GUIDELINE

Syphilis: Investigation and management of the neonate born to a mother with syphilis

Scope (Staff):	Nursing and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH, NETS WA, KEMH Postnatal Wards

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this disclaimer

Also refer to maternal guideline: Syphilis in pregnancy

Contents

Aim 2
Risk 2
Syphilis in the neonate 2
Early congenital syphilis 3
Late congenital syphilis 3
Risk assessment/management of neonates born to mothers with positive syphilis serology 3
1. No risk neonate 4
2. Low risk neonate 4
3. High risk neonate 6
Interpretation of syphilis investigations in the neonate 7
Breast feeding 8
Notification of congenital syphilis 8
Infection prevention and management 8
Appendix 1: Quick Reference Guide for Neonate at KEMH 11

Aim

To describe the optimal treatment and investigation of neonates at risk of congenital syphilis and ensure notification of congenital syphilis cases to the communicable disease directorate occurs.

Risk

Delayed diagnosis of infants with congenital syphilis can lead to a delay in establishing adequate treatment.

Key points

- Discuss treatment plan with paediatric ID team or KEMH/PCH microbiology team.
- Untreated early syphilis in the mother is highly transmissible to the neonate. There is currently a syphilis outbreak in WA which has resulted in congenital syphilis cases. See Syphilis in pregnancy (WNHS O&G Guideline) which has all the epidemiology information. When infants are born to unscreened women as a result of minimal or no antenatal care the possibility of congenital syphilis should be considered and urgent syphilis testing performed on the mother . The neonate should be tested if clinical concerns or if the mother cannot be tested urgently. See Newborn Care of the Infant Born to a Mother receiving Minimal or No Antenatal Care.
- Probable or confirmed congenital syphilis cases (including stillbirths) are notifiable conditions (link for case definitions and notification procedure).
- Benzylpenicillin IV for 10 days is the recommended treatment for high risk or confirmed cases.
- Low risk infants > 3kg may be administered a precautionary IM Benzathine Penicillin dose.

Syphilis in the neonate

During pregnancy *T. pallidum* can cross the placenta to cause fetal infection. This may occur throughout the course of pregnancy. Spirochaetes are released into the circulation and disseminate to organs, producing an inflammatory response. The risk of vertical transmission increases with gestational age. Pregnancies complicated by untreated maternal syphilis are at increased risk of adverse outcomes such as intrauterine growth restriction, preterm birth, stillbirth, neonatal death and congenital deformities.

Infection can be transmitted to the fetus at any stage of maternal disease. The rate of transmission is 70% during primary and secondary syphilis and decreases with later stages of maternal infection; approximately 40% in early latent infection and 10% in late latent infection.

Treatment of early maternal syphilis at least 30 days before delivery is the most important factor influencing the risk of congenital infection. 70 - 100% of infants born to untreated mothers will be infected compared to 1% - 2% of those born to women adequately treated during pregnancy.

Early congenital syphilis

- Most affected infants are asymptomatic at birth (60-90%). Early congenital syphilis is defined as onset of symptoms before 2 years of age.
- Clinical manifestations vary widely; common presentations include hepatosplenomegaly, pallor, jaundice, rash and mucosal lesions. Persistent rhinitis (snuffles) is often the earliest presenting symptom occurring in up to 40% of affected neonates.
- Generalised lymphadenopathy (especially epitrochlear), non- immune hydrops, eye abnormalities, haematological abnormalities (anaemia, leuococytosis or leucopaenia, thrombocytopaenia), placental and umbilical cord or skeletal abnormalities may also be seen. Skin lesions may contain spirochaetes and can transmit infection.
- A fulminant sepsis picture may also occur.
- **Central Nervous System (CNS)** involvement may be symptomatic or asymptomatic. CSF abnormalities may include raised protein, raised WCC, *T. pallidum* positive PCR or positive VDRL.
- Note, that a blood culture will be negative in congenital syphilis.

Late congenital syphilis

Defined as onset of clinical manifestations after 2 years of age. Manifestations include facial deformities, keratitis, sensorineural hearing loss, dental deformities (for example, Hutchinson teeth, mulberry molars), gummas of the skin and mucous membranes, neurodevelopmental delay**,** hydrocephalus and skeletal deformities (“sabre shins”, arthritis) which may present as pain, pseudoparalysis, or a pathological fracture.

