

## Postneonatal Screening for Congenital Syphilis

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The incidence of congenital syphilis has recently reached epidemic proportions. With the resurgence of this important clinical entity, currently recommended screening procedures may be inadequate. We describe three cases that highlight the limitations of these screening procedures. All these infants had associated maternal risk factors for congenital syphilis, such as poor prenatal care and illicit drug use. All the infants and mothers were seronegative for syphilis at the time

of birth but the infants became seropositive at 2 months of age. These cases support the need to reexamine current screening policies. In addition to prenatal and at-delivery screenings for congenital syphilis, it may be appropriate to screen infants born to high-risk mothers at 4 to 8 weeks of age.

*Key words.* Syphilis, congenital; postnatal care; reagins. (*J Fam Pract* 1995; 41:286-288)

The District of Columbia has the second highest incidence (183 per 100,000) of primary and secondary syphilis in the United States.<sup>1</sup> The current increase in the incidence of syphilis has been attributed to the association between illicit drug use and sexual promiscuity.<sup>2</sup> The incidence of congenital syphilis parallels the occurrence of primary and secondary syphilis in women.<sup>3</sup> Serologic tests are currently performed on women during pregnancy and at the time of delivery.<sup>3</sup> In principle, the infant is considered free from infection if the mother is seronegative.

### Cases

We have recently seen three infants born at the District of Columbia General Hospital whose mothers were seronegative for syphilis at the time of delivery (Table 1). The infants were seronegative at birth, but became seropositive between 7 and 8 weeks of age. These infants were delivered vaginally at term and were appropriate for gestational age. Infants A and B became symptomatic (ie,

developed a rash), which prompted testing for syphilis. Infant C was referred because the mother tested positive for syphilis during her postnatal follow-up. All three mothers had had poor or no prenatal care and two had used illicit drugs during pregnancy.

### Discussion

Since 1989, when the Centers for Disease Control<sup>3</sup> issued syphilis screening guidelines, several case series of congenital syphilis diagnosed after the newborn period have been reported (Table 2).<sup>4-10</sup> The infants' age at the time of diagnosis ranged from 3 to 15 weeks. A significant number of these infants were seronegative and asymptomatic at birth. Mothers were also seronegative at the time of delivery. Several of these mothers had had poor or no prenatal care, and hence had missed opportunities for testing for syphilis during pregnancy. A history of illicit drug use was common among the reported cases. Congenital syphilis was diagnosed for most of these infants when they presented to the emergency departments and clinics with symptoms.

There were several reasons for not identifying these infants at birth: (1) infants were asymptomatic at birth; (2) there was confusion about the interpretation of the rapid plasma reagin (RPR) test titers, particularly when the mothers' titers were positive and infants' were nega-

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Table 1. Characteristics of Mothers and Infants

Characteristic	Infant A	Infant B	Infant C
<b>Mother</b>			
Prenatal care	Inadequate	Inadequate	Inadequate
Illicit drug use	Yes	Yes	No
<b>Symptoms</b>			
At delivery	None	None	None
7-8 weeks postnatal	None	Rash on palms	None
<b>Serology (RPR)</b>			
At delivery	Negative	Negative	Negative
7-8 weeks postnatal	Not known	Not known	1:256
<b>Infant</b>			
Age at diagnosis	8 weeks	8 weeks	7 weeks
Birthweight, g	3807	3690	3750
Presentation	Rash on face and chest	Stuffy nose, rash	Asymptomatic
<b>Serology</b>			
Cord blood	Negative	Negative	Negative
At 7 to 8 weeks			
RPR	1:128	1:128	1:4
FTA-AB	Positive	Positive	Positive
CSF workup	Negative	Negative	Negative
Treatment	IV penicillin	IV penicillin	IV penicillin

RPR denotes rapid plasma reagin test; FTA-AB, fluorescent treponemal antibody absorbed; CSF, cerebrospinal fluid.

ive; (3) it was difficult to document the adequacy of treatment in mothers who were positive; and (4) it was difficult to obtain the RPR titers prior to discharge for newborns discharged within 1 day of birth. In some instances, titers were truly negative in both the mother and the infant at the time of delivery.

