Congenital Syphilis: An Emerging Threat to Neonatal Health

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PURPOSE STATEMENT

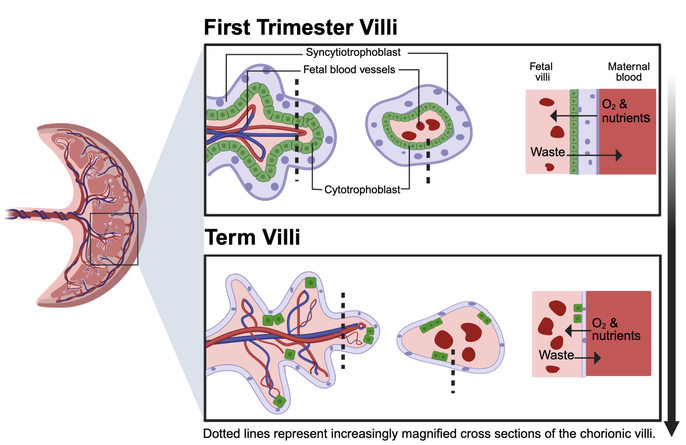
Present a case report of a preterm neonate with congenital syphilis (CS). A review of the pathophysiology, manifestations, diagnostic pathways, and treatment algorithms is also provided.

BACKGROUND

- Syphilis is a sexually transmitted infection caused by the spirochete bacterium *Treponema pallidum.*
- CS occurs when *T. pallidum* is shared from mother to offspring, most often transplacentally during primary or secondary maternal infections.
- The global incidence of CS has risen 740% over the past decade. Most recent epidemiological data show an incidence of ~106 per 100,000 live births in the United States.
- Inadequate prenatal care and treatment are the most significant risk factors for perinatal transmission.

PATHOGENESIS

- *T. pallidum* gains access to the maternal bloodstream via mucous membranes.
- Organism evades immune defenses and crosses placenta with increasing ease as gestation progresses.
- Pathogen is widely disseminated following direct entry to fetal circulation.



Dotted lines represent increasingly magnified cross sections of the chorionic villi.

CASE REPORT

Prenatal

-Nonreactive RPR 1st trimester
-Reactive RPR (1:16) 3rd trimester
-Noncompliant with PCN G
-Fetal cardiac lesions noted

Delivery

-32+3 weeks d/t placental abruption
-Maternal admission RPR reactive (1:16)
-No abnormalities on physical exam

14 Hours of Life

-Reactive neonatal RPR (1:16)
-Transferred to level IV NICU

24 Hours of Life

-Initiation of 10-day course of PCN G 50,000 u/kg IV q12 hours
-Echo: multiple echodensites with reduced LV function

DOL 2

-Radiolucent bands to all long bones on x-ray

DOL 5

-Cerebrospinal fluid studies with nonreactive VDRL

Week 2

-PCN G dosing interval increased to q8 hours on DOL 8
-Ophthalmology exam with no ocular findings of CS

DOL 60

-Repeat RPR reactive (1:2)

Discharge Follow-up

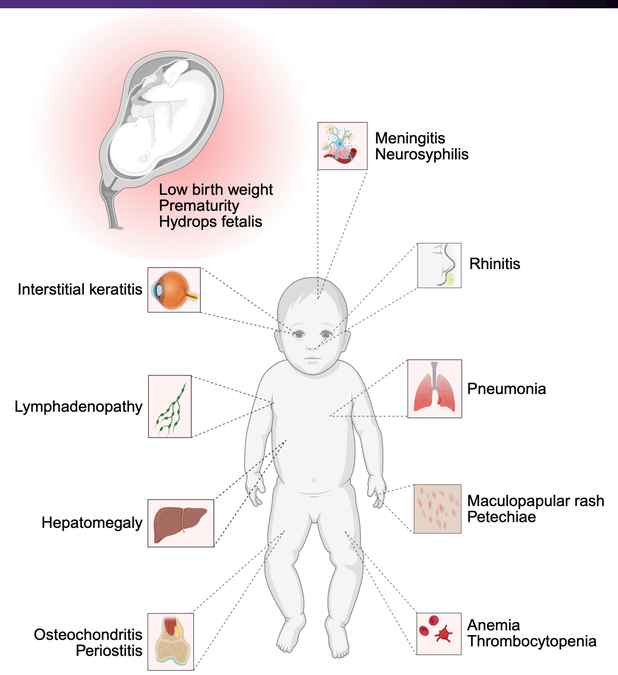
-Repeat infant's RPR testing every 2-3 months until nonreactive

