INVASIVE GROUP A STREPTOCOCCAL (GAS) DISEASE

Clinical Description:

- A disease caused by the bacterium *Streptococcus pyogenes*, which is often present on the skin and in the throat. Prior to the advent of antimicrobials, morbidity due to GAS infection was common. Virulence of Group A streptococcus has increased since the 1980’s. Invasive GAS is defined by the presence of *S. pyogenes* in areas of the body that are normally sterile (ex. blood, cerebrospinal fluid, or soft tissue).

Sources of Infection and Transmission:

- Humans are the only reservoirs for *Streptococcus pyogenes*.
- Over 10% of invasive GAS cases are nosocomial infections.
- The elderly and young children are at greatest risk for contracting invasive GAS disease due to weaker immunity.
- Group A Streptococcus is spread through direct contact with respiratory secretions of an infected person (*Droplet Precautions required for hospitalized patients*), or through direct contact with an infected wound or sore on the skin (*Contact Precautions required for hospitalized patients*).  
- Those infected with GAS disease are considered contagious 7 days prior to the onset of symptoms and until 24 hours after initiation of antimicrobial therapy.

Incubation Period:

- Pharyngitis - usually 2-5 days/Impetigo - 7-10 days.
- The incubation period for invasive GAS disease is variable.

Symptoms

- Carriers may show no signs of illness or present with only a mild infection such as pharyngitis (strep throat) or impetigo. *However, these conditions are not in themselves Invasive GAS.*
- Invasive GAS may present as:
  - Streptococcal toxic shock syndrome (STSS), which is characterized by hypotension (systolic blood pressure \( \leq 90 \) mmHg in adults or <5th percentile for age for children) and at least two of the following findings:
    - renal impairment (creatinine level \( \geq 177 \) \( \mu \)mol/L for adults)
    - coagulopathy (platelet count \( \leq 100,000/mm^3 \) or disseminated intravascular coagulation)
- liver function abnormality (SGOT [AST], SGPT [ALT], or total bilirubin >2x upper limit of normal)
- adult respiratory distress syndrome (ARDS)
- generalized erythematous macular rash that may desquamate
- Early signs and symptoms may include fever, dizziness, confusion, and a flat red rash over large areas of the body.

- Soft-tissue necrosis, including necrotizing fasciitis, myositis or gangrene
- Early signs and symptoms may include fever, and severe pain, swelling, and/or redness at a recently traumatized site. Pay special attention to areas with abrasions or bruises.

- Meningitis.
- A combination of the above.

**Major Complications:**

- Necrotizing fasciitis and STSS are the least common but most severe forms of invasive GAS diseases with a 45% and 81% case fatality rate respectively.
- GAS disease is significantly associated with several underlying conditions, including HIV infection, heart disease, diabetes, lung disease, and alcohol abuse.

**Diagnosis and Treatment:**

- Diagnosis of invasive GAS disease is confirmed through specimens taken from normally sterile sites (ex. blood or cerebrospinal fluid).
- Many different antibiotics and procedures can be used in the treatment of invasive GAS disease. Some recommendations are:
  - For necrotizing fasciitis: surgical debridement, high-dose intravenous penicillin and Clindamycin.
  - For streptococcal toxic shock syndrome: IV Penicillin, Clindamycin and immune globulin via IV coupled with intensive supportive care.
  - When deciding treatment be aware that macrolide (erythromycin, clarithromycin) resistance, though stable, is of concern in Canada.

**Public Health Measures:**

- There are a number of possible vaccines under development. However, none are yet approved for the prevention of GAS disease in Canada. Varicella vaccination may help to prevent invasive GAS as a complication of chickenpox.
- Upon report of a probable or suspected case, begin aggressive contact tracing and surveillance for further cases.
- Initiate prophylaxis treatment for close contacts. To date, there are no published reports of secondary disease invasive infection among close contacts receiving a 10-day course of post-exposure antibiotic.
prophylaxis. Given their effectiveness in preventing severe disease and the associated low risk of side effects, prophylactic antibiotics should be considered for all contacts of invasive GAS infection regardless of their severity.

- First line antibiotic therapy: First-generation Cephalosporins such as Cephalexin, Cephadroxil, and Cephradine. Penicillin can be considered as an alternate first line antibiotic.

  Example of a common treatment regime:
  Children – Keflex 25-30mg/kg/day (max 500mg/dose) X 10 days
  Adults – Keflex 250mg PO qid x 10 days or 500mg PO bid x 10 days

- Second line antibiotic therapy: Erythromycin, Clarithromycin, and Clindamycin

- Close contacts are defined as those who have spent at least 4hrs/day in the previous 7 days or 20hrs/week with the case. This includes both household and non-household persons who have shared close personal space (ex. shared the same bed) with the case or been in contact with their nasal/oral secretions or open skin lesions.

- Refer to current edition of “Bugs and Drugs”.

### Reporting and Follow-up:

- Probable or confirmed cases of invasive GAS disease must be reported to the Office of the Chief Medical Health Officer (OCMHO) within 24 hours.
- Only confirmed cases of invasive GAS disease are notifiable at the national level.
  - Confirmed means that there has been isolation of group A streptococcus from a normally sterile site.
- Complete the *Communicable Disease Report Form*.

### Public Education: (Key Messages)

- Stress the importance of proper hand washing, disposal of soiled tissues, and cleaning of soiled linen when in proximity to someone with GAS infection.
- Highlight who is at risk for GAS and why (compromised immune system, close contacts, previous infection, etc.)
- Inform on the signs and symptoms associated with GAS disease and what to do in the event that they are present.
- Discuss methods of diagnosis and what treatments are available.

### Epidemiology:

There have been 26 cases of Invasive Streptococcal Group A reported in the NWT since 1989.