

## *Chlamydia trachomatis* infection in dizygotic twins delivered by caesarean section

THOMAS A BELL

From the Departments of Pediatrics and Epidemiology, University of Washington, Seattle, Washington, USA

**SUMMARY** *Chlamydia trachomatis* was isolated from the conjunctiva, pharynx, and rectum of one 10 day old twin delivered by caesarean section without prior rupture of the chorioamnion and from the pharynx of her brother. The means by which *C trachomatis* causes such infection is not known.

*Chlamydia trachomatis* infects about two thirds of singleton infants born vaginally to infected women.<sup>1,2</sup> Normal vaginal delivery may permit prolonged exposure of the infant's head to the infected cervix or endometrium. This exposure permits chlamydiae to enter the conjunctiva, nasopharynx, oropharynx, and lung — anatomical sites commonly found to be infected in exposed infants. Chlamydial infection in infants delivered by caesarean section with unruptured membranes has a less obvious mechanism of transmission, as shown by the following case.

### Case report

Dizygotic twins were born to a black woman aged 29, who had previously delivered a set of twins by caesarean section and was experiencing her sixth pregnancy. Uterine contractions began 10 days before delivery, but labour was arrested with ritodrine. The mother was also treated with betamethasone and magnesium sulphate and with 2 g cephalosporin intravenously 18, 12, and 6 hours before delivery. Labour resumed three hours after the last dose of cephalosporin, and 186 minutes before the performance of an elective classical caesarean section. The chorioamnionic membranes were apparently intact until they were incised one minute before delivery of the first twin, who presented cephalically. The presenting parts of the second twin were the feet; he was born one minute after his sister. The placenta was removed one minute later. Both infants were premature, but neither required resuscitation (table 1). In the intensive care nursery, both twins received 1% silver nitrate solution as eye prophylaxis. The first twin received prophylaxis

Table 1 Perinatal histories of dizygotic twins delivered by caesarean section

	Twin A	Twin B
Gender	Girl	Boy
Duration of labour (minutes)	187	188
Time from incision of membrane (minutes)	1	2
Presenting part	Head	Feet
Birth mass (grams)	1740	1950
Apgar score at 1 minute	8	7
Apgar score at 5 minutes	9	9

at 33 minutes; no time was recorded for the second. A bilateral tubal ligation was performed on the mother, and she left the hospital four days after delivery. Histological examination of the placenta showed that it was dichorionic and diamniotic. Chorioamnionitis was noted in one section of the membranes. The resected segments of the fallopian tubes were normal.

At six days, the infant girl was noted to have a purulent discharge from the left eye. Culture of the material from the left lower palpebral conjunctiva taken the next day yielded a heavy growth of *C trachomatis*.<sup>3</sup> At 10 days, calcium alginate urethrogenital applicators (Hardwood Products, Guilford, Maine, USA) were used to obtain samples from both lower palpebral conjunctivae, the posterior oropharynx, both sides of the posterior nasopharynx, the rectum, and the vagina of the first twin and from her symptomless brother. Cultures from both eyes, both sides of the nasopharynx, and the anus of the girl yielded chlamydiae. The only positive cultures from her brother were those from the nasopharynx and oropharynx. The specimens from the girl generally grew more inclusions than those from the boy (table 2). Treatment of the first twin with oral erythromycin was begun before her discharge from hospital, but the mother and second twin were treated by referring doctors after their discharge from hospital. No cul-

Address for reprints: Dr Thomas A Bell, Department of Epidemiology, SC-36 University of Washington, Seattle, Washington 98195, USA

Table 2 Numbers of inclusion forming units of *Chlamydia trachomatis* isolated from various anatomical sites of each of a pair of dizygotic twins

Anatomical site	Twin A	Twin B
Right eye	4500	0
Left eye	2250	0
Right nasopharynx	36	1
Left nasopharynx	36	72
Oropharynx	0	2
Rectum	1	0
Vagina	0	(Boy)

tures were taken from the mother, who had already been discharged and lived elsewhere.

## Discussion

This report shows that *C trachomatis* may be acquired through intact membranes by infants delivered by caesarean section. Most rectal infections in infants do not appear before the second month of life.<sup>14</sup> The early detection of *C trachomatis* in the rectum of the first twin suggests that her infection was acquired before or at birth. It is not clear whether chlamydiae passed through her gastrointestinal tract or were inoculated direct into the rectum during delivery. In other reports, the respiratory tract, which includes the conjunctiva, is the anatomical site most commonly infected.<sup>1,2,4</sup>

Four other infants have been reported as having acquired *C trachomatis* after caesarean delivery with intact membranes, as shown by isolating the organism from the infants.<sup>5-8</sup> In another three cases, the method of detection was either isolation or staining with fluorescein labelled monoclonal antibodies.<sup>9</sup> The small number of such reports suggests that infection after caesarean delivery is rare because *C trachomatis* is a relatively common infection in pregnant women and is readily transmitted by vaginal delivery. Some prospective studies of infants born to infected women excluded those delivered by caesarean section.<sup>12</sup> I know of no prospective studies that have assessed the risk of infection by various routes of delivery.

