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

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

Contents

Aim

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

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.
- 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 Bezathine penicillin dose.
- Follow up is required for at risk neonates.
- Probable or confirmed congenital syphilis cases (including stillbirths) are notifiable conditions (link for case definitions and notification procedure).

Also refer to maternal guideline: Syphilis in pregnancy

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 babies are asymptomatic at birth (60-90%). Early congenital syphilis is defined as onset of symptoms before 2 years of age.

Clinical manifestations can be varied; however persistent rhinitis (snuffles) is often the earliest presenting symptom occurring in up to 40% of affected neonates.

Hepatomegaly, rash, generalised lymphadenopathy (especially epitrochlear, non-immune hydrops, eye abnormalities, haematological abnormalities, placental and umbilical cord or skeletal abnormalities may also be seen. Skin lesions may contain spirochaetes and can transmit infection. 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. A fulminant sepsis picture may also occur.

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, intellectual impairment, hydrocephalus and skeletal deformities ("sabre shins", arthritis).

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

The risk of congenital syphilis should be determined on the basis of the maternal treatment history and the neonatal physical examination. 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 (eg 1:32 declining to 1:8).

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

- All neonates born to a mother with positive syphilis serology should have a physical examination.
- Clinical evidence of syphilis includes: rash, mucosal lesions, nasal discharge, hepatosplenomegaly, bony tenderness, eye lesions sepsis, jaundice.
- Neonates who are assessed as being at risk of congenital syphilis require further investigations and initiation of treatment.

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. Physical examination of the neonate does not raise suspicion of congenital syphilis

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

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. Baby clinically has no signs of congenital syphilis
6. RPR of infant is the same or less than the maternal titre at delivery

Require: 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 relevant public health unit of follow up plan, see Contact details for population/public health units.

Treatment

Prophylactic IMI Benzathine Benzylpenicllin as per Perth Children's Hospital Children's Antimicrobial Programme monograph 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 during office hours on 9222 0255. 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
- *If positive RPR repeat RPR at 6 months
- *positive RPR at 6 months or positive EIA at 18 months, refer to a paediatrician for assessment and management as possible treatment failure

High risk neonate: concerns regarding adequate treatment , treatment < 30 days before delivery

1. Mother treated less than 30 days of delivery
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. Baby has signs of congenital syphilis
7. High suspicion of active syphilis in the mother pending results of tests

Investigations:

- FBE, LFT
- Syphilis serology including RPR (run "in parallel" with mother's serum collected at delivery) and IgM. Do not use cord blood.
- Placenta, histology and *T. pallidum* PCR
- Skin lesions, nasal secretion *T.pallidum* PCR
- CSF examination if required : 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 if required

Treatment:

There is considerable variation in recommendations , NT guidelines suggest the following:

Commence Rx with IV benzylpenicllin 50 mg/kg 12 hourly for 10 days for syphilis.

NB the 60 mg/ kg dose used for Group B Streptococcus and early onset sepsis at KEMH is also suitable for treatment of syphilis in neonates

The Neonatology policy for benzylpenicillin in neonates.

Follow up

- With PCH ID physician or GP or paediatrician at 3,6,18 months
- 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

- *examination normal, Syphilis serology and RPR negative, no further follow up

- *If neurosyphilis: repeat CSF exam at 6 months
- * RPR reactive at 6 months or positive EIA at 18 month refer to PCH infectious diseases department or a paediatrician for assessment and management as possible treatment failure.

Interpretation of syphilis investigations in the neonate

Refer to maternal syphilis guideline for more detail. Syphilis serology may be confusing to interpret. Contact the microbiology registrar or consultant if assistance in interpretation is needed.

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

Non-treponemal tests (RPR, VDRL)

These test antibiodies 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 or nasal secretions.

Breast feeding advice

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 on 9222 0255.

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. Because 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

- Benzylpenicillin

PCH ChAMP Protocol

Benzathine Benzylpenicillin (Benzathine Penicillin G) - Paediatric

WNHS Obstetrics & Gynaecology

- Syphilis in pregnancy

References

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4. CDNA Syphilis CDNA National Guidelines for Public Health Units Version 1.1. Canberra: CDNA. 2018.
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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]

Useful resources (including related forms)

Infectious and Related Diseases Notification Form.

