INFECTION PREVENTION AND MANAGEMENT GUIDELINE	
Group A Streptococcus (GAS)	
Scope (Staff):	All staff
Scope (Area):	All areas
This document should be read in conjunction with the Disclaimer. **For any uncertainty in the management of an infection prevention and management issue, contact Infection Prevention and Management in hours, or the On-Call Microbiologist out of hours**	

Contents

Introduction

Group A Streptococcus (also called *Streptococcus pyogenes* or GAS) is an organism of particular significance in an obstetric health care setting as it may cause severe, potentially fatal, post-partum sepsis. Exposed neonates are at also at risk of severe sepsis[1].

Invasive GAS infection may arise in a GAS carrier or contact or may be healthcare associated. Contaminated equipment, poor hand hygiene practices and staff carriers have been implicated in some hospital outbreaks. [2, 3, 4, 5] Prompt diagnosis and treatment is imperative as mortality rates for invasive GAS (iGAS) are high: 79% in the presence of septic shock, 48% for bacteraemia cases overall.[6] The implementation of transmission-based precautions to avoid transmission in a healthcare setting is also outlined in this document.

Clinical Presentation and Outcome

- GAS may cause asymptomatic colonisation, minor infections or severe life-threatening infection. GAS may colonise the nasopharynx, vagina, perineum and skin lesions. Up to 25% of the paediatric population and 5% adult population are asymptomatic throat carriers[8, 9] and 28% of healthy patients are vaginal carriers[10]. Common non-invasive clinical manifestations are tonsillitis and cellulitis. Invasive and puerperal GAS infections occur very uncommonly but are important to recognise due their clinical acuity. Invasive GAS is associated with particular strains (*emm* types) of GAS. GAS isolates can be characterised by molecular typing to assist in outbreak management.

Invasive manifestations include:

- puerperal sepsis
- bacteraemia
- pneumonia
- necrotising fasciitis
- streptococcal toxic shock syndrome

Rheumatic fever and glomerulonephritis may be delayed manifestations of infection, most typically in children.

Mode of Transmission

GAS is transmitted by droplet spread of respiratory secretions to nasal and respiratory mucous membranes or open wounds, and by direct contact of non-intact skin with exudates from skin infections or respiratory secretions.

Incubation Period

The incubation period varies according to the clinical illness. It is usually 1-3 days but can be up to 30 days in some cases.

Infectious Period

Cases are infectious from 7 days before the onset of symptoms until 24 hours after initiation of suitable antibiotic treatment.

Patient Management

Adult with Invasive GAS

Women suspected of having iGAS infection should have appropriate specimens taken:

- Throat swab, if sore throat
- Blood Cultures, if clinical evidence severe sepsis
- Wound swabs, if cellulitis/ suspected necrotising fasciitis
- Vaginal swabs, if suspected puerperal sepsis
- Placental culture, if available.

Recommended antibiotic therapy **(See Appendix 1 – For a 1-page summary)**

Suspected or proven severe GAS infections

	Suspected or proven **severe** GAS infections *(sepsis, septic shock, toxic shock syndrome, pneumonia, meningitis, necrotising fasciitis)*
NO penicillin hypersensitivity	benzylpenicillin intravenously (IV) 1.8 g 4-hourly (if requiring ICU support, use 2.4g IV 4-hourly) **PLUS** clindamycin IV 600 mg, 8-hourly for a minimum 72 hours and until organ function has significantly improved **PLUS** If toxic shock syndrome or necrotising fasciitis use: intravenous immunoglobulin (IVIg) 2g/kg IV as a single dose within 72 hours
Immediate non-severe or delayed non-severe hypersensitivity to penicillins	cefazolin 2 g IV 8-hourly; (if requiring ICU support, use 2 g IV 6-hourly) **PLUS** clindamycin IV 600 mg, 8-hourly for a minimum 72 hours and until organ function has significantly improved

	PLUS If toxic shock syndrome or necrotising fasciitis use: intravenous immunoglobulin (IVIg) 2g/kg IV as a single dose within 72 hours
Immediate severe or delayed severe hypersensitivity to penicillins	vancomycin intravenously (see KEMH Adult Medication Monograph: Vancomycin for dosing recommendations, including loading doses) **PLUS** clindamycin IV 600 mg, 8-hourly for a minimum 72 hours and until organ function has significantly improved **PLUS** If toxic shock syndrome or necrotising fasciitis use: intravenous immunoglobulin (IVIg) 2g/kg IV as a single dose within 72 hours

Suspected or proven uncomplicated invasive GAS infections

	Suspected or proven **uncomplicated** invasive GAS infections
NO penicillin hypersensitivity	benzylpenicillin IV 1.8 g 4-hourly
Immediate non-severe or delayed non-severe hypersensitivity to penicillins	cefazolin 2 g IV 8-hourly
Immediate severe or delayed severe hypersensitivity to penicillins	vancomycin intravenously (see KEMH Adult Medication Monograph: Vancomycin for dosing recommendations).