Several reasons can be given for the nonreactivity to RPR tests performed on the mothers and infants at the time of delivery. Mothers might have acquired infection in the last trimester of pregnancy (incubating syphilis). Since it takes several weeks for the mother and baby to mount antibody response to the treponeme, they might have tested negative at the time of delivery.<sup>11,12</sup> Another explanation is that, in primary syphilis, nonreactivity to the nontreponemal test is reported to occur in approximately 25% of cases.<sup>11,12</sup> A negative serological test may

also be the result of a prozone phenomenon, which occurs when an excess of antibodies in a given specimen prevents flocculation<sup>11-13</sup>; when the same specimen is diluted, it will exhibit titers of 1:16 or more. Fewer than 2% of patients with secondary syphilis exhibit this phenomenon.<sup>11-13</sup> Our laboratory does not routinely look for this phenomenon on sera that are negative for syphilis. Routine performance of prozone serum dilutions may not be cost-effective.

In view of the recent dramatic rise in the incidence of maternal syphilis, these reported cases of congenital syphilis missed at birth may represent only a small sampling of a large population. These cases also highlight the limitations of current screening methods. In recognition of these deficiencies, Dorfman and Glaser<sup>5</sup> and Berry and Dajani<sup>6</sup> recommended syphilis screening for infants who present with fever during infancy. However, the manifestations of congenital syphilis are known to be quite non-specific, and syphilis in a myriad of afebrile and asymptomatic infants could go undiagnosed. Sanchez et al<sup>7</sup> suggested screening mothers postnatally to identify those who were incubating syphilis at the time of delivery, and then, if the mother tested positive, evaluating her infant for congenital syphilis. Doing so, however, would require a multidisciplinary team approach and good communication, which can be difficult because many of these high-risk mothers lack a permanent address and a stable family life. Coordination of care is best accomplished by a family physician who provides care for both the mother and the infant.

Early diagnosis of syphilis is critical to prevent the progression of the disease, which may cause irreparable neurological problems. Three of seven infants reported by Dorfman and Glaser<sup>5</sup> had central nervous system involvement. Current CDC guidelines call for maternal serologic testing for syphilis early in pregnancy, at 28 weeks' gestation, and at the time of delivery for high-risk groups.<sup>3</sup> These current screening methods may miss syphilis in

Table 2. Literature Review of Congenital Syphilis Not Diagnosed at Birth Since 1990

Authors/Cite	Total No. of Cases	No. of Symptomatic Infants	Type of Symptoms (No. of Infants)	Age at Diagnosis, wk	Negative Serology of Mother and Infant at Birth (No. of Infants)
Freudentese et al <sup>4</sup>	1	1	Rhinorrhea and pseudoparalysis (1)	7	Not described
Dorfman et al <sup>5</sup>	7	7	Rash (4), fever (3)	3 to 14	4
Berry and Dajani <sup>6</sup>	3	3	Fever and rash (2), leukocytosis (1)	9 to 15	3
Sanchez et al <sup>7</sup>	3	2	Rash (1), pseudoparalysis (1)	8 to 10	3
Vohra <sup>8</sup>	1	1	Not described	8	1
Wood and Rana <sup>9</sup>	1	1	Fever and respiratory distress (1)	7	0
Cohen <sup>10</sup>	54	54	Not described	6*	2
Current study	3	2	Rash (1), rhinorrhea (1)	7 to 8	3

\*Age at time of diagnosis not given for some infants.

high-risk groups, such as women with inadequate prenatal care, as evidenced by our three cases and the literature review.<sup>4-10</sup> Additional screening of infants at 4 to 8 weeks of age during the well-baby visit, or at the first opportunity thereafter, may greatly improve early identification of syphilis in these high-risk infants.

Approximately 230,000 infants (5.8% of total births) are born each year to mothers who had inadequate or no prenatal care.<sup>14</sup> These infants are at risk for congenital syphilis and are likely to be missed if the mother acquires syphilis late in the pregnancy. Serology testing at 4 to 8 weeks of age would identify infants with congenital syphilis whose condition is not diagnosed at birth. Health providers should have a high index of suspicion for congenital syphilis in infants born to mothers with inadequate prenatal care and in those who present with symptoms, such as fever and rash.

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