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

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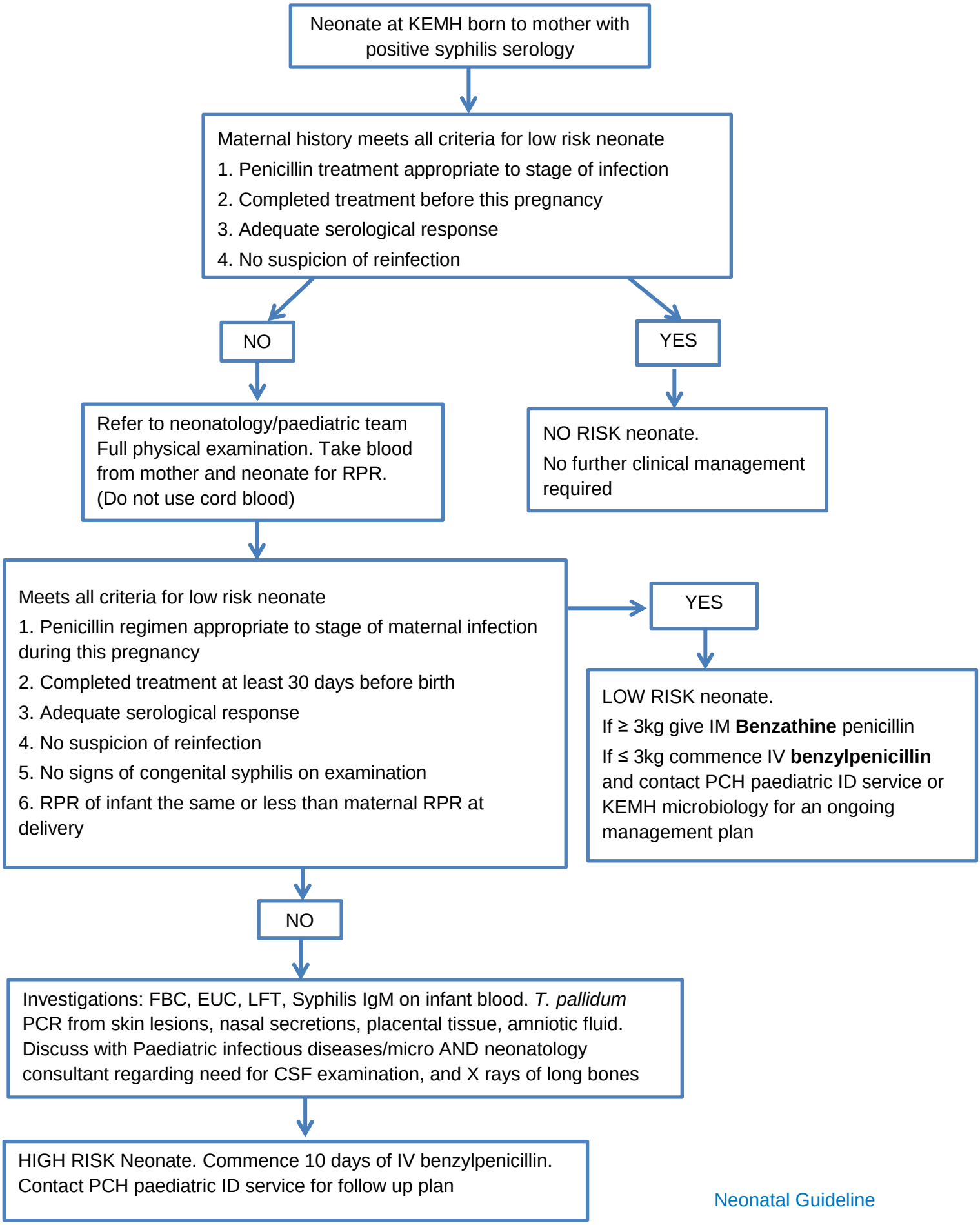
Appendix


Neonate at KEMH born to mother with positive syphilis serology
Maternal history meets all criteria for low risk neonate
1. Penicillin treatment appropriate to stage of infection
2. Completed treatment before this pregnancy
3. Adequate serological response
4. No suspicion of reinfection
NO
YES
Refer to neonatology/paediatric team Full physical examination. Take blood from mother and neonate for RPR. (Do not use cord blood)
NO RISK neonate.
No further clinical management required
Meets all criteria for low risk neonate
1. Penicillin regimen appropriate to stage of maternal infection during this pregnancy
2. Completed treatment at least 30 days before birth
3. Adequate serological response
4. No suspicion of reinfection
5. No signs of congenital syphilis on examination
6. RPR of infant the same or less than maternal RPR at delivery
YES
LOW RISK neonate.
If ≥ 3kg give IM Benzathine penicillin
If ≤ 3kg commence IV benzylpenicillin and contact PCH paediatric ID service or KEMH microbiology for an ongoing management plan
NO
Investigations: FBC, EUC, LFT, Syphilis IgM on infant blood. T. pallidum PCR from skin lesions, nasal secretions, placental tissue, amniotic fluid. Discuss with Paediatric infectious diseases/micro AND neonatology consultant regarding need for CSF examination, and X rays of long bones
HIGH RISK Neonate. Commence 10 days of IV benzylpenicillin. Contact PCH paediatric ID service for follow up plan