Subclinical pneumonia due to serotypes D-K of *Chlamydia trachomatis*

Case reports of two infants

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SUMMARY Pneumonia due to serotypes D-K of *Chlamydia trachomatis* occurred in a 10-week-old baby, who had been successfully treated with chlortetracycline eye ointment for chlamydial ophthalmia neonatorum, and in a 7-week-old baby being treated for the same condition. Clinical signs of pneumonia were minimal. Such chlamydial pneumonia in infants must be under-diagnosed. Infants with chlamydial ophthalmia neonatorum are now routinely treated with erythromycin suspension by mouth in addition to chlortetracycline eye ointment.

Introduction

Pneumonia due to serotypes D-K of *Chlamydia trachomatis* in infants has been described.¹⁻¹² The pneumonia was preceded in most cases, but not in all, by clinically obvious chlamydial ophthalmia neonatorum. The onset was gradual in the first three months of life. The features were closely spaced staccato coughs, eosinophilia, raised levels of IgM and IgG, the presence of antibodies to serotypes D-K of *C trachomatis* in serum of all and in nasopharyngeal material and tears of most, together with radiographic diffuse pneumonic consolidation and hyperinflation. Similar pneumonia has resulted from the experimental inoculation of the infant baboon.¹⁰

Case report (1)

INFANT

Baby J was born to an English mother and was mildly jaundiced. The birth weight was 2.75 kg. Mild conjunctivitis developed on the fourth day of life and was treated with neomycin 0.5% eye ointment four times a day after feeds. On the ninth day the conjunctivitis was purulent, so the following day the baby was seen in the Whitechapel Clinic for investigation. There was some swelling of the right

upper lid and the conjunctivae of both eyes were inflamed. Conjunctival smears contained 100 polymorphonuclear leucocytes per high-power field (PMNL/hpf) ($\times 1000$) but no organisms. No growth was obtained on culture for bacteria from both eyes, but coliforms were isolated from a vulvovaginal swab. *C trachomatis* was isolated from the pooled conjunctival specimens but cultures for chlamydia from throat, vagina, and rectum gave negative results. Local treatment with chlortetracycline 1% eye ointment four times a day after feeds was started.

MOTHER

The baby's mother (Miss N), who was aged 23 years and unmarried, was found to have cervicitis (80 PMNL/hpf), urethritis (40 PMNL/hpf) and proctitis (20 PMNL/hpf). Although cultures for chlamydia from the urethra, cervix, rectum, and throat gave negative results, antichlamydial IgG at a titre of 1/32 to serotypes D-K of *C trachomatis* was detected in her serum using a modified microimmunofluorescence (micro-IF) test.¹³ No pathogen was cultured. Serological tests for syphilis, an Ayre's smear, and a lymphogranuloma venereum complement-fixation test (LGVCF) for group antichlamydial antibody gave negative results. She was breast-feeding so was treated with erythromycin stearate 500 mg four times a day after meals for 14 days.

Inflammatory changes in mother and baby subsided promptly. Further cultures for chlamydia from the eyes and throat of Baby J and from the

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throat, genitalia, and rectum of Miss N gave negative results on two occasions. After one week of treatment, smears from the left eye showed no inflammatory cells and those from the right eye only an occasional PMNL. After that conjunctival smears did not contain pus.

FOLLOW UP

Miss N then defaulted from observation. She was written to and returned when Baby J was 10 weeks and 4 days old. Baby J had continued to receive chlortetracycline eye ointment for more than six weeks; conjunctivitis had not returned after two weeks without ointment. In the week before attendance she had been crying excessively and had been "chesty" with "snuffling" in the evenings but with only occasional single coughs. When she was seen as an outpatient, her conjunctival smears contained epithelial cells without pus; there was no fever and no obvious clinical abnormality. Radiography however showed shadowing of the left mid-zone and right lower zone due to patchy consolidation (figure).

On the evening of admission her temperature was 37.4°C, on the second evening it was 37.5°C, and after that she was afebrile. Cultures from conjunctivae and throat for chlamydia gave negative results. Antichlamydial IgG against serotypes D-K of *C trachomatis* was detected at a titre of 1/256 using the

micro-IF test. The white blood cell count was $8.3 \times 10^9/l$ ($8.3 \times 10^3/mm^3$), neutrophils 24%, lymphocytes 72%, and eosinophils 3%. Baby J was admitted to hospital and treated with 40 mg/kg daily of erythromycin suspension by mouth. Within four days her condition had improved; she was no longer "chesty" or "snuffling" and was feeding well. She was discharged from hospital. At the age of 13 weeks radiographs of the chest were normal.

Case report (2)

INFANT

While the report on Baby J was being prepared a second baby with chlamydial pneumonia was seen. Baby GB (birth weight 3.5 kg, 7.9 lb) was born to English parents. Her right eye became "sticky" during the first week of life, so that at 3 weeks of age she started treatment with neomycin 0.5% eye ointment but with no improvement.

At 6 weeks of age she was referred to the Whitechapel Clinic from the emergency and accident department. Both upper eyelids were slightly swollen and both conjunctivae were reddened and slightly swollen. A smear of the conjunctival material from the right eye contained 15 PMNL/hpf ($\times 1000$) but no organisms; there were no PMNL in a smear from the left eye. *C trachomatis* was isolated from both

FIGURE Radiograph of the chest of Baby J showing shadowing of left mid-zone and right lower zone

conjunctivae, the vulva, and the anorectum but not from the throat. Cultures did not show gonococci. A micro-IF test of the serum did not show antichlamydial antibodies. Treatment was changed to chlortetracycline 1% eye ointment four times a day after feeds as soon as material for these tests had been taken.

