSN) Student Scholarship by an authorized administrator of Digital Commons @ Otterbein. For more information, please contact shickey@otterbein.edu.
Reason for Study
The virulence factors and activities of this bacterium make it a powerful pathogen that is capable of creating a large disease burden that can affect a family and a nation. Research is revealing genetic and molecular structure of GAS and its interaction with host, susceptibility to a GAS infection. As this research continues, the quest to develop a GAS vaccine looms promising, but pose many challenges. These factors create several research directions for GAS pathogenesis in humans, and several laboratories are working in this regard. To fully understand the infection, it is crucial to find mechanisms that help GAS to escape the immune system.

Virulence Factors
The most common forms of streptococcus are the virulence factors: 
- Highly virulent strains of GAS cause post-streptococcal sequelae: 
  - Infective endocarditis 
  - Rheumatic fever 
  - Viral exanthem
- Cell wall complex and chemically diversified
  - Outermost capsule: hyaluronic acid
  - Structure resembles host

Extracellular components
- Exotoxins: streptolysin O, streptolysin S
- Peptidoglycan, extracellular matrix molecules
- Hyaluronic acid
- Motile, non-motile, non-sporulating

Structure of GAS
The Group A Streptococcus (GAS) belongs to a new group of gram-positive, non-motile, non-sporulating cocci. The species is known for its high prevalence worldwide, with an estimated 700 million infections worldwide annually. GAS bacteria are responsible for more than 700,000 deaths annually, with almost 500,000 deaths occurring globally. The bacteria adhere to host cells and can cause a range of infections, from minor throat infections to serious conditions like rheumatic fever and rheumatic heart disease. GAS bacteria are found in the oral cavity and can spread to other body sites through contact with infected individuals. Infections caused by GAS include pharyngitis, tonsillitis, scarlet fever, and impetigo. GAS is a major cause of throat infections in children, and streptococcal infections can spread through close contact or through airborne droplets.

Pathophysiology and Significance of Pathophysiology
GAS causes a range of diseases, including bacterial infections like pharyngitis, tonsillitis, and scarlet fever, as well as more serious conditions like rheumatic fever and rheumatic heart disease. The bacterium is known for its ability to evade the immune system and to cause persistent infections. GAS is a major cause of throat infections in children, and streptococcal infections can spread through close contact or through airborne droplets.

Pharyngitis
Signs and symptoms include sore throat, fever, lymph node enlargement, and white patches in the throat. The infection is caused by GAS, which is a type of streptococcal bacteria. GAS is a common cause of strep throat, and infections can spread easily through close contact or through airborne droplets.

Rheumatic Fever
GAS can cause rheumatic fever, which can lead to heart damage and inflammation of the heart valves. The global burden of rheumatic fever is estimated to be 246,000 new cases per year, with an additional 500,000 cases of rheumatic heart disease. Prevention and early treatment are crucial to avoid the long-term complications of this disease.

Glocomerulonephritis
GAS infection can lead to glomerulonephritis, a type of kidney inflammation that can result in kidney damage and failure. The infection can cause inflammation of the glomeruli, the filters in the kidneys that remove waste products from the blood.

Conclusion
GAS is an important pathogen responsible for 700+ million infections worldwide annually. The global burden of invasive strep is 1,663,000 new cases, 163,000 deaths each year (Ertem et al., 2015). Quick identification and treatment of GAS prior to infection control, arrest the disease process, and prevent complications. It is important to prevent spread, as GAS can cause major disabilities between humans with close contact; disease spread can be arrested by proper use of antibiotics to treat GAS infections if caught and identified quickly. The effective prevention strategy needs to be developed to prevent the prevalence of GAS infections and assess patients, as it is acceptable, and the GAS group or people is completely immune to GAS. Research on a GAS vaccine would prove valuable, and once developed, the vaccine may help reduce some of the worldwide disease burden of this powerful pathogen.

Select References