Risk assessment and management of neonates born to mothers with positive syphilis serology

The risk of congenital syphilis should be determined based on:

1. Maternal syphilis testing
2. Clinical suspicion (mother or baby)
3. Maternal treatment history

   Treatment in pregnancy is considered adequate if recommended treatment is completed > 30 days before delivery and there is a four-fold drop in RPR titre (e.g. 1:32 declining to 1:8).

Cases discussed prior to delivery by Public Health, Maternity services, Paediatric Infectious Diseases, and/or Neonatology, may already have a recommended risk assessment with a Neonatal Management Plan available (if so this will be located in the maternal DMR/***neonatal shadow file***. Contact the relevant Public Health Unit, or Paediatric Infectious Diseases for further information.

If a Neonatal Management Plan has **NOT** been generated:

- Maternal syphilis testing and treatment history should be obtained by contacting the relevant Public Health Unit.
- Information regarding maternal syphilis and interpretation of maternal tests (including RPR titre changes following treatment) can be found in the Maternal guideline: Syphilis in pregnancy.
- Neonates born to a mother with positive syphilis serology should have a physical examination, specifically looking for signs and symptoms as listed above (Early Congenital Syphilis)
- Paediatric Infectious Diseases can be contacted to assist in providing a risk assessment, with the above information.

Neonates who are assessed as being at risk of congenital syphilis require further investigations and initiation of treatment. All neonates born to Mothers with positive syphilis serology should be discussed with Paediatric Infectious Diseases and a NMP generated in conjunction with the Infectious Diseases Physician.

Refer to Appendix 1: QRG for managements of no risk, low risk and high risk neonates.

1. No risk neonate: no evidence of maternal infection during current pregnancy

The following criteria must ALL be met:

1. Mother was infected and treated before the pregnancy with an appropriate regimen for the stage of infection
2. Documented 4-fold decline in RPR, or if treated during late latent phase, all titres during pregnancy and delivery are low (no greater than 1:4) and stable.
3. No clinical suspicion of acquisition of syphilis during this pregnancy
4. No clinical suspicion of acquisition of congenital syphilis in the neonate, including normal clinical examination.

Neonates deemed to be at no risk DO NOT require any laboratory investigations, treatment or follow up.

2. Low risk neonate: maternal infection adequately treated during current pregnancy

The following criteria must ALL be met:

1. Mother treated during pregnancy with appropriate penicillin regimen.
2. Treatment completed > 30 days before delivery.
3. Adequate maternal response to treatment as shown by >/= 4- fold drop in RPR in mother or if treated during late latent phase all RPR titres are no greater than 1:4 and stable
4. No suspicion of reinfection
5. No clinical suspicion for congenital syphilis in neonate, including normal clinical examination.
6. RPR of infant is the same or less than the maternal titre at birth.

THESE INFANTS ALL REQUIRE A PHYSICAL EXAMINATION AT BIRTH.

Investigations

- Paired maternal and neonatal serum (do not use cord blood).
- Follow up at 3 and 18 months with for repeat serological testing and clinical exam by GP or paediatrician.
- Inform Communicable Disease Control Directorate and/or relevant public health unit of follow up plan:
  - Contact details for population/public health units
  - Notification of infectious diseases and related conditions
  - CDCD.directorate@health.wa.gov.au

Treatment

Prophylactic IMI Benzathine Benzylpenicllin if ≥ 3kg. This is a precautionary dose as follow up review may be difficult.

For neonates <3kg commence IV Benzylpenicillin and contact the paediatric ID team or KEMH/PCH microbiology team for a treatment plan.

Probable or proven congenital syphilis cases require the 10 day IV Benzylpenicllin regimen as per high risk neonates.

Follow-up

GP or paediatrician or PCH infectious disease team + notify follow up plan to the Communicable Disease Control Directorate (CDCD) during office hours. Contact details for population/public health units. Request to speak to the senior epidemiologist or a medical advisor.

At 3 months, physical examination and serology

- Normal examination, negative EIA and RPR, no further follow up required
- Non-reactive RPR but positive EIA, retest at 15-18 months
- Positive RPR, repeat RPR at 6 months

- Positive RPR at 6 months or positive EIA at 18 months, refer to Paediatric Infectious Diseases for assessment and management as possible treatment failure.