Continuation therapy

Once the patient has clinically improved, switch to oral therapy. Use: amoxicillin 1 g orally, 8-hourly.

For oral continuation therapy for patients **hypersensitive to penicillins**, seek expert advice.

A total treatment duration (empirical + directed) of 7 to 10 days (intravenous + oral) is often adequate.

Mothers with suspected puerperal sepsis require resuscitation if evidence septic shock and prompt institution of antibiotic therapy. See WNHS Adult / Maternal Sepsis Pathway.

Broader spectrum antibiotic regimens, alternative therapies due to allergy or dosage variations may be required. Infections associated with toxic shock syndrome may warrant consideration of immunoglobulin therapy. **Discussion with the on call Clinical Microbiologist for KEMH is strongly advised to appropriately individualise therapy for KEMH patients**. Where patients are managed in locations other than KEMH the usual referral pathways for infectious diseases or microbiology advice should be followed.

See KEMH Sepsis and septic shock: Antibiotics for adult patients at KEMH

Notification of Invasive GAS infection

iGAS is notifiable to the communicable disease directorate by clinicians or microbiologists using the Infectious and Related Diseases Notification Form located at WA Health - Notification of infectious diseases and related conditions.

Treatment of Non-Invasive Gas Infection

Non-invasive GAS infections identified during pregnancy should be treated in order to reduce the risk of iGAS infection. These patients do not require any additional infection control measures. Oral antibiotic therapy is often suitable for less severe infections. Recommended regimens for tonsillitis and skin infections may be viewed on the Therapeutic Guidelines website[13]. Guidelines for treatment of GAS vaginitis are lacking however regimens penicillin V 500 mg four times daily for 10–14 days or 2% clindamycin cream PV for 7–10 days are reported to be efficacious[14]. Neonates born to mothers with localised non- invasive infections which do not involve the placenta or vagina do not require prophylaxis. Contact the on-call Clinical Microbiologist to individualise therapy.

Neonatal Management when Mother is diagnosed with Invasive GAS (iGAS) / puerperal sepsis

Any neonate born to a mother with iGAS/ puerperal sepsis should be considered at high risk of early onset sepsis (consider as “red “category in Sepsis Calculator-Assessment of Early-Onset Sepsis in Infants > 35 weeks

Neonates exposed to maternal iGAS require assessment by the neonatology team, septic screen (including umbilicus swab / swabs of any wounds) and commencement of empiric IV antibiotic therapy with a regimen which includes benzylpenicillin. Clindamycin may be added if required (see Neonatal Medication Protocols for dosing recommendations). Contact the on call Clinical Microbiologist for advice.

Infection Prevention Precautions for Patients with Suspected or Proven Invasive GAS Infection

For patients with suspected or confirmed postpartum sepsis, toxic shock syndrome, bacteraemia or necrotising fasciitis pertaining to iGAS:

- Single room with ensuite for a minimum of 24 hours post initiating antibiotic therapy.[7] Length of isolation will be on instruction from the infection prevention team and may be extended in some situation e.g. in the presence of an extensive wound from necrotising fasciitis.
- Contact Precautions
- Droplet Precautions, if high risk of aerosolisation secretions (e.g. suctioning) or if tending infected wounds of a patient with necrotising fasciitis
- 2 step cleaning product (Clinell/Chloradet) daily and discharge.

See below for contact management of the newborn.

Outbreak Investigation

An outbreak is defined as 2 or more cases of culture confirmed symptomatic invasive GAS which are linked in time and place.[7] In addition, if more than one case of iGAS infection with the same strain (emm type) occurs, even if not simultaneous, epidemiologic investigations will be initiated by the Clinical Microbiologist and the Infection Prevention and Management Clinical Nurse Consultants (CNC's).

Healthcare Worker Management

HCW's in direct contact with the patient in the seven (7) days prior to the onset of infection can be a source of transmission. Especially if the:

- HCW present in theatre
- Performing dressing changes
- HCW performing vaginal examinations, episiotomies or present at delivery for maternal cases
- HCW has symptoms of sore throat, skin infection or vaginitis in the week prior to onset in the case[7].

HCW's with an epidemiological link to affected patients at KEMH may be asked to supply screening swabs.

HCW's identified as carriers may be treated with antimicrobials on advice from the on call Clinical Microbiologist and excluded from work. Suitability of carriers to return to work will be assessed by the infection prevention team.

Any staff with an occupational exposure to an invasive GAS strain at KEMH will be assessed for suitability for prophylaxis although it should be noted that this is a controversial area without clear recommendations and will be considered on a case by case basis. Exposures at other hospitals should be managed according to the local infection prevention management policy.

Hospital clusters or suspected outbreaks should be notified to the responsible public health unit (metropolitan CDCD for KEMH).