DIAGNOSTICS AND TREATMENT

Risk Categories			
Proven or Highly Probable	**Possible**	**Less Likely**	**Unlikely**
One of the following: ☐ Neonatal VDRL/RPR fourfold or greater than maternal titer at delivery ☐ Microscopic evidence from lesions, bodily fluids, or placental pathology ☐ Abnormal physical examination	All of the following: ☐ Neonatal VDRL/RPR less than fourfold maternal titer at delivery ☐ Normal physical examination ☐ Inadequate maternal treatment [a]	All of the following: ☐ Neonatal VDRL/RPR less than fourfold maternal titer at delivery ☐ Normal physical examination ☐ Adequate maternal treatment during pregnancy without evidence of relapse [b]	All of the following: ☐ Neonatal VDRL/RPR less than fourfold maternal titer at delivery ☐ Normal physical examination ☐ Adequate maternal treatment prior to pregnancy with maintenance of low or negative titers [c]
Diagnostic Evaluation			
Full diagnostic evaluation: ☐ CSF analysis (incl. VDRL, cell count, and protein) ☐ CBC with differential ☐ Long bone radiography ☐ Other testing as clinically indicated [d]	Full diagnostic evaluation: ☐ CSF analysis (incl. VDRL, cell count, and protein) ☐ CBC with differential ☐ Long bone radiography ☐ Other testing as clinically indicated [d]	Full diagnostic evaluation not indicated.	Full diagnostic evaluation not indicated.
First-Line Pharmacologic Treatment			
10-day course of aqueous crystalline penicillin G, 50,000 U/kg, intravenous (IV), every 12 hours through the first week of life, then every 8 hours beyond the first week of life.	10-day course of aqueous crystalline penicillin G, 50,000 U/kg, IV every 12 hours through the first week of life, then every 8 hours beyond the first week of life.	Single dose of penicillin G benzathine, 50,000 U/kg IM.	No treatment indicated if follow-up is certain.

[a] Inadequate maternal treatment: undocumented, initiated less than 30 days prior to delivery, or comprised of a non-penicillin drug. Additional high-risk criteria include the presence of a partner with a recent syphilis diagnosis or mothers with possible reinfection (as evidenced by fourfold or greater increase in nontreponemal titers).
[b] Adequate maternal treatment: initiated at least 30 days prior to delivery and titers without evidence of reinfection.
[c] Low, stable, or serofast titers: VDRL ≤ 1:2 or RPR ≤ 1:4.
[d] Chest radiography, ophthalmic examination, liver function tests, neuroimaging, and auditory brainstem response as clinically indicated.

CLINICAL MANIFESTATIONS



*The majority of infants with CS are asymptomatic at birth. Without treatment, manifestations of early CS appear within the first two years of life.

CLINICAL IMPLICATIONS

- Stay abreast of ACOG guidelines:
  - Testing at the first prenatal visit, 28 weeks, and on admission for delivery for ALL pregnant patients.
- Carefully review maternal records.
- Maintain vigilance.
- Act on suspicion.
- Ensure proper follow-up.
- Advocate for prevention.

CONCLUSION

- CS remains a leading cause of fetal mortality.
- Penicillin G is the sole agent effective against CS.
- Surviving fetuses may remain asymptomatic until hearing loss, dental and facial defects, musculoskeletal deformities, ocular abnormalities, and impaired neurodevelopment manifest in childhood.
- Timely treatment is critical to optimizing long-term outcomes.