3. High risk neonate: concerns regarding adequate treatment, treatment < 30 days before birth

1. Mother treated less than 30 days of birth
2. Treatment of mother was not adequate (4-fold drop in RPR titre after treatment for early syphilis)
3. Maternal treatment unknown
4. Maternal treatment with a drug other than penicillin
5. Mother's serology at delivery shows previously undiagnosed syphilis
6. Neonate has signs of congenital syphilis
7. High suspicion of active syphilis in the mother pending results of tests

Investigations for high-risk neonate

- Blood tests: FBC, LFTs, and syphilis serology
  - Syphilis serology including RPR and IgM
  - Run "in parallel" with mother's serum collected at delivery.
  - Do not use cord blood.
- If placenta available, send for histopathology and test for *T. pallidum* PCR (placental tissue, not surface swabs)
- In case of skin lesions or nasal secretion test for *T. pallidum* PCR (swab)

The following investigations may be required if there is an increased index of suspicion for congenital syphilis, as determined by clinical and microbiological findings. This should be discussed with Paediatric Infectious Diseases and/or Neonatology:

- CSF examination: microscopy, protein (ref range elevated protein < 1 month of age => 150mg/L, preterm baby.170mg/L), syphilis PCR and syphilis serology (VDRL),
- X-rays of long bones

Treatment

The treatment for neonates at high risk of developing congenital syphilis, and for those with probable or confirmed congenital syphilis, is the same. Whilst there is variation in treatment approaches, in WA the recommendations follow key Australian and United States Sexually Transmitted Infections Treatment CDC guidelines (2021):

- IV Benzylpenicillin **30 mg/kg** (50,000 IU/kg) 12 hourly 0-7 days of life, and 8 hourly 7-28 days of life. ***Note: the 60 mg/kg*** *Benzylpenicillin* ***dose used for GBS and early onset sepsis is also suitable for treatment of syphilis in neonates.***

Follow-up

- Refer to Paediatric Infectious Diseases (ID) for follow-up usually at 3,6, and then 18 months. ID will facilitate any rural follow-up schedule needed.
- Notify the follow up plan to the Communicable Disease Control Directorate during office hours on 9222 0255. Request to speak to the senior epidemiologist or a medical advisor.

If at 6 months

- Physical examination normal, Syphilis serology (EIA) and RPR negative, no further follow-up.
- Non-reactive RPR but positive EIA, retest at 15-18 months.
- Positive RPR (or persisting EIA at 18 months), assess and manage for possible treatment failure, in conjunction with Paediatric Infectious Diseases.
- Neurosyphilis: discuss with PCH Infectious Diseases regarding the need for repeat CSF exam at 6 months.

Refer to Appendix 1: QRG

Interpretation of syphilis investigations in the neonate

Refer to WNHS Syphilis in Pregnancy guideline for more detail. Syphilis serology may be confusing to interpret. Contact the PCH/KEMH microbiology registrar or consultant if assistance in interpretation is needed.

Treponemal tests (EIA IgG and IgM, FTA-Abs), TPPA, TPHA, FTA-Ab

Treponemal EIA IgG in the neonate is reflective of maternal antibody transfer. Maternal IgG antibody should not persist beyond 15-18 months of age. IgM antibody is of neonatal origin (IgM cannot cross the placenta). Presence of neonatal *T. pallidum* IgM is suggestive of congenital syphilis (although not diagnostic in isolation). A negative IgM in the neonate does not exclude congenital infection. In 2024 due to discontinuation of reagents, the TPHA will replace the TPPA test for confirmatory testing.

Non-treponemal tests (RPR, VDRL)

These test antibodies to cardiolipin protein and are a measure of disease activity and response to therapy. Reported as a titre (1:2,1:4 etc). Tests done at PathWest Laboratory Services use the RPR for serum tests and VDRL for any tests on cerebrospinal fluid.

Maternal and infant serology should be obtained at birth and testing run in parallel. An infant RPR >/=4 fold greater than the mother's RPR at delivery should be considered to have congenital syphilis. RPR titres should be negative by 6 months of age in the absence of congenital syphilis.

Polymerase chain reaction (PCR)

Direct detection of *T. pallidium* DNA in placental samples or CSF establishes a diagnosis of congenital syphilis. *T. pallidium* PCR can also be performed from skin lesions, nasal secretions, or nasal swab.

