Infection prevention and control of Group A Strep (GAS) infection

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ID Forum on GAS and STSS

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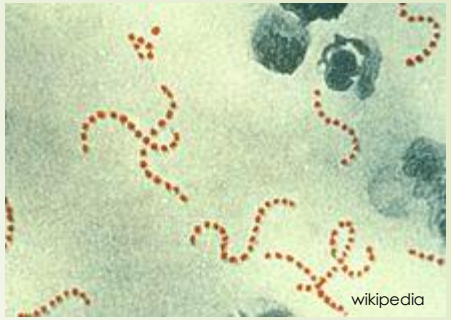
Characteristics of GAS



- GAS cause **variety of clinical manifestations** ranging from asymptomatic carriage to severe or invasive infections (even within the same strain of isolates)
- **Humans are the only reservoir**, companion animals may get infected from humans. Asymptomatic carriage rate in children: up to 20%, in adult: less than 5%
- **Survive on environmental surface** from 2hours to 4 months depending on type of surface, physical conditions, biofilm formation ability
- Susceptible to common **disinfectants** including alcohol, diluted bleach (sodium hypochlorite) solution

Mode of transmission

- Main mode of transmission
  - Direct **contact with secretions** from respiratory tract or wound
  - **Droplet** dispersal when the infected sneeze or cough
  - Environmental surfaces (**fomites**) is believed to be possible
  - Foodborne outbreak reported (potluck luncheon, prisons)
- Isolation precautions:
  - pharyngitis and pneumonia – standard and droplet precautions
  - major wound – standard, droplet, contact precautions
  - invasive infections e.g. STSS – **standard, droplet, contact**
  - Duration: **at least 24 hours** after initiation of effective antibiotic treatment, wound drainage stop or can be **covered**
  - Large discharging necrotizing fasciitis wound: culture negative

Risk factors for invasive GAS (iGAS) infection

iGAS defined as isolation from **sterile body site** with clinical signs of invasive infection

Severe GAS is defined as isolation from non-sterile body site with clinical signs of invasive infection

Risk factors

- Older persons (Age >75 years)
- Pregnancy at 37 or more weeks gestation
- Post partum women and neonate (up to 28 days after delivery)
- Chronic medical illness e.g. Diabetes mellitus
- Immunocompromised state e.g. malignancy, HIV infection, systemic steroid
- Presence of wounds, recent surgery, burns
- Concurrent viral infection e.g. varicella, influenza, measles
- IVDU, homelessness (sharing of needles, poor hygiene, ectoparasites)

Settings in which iGAS outbreaks reported in literature

- Nosocomial (Surgical, Obstetrics, Burns unit)
- Long-term care facilities
- Home healthcare services
- Primary school, kindergartens, child care centres (Scarlet fever)
- Household
- Others: homeless people in the community, prisons

iGAS cases occurring within 30 days from date of diagnosis of index case are considered epidemiologically linked and warrant further investigations

Nosocomial GAS transmissions

- Most commonly reported as **post surgical, post partum**, and **burns** unit
- Range from wound infection and cellulitis to bacteremia, necrotizing soft tissue infections, streptococcal toxic shock syndrome
- In general, **single** case should prompt investigations if hospital acquired
- **Chart reviews, laboratory records, retrospective case findings and prospective surveillance**, saving isolates in lab for at least 6 months
- Patients in the ward may be **offered screening** to determine carriage status. Targeted **chemoprophylaxis** can be offered to those positive.
- Screening of HCW can be considered in step wise approach (start with those providing direct patient care e.g. PV exams in post partum cases, episiotomy wound care, and staff who are symptomatic. Sites of specimen: throat, skin lesion and hands)

Nosocomial GAS transmission (2)

- Patient to HCW, HCW to patient, patient-to-patient transmission have all been reported
- Surgeons, nurses, anesthetists, midwives, wound care teams
- **Patient to HCW** attributed to: gross contamination of surgical attire during extensive wound debridement, presence of dermatitis, not using gloves when providing wound care, sharps injury
- Outbreaks in patients cared by same HCW carrying the same strain in throat or other sites have been reported, controlled after exclude HCW from work
- If documented to carry outbreak strain, HCW should stop work **at least 24 hours** after initiation of effective antibiotic treatment, and until **symptoms resolved** if symptomatic. Wound should stop drainage or can be adequately covered.
- If **persistent carriage**, review ST results, compliance in taking antibiotic, household members having pharyngitis or other GAS infections

Nosocomial GAS transmission (3)

- Infection control measures
  - **Hand hygiene**
    - Adequate hand washing facilities with soap and water, disposable paper towel
    - Alcohol-based hand rubs
  - **PPE** including gloves, gown, mask and face protection
  - Environmental **cleaning**
  - Dedicated **equipment** or proper disinfection between uses
    - communal items e.g. baths, bidet, handheld shower
  - Safe injection practices including proper use of **multidose vials** if necessary
  - **Sharps** injury prevention