At 7 weeks the results of the cultures for chlamydia were available. Baby GB was then "chesty" at night when her breathing was audible, and she coughed occasionally. She had subsiding conjunctivitis with 20 PMNL/hpf ($\times 1000$) in smears from both conjunctivae but no organisms. Examination of the chest showed no abnormality and she did not cough when examined. She was afebrile.

Radiography showed patchy pulmonary consolidation of the mid-zone, similar to that of Baby J. A micro-IF test did not show antichlamydial antibodies in serum or throat secretions. Treatment with erythromycin suspension 40 mg/kg daily before feeds for 14 days was started; the application of chlortetracycline 1% eye ointment was continued. A blood count showed WBC $11.8 \times 10^9/l$ ($11.8 \times 10^3/mm^3$), eosinophilis 3%, neutrophils 11%, lymphocytes 86%, and RBC $3.08 \times 10^{12/l}$ ($3.08 \times 10^6/mm^3$).

At 8 weeks the pneumonic consolidation was still present radiographically. At 9 weeks it had cleared and the child was clinically well. At 8 weeks the micro-IF tests showed antichlamydial IgG antibody to group 1, 2, and 3 at a titre of 1/32. No antichlamydial IgM antibody was detected.

MOTHER

Baby GB's mother was aged 24 years and married. She had had a vaginal discharge during pregnancy. Soon after delivery she had developed lower abdominal pain on the right side, followed three weeks after delivery by high abdominal pain on that side. This high abdominal pain had been associated with pain in the right shoulder, which was worse on deep breathing. She had cervicitis with an intrauterine contraceptive device in situ and a lumpy erosion. The right Fallopian tube was thickened and tender. There was tenderness around and at the edge of the liver and in the right lower abdomen. On deep breathing there was pain behind the right shoulder tip. There was no other abnormality. Her blood pressure was 110/80 mmHg.

The urethral smear contained 10 PMNL/hpf, the cervical smear 50 PMNL/hpf and red cells; the rectal smear contained debris and organisms only.

Cultures for gonococci, trichomonads, and *Candida* species and for chlamydia from the throat, cervix, urethra, and rectum gave negative results as did serological tests for syphilis and an Ayre's smear.

The LGVCFT gave a positive result (1/512); antichlamydial IgG antibody to serotypes D-K was detected by the micro-IF test at a titre of 1/128. Radiography of the chest showed no abnormality.

A diagnosis of chlamydial genital infection with right salpingitis and perihepatitis was made. Because she was bottle-feeding her baby, she was treated with doxycycline 200 mg daily for 14 days. After three days the pain was less severe and after nine days it had disappeared. At the end of treatment no abnormality was detected on pelvic examination.

FATHER

The father of baby GB was seen. The last admitted extramarital sexual intercourse had been one year before attendance. He had had recurrent episodes of dysuria without obvious urethral discharge. Investigations seven hours after he had last micturated showed that he had low-grade non-specific urethritis with 18 PMNL/hpf. Cultures for chlamydia of material from the throat and urethra (obtained with a meatal swab, an endourethral swab, and endourethral curette) gave negative results as did the micro-IF and LGVCFT. He was treated with oxytetracycline 500 mg four times a day after meals for 14 days and then defaulted from follow up.

Discussion

That Miss N had been abandoned by the father of Baby J was in keeping with the sexual instability that is usually found in the parents of babies with chlamydial and gonococcal ophthalmia neonatorum.

Mrs B had salpingitis and perihepatitis. Salpingitis commonly develops in mothers of babies with chlamydial ophthalmia neonatorum.¹⁴⁻¹⁶ The isolation of *C. trachomatis* from inflamed Fallopian tubes¹⁷⁻¹⁹ has proved that this agent can cause salpingitis; it may cause perihepatitis (FitzHugh-Curtis syndrome).²⁰

Of over 70 babies with chlamydial ophthalmia neonatorum seen by the Institute of Ophthalmology/London Hospital group, these two are the first in which chlamydial pneumonia has been diagnosed. The clinical evidence of pneumonitis was minimal and lacked the more marked illness or the characteristic cough described by Beem and Saxon.²³ Chlamydial pneumonia thus occurs in England, as well as in North America, and is presumably under-diagnosed.

Baby GB had chlamydia in anorectal and vulval material. As Schachter and Dawson²¹ have pointed out "inclusion conjunctivitis of the newborn" is now known to be a manifestation of a more generalised chlamydial infection. Doubts about the efficacy of local treatment alone for chlamydial conjunctivitis

were first expressed^{22 23} after the description of the chlamydial pneumonia syndrome by Beem and Saxon.² These doubts were fully justified. Even if investigations show chlamydial infection of the eye alone it is clear that if treatment is confined to local therapy, this will permit chlamydial pneumonia or infection at other sites to develop. For this reason, as soon as the diagnosis of chlamydial ophthalmia neonatorum has been confirmed, erythromycin suspension 40 mg/kg daily by mouth before feeds for 14 days is now being used routinely in the treatment of affected infants in addition to chlortetracycline 1% eye ointment.

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