Breast feeding

T. pallidum is not transmitted in breast milk, Breastfeeding is recommended unless there is a chancre present on the breast or axilla.

Notification of congenital syphilis

Syphilis is a notifiable disease. The Communicable Disease Control Directorate can access information about persons who have been notified to the WA Department of Health. Clinicians should contact Communicable Disease Control Directorate during office hours.

- Contact details for population/public health units
- Notification of infectious diseases and related conditions
- CDCD.directorate@health.wa.gov.au

The national case definitions for probable and confirmed congenital syphilis can be obtained from the Communicable Diseases Network of Australia.

Infection prevention and management

Standard precautions are recommended for all patients, including infants with suspected or proven congenital syphilis.

Moist open lesions, secretions, and possibly blood are contagious in all patients with syphilis, gloves should be worn when caring for patients with congenital, primary, and secondary syphilis with skin and mucous membrane lesions.

Infectivity is diminished following 24hr of appropriate treatment. All hospital personnel, who have had close unprotected contact with a patient with early congenital syphilis before identification of the disease or during the first 24 hours of therapy should contact infection prevention.

Related CAHS internal policies, procedures and guidelines
Neonatal Medication Protocol • Benzathine Benzylpenicillin • Benzylpenicillin

WNHS Obstetrics & Gynaecology

- Syphilis in pregnancy

References

1. Australian Government, Department of Health. Pregnancy Care Guidelines: Syphilis. 2019.
2. Australian Therapeutic Guidelines, Antibiotic, Version 16. 2019.
3. CDC Sexually Transmitted Disease Treatment Guidelines. 2021. Available from https://www.cdc.gov/std/treatment-guidelines/congenital-syphilis.htm
4. CDNA Syphilis CDNA National Guidelines for Public Health Units Version 1.1. Canberra: CDNA. 2018.
5. Northern Territory Government, Department of Health: Congenital Syphilis Guidelines for the Northern Territory: Assessment and management of syphilis in pregnancy and the neonatal period. 2015.
6. Palasanthiran P, Starr M, Jones C et al. Management of Perinatal Infections. 3rd Ed Sydney: Australasian Society for Infectious Diseases (ASID). 2023.
7. Queensland Health. Queensland clinical guidelines: Syphilis in pregnancy. 2018.
8. Rac MW, Revell PA, Eppes, CS. Syphilis during pregnancy: A preventable threat to maternal-fetal health. AJOG. 2017. 352-363.
9. Silver Book Guidelines for Managing Sexually Transmitted Infections. Government of Western Australia, Department of Health, Public Health. Accessed 22 Aug 2019.
10. Syphilis in: Red Book 2018-2021 report of the Committee on Infectious Diseases, American Academy of Pediatrics: David W Kimberlin, editor 31st Ed , Elk Grove Village, IL : American Academy of Pediatrics, [2018]
11. Kwak J, Lamprecht C . A review of the guidelines for the evaluation and treatment of congenital syphilis - PubMed (nih.gov) *Pediatr Ann*. 2015;44(5):e108-e114
12. Yang H, Zhang H, Wang C, Pang L. An analysis of the clinical features of children with early congenital Syphilis and Syphilitic Hepatitis. BMC Pediatrics (2021) 21:498

Useful resources (including related forms)

Infectious and Related Diseases Notification Form.

Contact details for public health units (Department of Health)

This document can be made available in alternative formats on request.

Document Owner:	Neonatology		
Reviewer / Team:	Neonatal Coordinating Group / Infectious Diseases		
Date First Issued:	March 2020	Last Reviewed:	Feb 2025
Amendment Dates:		Next Review Date:	Feb 2028
Approved by:	Neonatal Coordinating Group	Date:	25th February 2025
Endorsed by:	Neonatal Coordinating Group		
Standards Applicable:	NSQHS Standards:  Child Safe Standards: 1,10		

Printed or personally saved electronic copies of this document are considered uncontrolled

Healthy kids, healthy communities

Compassion | Excellence | Collaboration | Accountability | Equity | Respect

Neonatology | Community Health | Mental Health | Perth Children's Hospital

Appendix 1: Quick Reference Guide for Neonate at KEMH