Nosocomial GAS transmission (4)

- Infection control measures (cont'd)
  - **Standard precautions** and **Transmission-based precautions**
  - Proper **isolation** or cohorting
  - **Separation** from immunocompromised patients
  - Good indoor **ventilation**
  - Other measures e.g.
    - 4% Chlorhexidine (or octenidine hydrocholoride) bath
    - Optimise skin and podiatry care
    - Review **wound care** and catheter care procedures
    - Suspension of use of water fountain
    - Change all **curtains** (high contamination rate by same strain in one report)

Post-exposure chemoprophylaxis

- Aim at **eradication** of carriage from throat and other sites in at-risk patients to prevent development of invasive infection or to prevent onward transmission
- Same regimen as treatment for GAS pharyngitis
  - IM benzathine **penicillin** G single dose / Oral penicillin or **amoxicillin** for 10 days (universally susceptible)
  - Beta lactam allergy: oral **azithromycin** for 5 days or **clindamycin** for 10 days (need to check ST as resistance rate is high)
  - Penicillin regimens is proven effective for pharyngeal site only
  - Compliance problem: IM penicillin or single megadose azithromycin
- Given **ASAP** preferably on the same day and not later than 7 days after exposure
- Balance control of outbreak with drug adverse effect, antibiotic resistance if mass prophylaxis is considered

Typing methods

- International guidelines recommend laboratory saving outbreak isolate for at least **6 months** for future reference
- Traditional methods of limited value : **Pulse Field Gel Electrophoresis (PFGE)** and **Multi-locus Sequence Typing (MLST)**
- **M protein gene (emm) types** can be sanger sequenced
  - emm 1, emm 3 are reported to be more virulent, but all emm types should be considered capable of causing invasive infections
- **Whole genome sequencing (WGS)**
  - High discriminatory power
  - Able to differentiate SNPs variations even within same emm type or clonal complex
  - Can serve to confirm whether cases with long interval in between belong to the same cluster and exclude epi-linked cases of the same emm type but do not belong to the same cluster, thereby refining the outbreak control strategy

Long-term care facilities (LTCFs)

- **High burden** reported in Western countries (vulnerable, crowded living conditions)
- May include nursing homes, homes for the elderly population, skilled nursing facilities, geriatric homes, etc.
- Commonly due to **lapses in infection control practices** (hand hygiene, PPE, wound care, isolation), perpetuated by carriage in staff who continue to provide care while symptomatic
- In many reports, **sequencing** results help to inform infection control strategy e.g. distinguish between intra-facility transmission vs. repeated introduction from community
- Stepwise approach: Targeted screening → mass screening → mass prophylaxis
- May need to restrict visiting and stop new admissions if unable to control
- Important to have good communication between facility transfers, and minimize transfer as far as possible
- Home healthcare: unique challenges in this special setting

Schools and childcare centres

- GAS can cause acute **pharyngitis** or **scarlet fever** outbreaks in school age children, most commonly before 8-12 years old
- Targeted screening and prophylaxis is recommended
- Parents should be educated to **watch out for symptoms of GAS**
- Check school for **co-circulation of viral infections** including chickenpox and influenza in which PEP (VZV vaccine, antiviral) may be needed
- Chickenpox should less common since introduction of vaccine in HKCIP

Schools and childcare centres (2)

- Infection control measures
  - **Hand washing** facilities should be adequate
  - **Cover your month** and nose when cough or sneeze, wash hands afterwards
  - Toys and carpets should be properly and regularly **cleaned**
  - Environmental surfaces **disinfection**
  - Consider replace low cost items that are hard to clean e.g. plasticine, pencils
  - Maintain good **ventilation**
  - Hygienic handling of **food**

Household contacts

- Close contacts:
  - Overnight stay with the iGAS index case
  - Pupils in the same dormitory
- Without screening performed, PEP may be given to **high-risk contacts**:
  - Those with risk factors for iGAS infections
- If 2 or more iGAS within the same family occurs within 30 days, the **entire household** should be prescribed PEP

Travel advice for GAS prevention

- Avoid visiting **spas, hot springs and swimming pools** if open wound is present
- **Cover wounds** properly with waterproof dressings
- Stay up to date with **vaccination against viral infections** e.g. influenza, VZV, measles, covid, etc. (No vaccine for GAS infection yet)
- Wear **mask** if there are respiratory symptoms or going to crowded places, especially for those with weakened immunity
- Practice proper **hand hygiene**
- Seek **medical attention** early if develop symptoms, volunteer travel and contact history to healthcare staff

Conclusion

- GAS is spread by contact and droplet route
- It can cause infection with a wide range of disease severity
- Basic infection control practices and hygiene can prevent infection
- Be mindful during travelling and after coming back

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Thank you