It is surprising that *C trachomatis* can infect infants when the membranes are ruptured only at caesarean section because amniotic fluid inhibits the growth of chlamydiae.<sup>10</sup> Perhaps infection is by infected amniotic cells floating in the amniotic fluid.<sup>11</sup> Although the oculogenital biovars of *C trachomatis* do not usually penetrate epithelial surfaces, chlamydiae have been isolated from chorion after removal of the amnion.<sup>12</sup> That *C trachomatis* can infect infants in

utero is also suggested by the isolation of the organism from an infant at birth.<sup>8</sup> Specimens of cord blood from 18 infants with chlamydial conjunctivitis contained no specific IgM,<sup>13</sup> and thus gave no evidence of prenatal infection.

Chlamydial conjunctivitis, which is usually apparent clinically, has been reported in twins.<sup>14</sup> The report published here shows that the other twin should be tested when one is found to be infected, regardless of the route of delivery and clinical findings.

This work was supported by US Public Health Service grants EY-00219 and AI-12192. Dr Walter E Stamm graciously performed cultures for *Chlamydia trachomatis*.

## References

- Schachter J, Grossman M, Sweet RL, Holt J, Jordan C, Bishop E. Prospective study of perinatal transmission of *Chlamydia trachomatis*. *JAMA* 1986;**255**:3374-7.
- Bell TA, Sandström KI, Gravett MG, et al. Comparison of silver nitrate solution and erythromycin ointment for prevention of naturally acquired *Chlamydia trachomatis*. *Sex Transm Dis* 1987;**14**:195-200.
- Stamm WE, Tam R, Koester M, Cles L. Detection of *Chlamydia trachomatis* inclusions in McCoy cell cultures with fluorescein-conjugated monoclonal antibodies. *J Clin Microbiol* 1983;**17**:666-8.
- Bell TA, Stamm WE, Kuo C-C, Wang S-P, Holmes KK, Grayston JT. Delayed appearance of *Chlamydia trachomatis* infections acquired at birth. *Pediatr Infect Dis* 1987;**6**:928-31.
- Givner LB, Rennels MB, Woodward CL, Huang S-W. *Chlamydia trachomatis* infection in infant delivered by caesarean section. *Pediatrics* 1981;**68**:420-1.
- Mårdh P-A, Johansson PJH, Svenningsen N. Intrauterine lung infection with *Chlamydia trachomatis* in a premature infant. *Acta Paediatr Scand* 1984;**73**:569-72.
- LaScolea LJ, Paroski JS, Burzynski L, Faden HS. *Chlamydia trachomatis* infection in infants delivered by caesarean section. *Clin Pediatr (Phila)* 1984;**23**:118-20.
- Attenburrow AA, Barker CM. Chlamydial pneumonia in the low birthweight neonate. *Arch Dis Child* 1985;**60**:1169-72.
- Barry WC, Teare EL, Uttley AHC, et al. *Chlamydia trachomatis* as a cause of neonatal conjunctivitis. *Arch Dis Child* 1986;**61**:797-9.
- Wølnner-Hanssen P, Weström L, Mårdh P-A. Influence of amniotic fluid on the formation of chlamydial inclusions in McCoy cell cultures. In: Mårdh P-A, Holmes KK, Oriol JD, Piot P, Schachter J, eds: *Chlamydial infections*. Amsterdam: Elsevier Biomedical Press 1982;283-6.
- Harrison HR, Riggan RT. Infection of untreated primary human amnion monolayers with *Chlamydia trachomatis*. *J Infect Dis* 1979;**140**:968-71.
- Schachter J. Isolation of Bedsoniae from human arthritis and abortion tissues. *Am J Ophthalmol* 1967;**63**(suppl):1082-6. (Supplement title *Trachoma and allied diseases*.)
- Persson K, Rønnerstam R, Svanberg L, Polberger S. Neonatal chlamydial conjunctivitis. *Arch Dis Child* 1986;**61**:565-8.
- Keskey TS, Suarez M, Gleicher N, Friberg J, Levy HB. *Chlamydia trachomatis* infections in infants. *Mt Sinai J Med (NY)* 1986;**53**:77-9.