Contact Management: Neonates, Mothers and Family Contacts

Although a neonate of a mother with iGAS is at high risk of GAS disease and requires careful assessment, separation of mother and baby is not required[9]. UK and now WA guidelines recommend prophylactic antibiotics should be administered to mother and baby if either develops suspected or confirmed invasive GAS disease in the neonatal period (first 28 days of life)[9]. This is due to the recognised high risk of transmission between affected mother-baby pairs. The optimal regimen is unclear. Perth Children's Hospital Medical Prophylaxis guideline provides a number of options.

If clinical illness is present in either mother or baby exposed to an iGAS infection within the last 30 days immediate medical assessment is recommended via a hospital emergency department.

Other immediate family members and staff in contact with infected patients are at increased risk of acquiring iGAS infection, although the overall risk is low. There are no universally accepted guidelines with respect to prophylactic therapy for iGAS contacts, however Therapeutic guidelines: antibiotic (2019) outline some suitable regimens in the chapter on Prevention of invasive Group A Streptococcal Infection . [11,12,13]. See also: Interim guidelines for the public health management of invasive group A streptococcal infections in Western Australia Version 1, 2022

Contact management can be discussed with the on call Clinical Microbiologist. Information should be supplied to contacts regarding symptoms and signs of iGAS disease to be alert for, and when it is necessary to seek medical advice.

Provide the following information sheets:

Group A Streptococcus (GAS) Fact Sheet for Adult Contacts

Group A Streptococcus (GAS) Fact Sheet for Neonatal Contacts

Appendix 1: **GAS Recommended Antibiotic Therapy**

Suspected or proven severe GAS infections ***(sepsis, septic shock, toxic shock syndrome, pneumonia, meningitis, necrotising fasciitis)***	
NO penicillin hypersensitivity	benzylpenicillin intravenously (IV) 1.8 g 4-hourly (if requiring ICU support, use 2.4g IV 4-hourly) **PLUS** clindamycin IV 600 mg, 8-hourly for a minimum 72 hours and until organ function has significantly improved **PLUS** If toxic shock syndrome or necrotising fasciitis use: intravenous immunoglobulin (IVIg) 2g/kg IV as a single dose within 72 hours
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Suspected or proven uncomplicated invasive GAS infections	
NO penicillin hypersensitivity	benzylpenicillin IV 1.8 g 4-hourly
Immediate non-severe or delayed non-severe hypersensitivity to penicillins	cefazolin 2 g IV 8-hourly
Immediate severe or delayed severe hypersensitivity to penicillins	vancomycin intravenously (see KEMH Adult Medication Monograph: Vancomycin for dosing recommendations).

Continuation therapy

Once the patient has clinically improved, switch to oral therapy. Use:
amoxicillin 1 g orally, 8-hourly.
For oral continuation therapy for patients **hypersensitive to penicillins**, seek expert advice.

Related policies and resources

1.Miyairi I, Berlingieri D, Protic J, Belko J. Neonatal invasive Group A Streptococcal Disease: case report and review of the literature. Pediatr Infect Dis , 2004; 23: 161-5

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12. Health Protection Agency, Group A Streptococcus Working Group Interim UK guidelines for management of close community contacts of invasive group A streptococcal disease *Communicable Dis Public Health* 2004; **7**(4): 354-61

13: Antibiotic expert group, Therapeutic Guidelines V16. 2019. Directed therapy for bloodstream infection, including sepsis and septic shock: Streptococcus pyogenes bloodstream infections, including toxic shock syndrome. eTG complete [Internet]. Melbourne: Therapeutic Guidelines Limited; 2019 [Amended Aug 22 , accessed13/10/22].

14. Verstraelen H, Verhelst R, Veneechoutte, Temmerman M. Group A streptococcal vaginitis: an unrecognised cause of vaginal symptoms in young women. Arch Gynaecology Obstetrics 2011:284(1):95-98

Related WNHS policies, procedures and guidelines

Adult Medication Monograph: Benzylpenicillin

Adult Medication Monograph: Clindamycin

Adult Medication Monograph: Vancomycin Oral

Adult Medication Monograph: Vancomycin IV

Hand Hygiene

Health Department Guideline: Interim guidelines for the public health management of invasive group A streptococcal infections in Western Australia Version1 2022

Neonatal Medication Protocols

Neonatal Sepsis Calculator- Assessment of Early-Onset Sepsis in infants > 35 weeks

Outbreak Management

Perth Children's Hospital. Children's Antimicrobial Management Program (ChAMP) Medical Prophylaxis Guideline

Sepsis and septic shock: Antibiotics for adult patients at KEMH

Transmission Based Precautions

WNHS Sepsis Pathway

Keywords:	KEMH, WNHS, iGAS, GAS, Group A Streptococcus, Neonatal contacts, prophylaxis, Post-partum sepsis, Toxic shock syndrome, bacteraemia or necrotising fasciitis, Outbreak investigation, puerperal sepsis, streptococcal toxic shock syndrome, maternal sepsis, Streptococcus pyogenes, Strep pyogenes.		
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