Short reports

Mycoplasma hominis

A cause of neonatal meningitis

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SUMMARY Two cases of *Mycoplasma hominis* meningitis in the newborn are described. These infants demonstrate the need to consider *M. hominis* as a cause of neonatal meningitis, especially if the Gram stain is negative, conventional cultures yield no growth, and there is a history of maternal infection. CSF cultures on appropriate medium can quickly confirm the diagnosis.

Neonatal central nervous system (CNS) infection due to *Mycoplasma hominis* has rarely been reported, despite the frequency with which it colonises the newborn (Klein *et al.*, 1969). A review by Remington and Klein (1976) described only 2 patients, and another case was recently reported (Siber *et al.*, 1977). This paper reports 2 more cases and demonstrates the significance of *M. hominis* in the aetiology of neonatal CNS infection, especially when the initial culture is negative.

Case reports

Case 1. The 1.74 kg baby girl of a 37-year-old gravida 5 para 1 mother was delivered at 33 weeks'

gestation via forceps after membranes had been ruptured for 5 days. At delivery the mother's temperature was 38.3°C (oral) and although treated with ampicillin her fever persisted for 6 days. The baby was bottle fed and did well for the first 5 days of life but then developed fever (38.8°C rectally). Skin, blood, and suprapubic urine cultures were performed but no antibiotics were given. These cultures were sterile but on the 7th day the WBC was 36 000/mm³ (36 × 10⁹/l) (79% neutrophils and 17% lymphocytes). Fever persisted and lumbar puncture was performed on the 8th day (Table 1). This confirmed the diagnosis of meningitis. IV ampicillin (200 mg/kg per day) and chloramphenicol (50 mg/kg per day) were started, and 1 mg intrathecal gentamicin was also administered. Generalised seizures developed and phenobarbitone was given. On the 9th day (Table 1) 0.5 mg gentamicin was instilled into the left lateral ventricle. At this time a growth of *Mycoplasma* was obtained from the mother's blood culture and the infant was started on IV tetracycline (20 mg/kg per day). Ampicillin was stopped but 2 further doses of intraventricular gentamicin were given. On the 15th day of life (10th day of illness) *Mycoplasma* was isolated from the

Table 1 CSF results in Case 1

Age (days)	Source	RBC (× 10 ⁶ /l)	WBC (× 10 ⁶ /l)	% polymorphs	% lymphocytes	Culture	Protein (g/l)	CSF glucose (mmol/l)
8	Lumbar	19 000	19 500			<i>M. hominis</i>	7.0	0.5
8	Lumbar	62 000	62 500	91	9	<i>M. hominis</i>		
9	Left ventricle	10 000	2 300	92	8	No growth		
10	Left ventricle	1 440	2 000	90	10	No growth		
11	Left ventricle	15 000	2 000	94	6	No growth	2.5	0.8
13	Lumbar	300	1 120	90	10	No growth	7.0	0.9
15	Lumbar	1 800	110	87	13	No growth	6.0	1.3
23	Lumbar	5	14	98	2	No growth	2.0	1.5
36	Lumbar	315	3	—	—	No growth	1.3	2.4

Conversion: SI to traditional units—Glucose 1 mmol/l ≈ 18 mg/100 ml; protein 1 g/l ≈ 100 mg/100 ml.

CSF obtained at the original lumbar puncture. All *Mycoplasma* isolated were later identified as *M. hominis*. Drug sensitivities for the organism are listed in Table 2. Subsequent antibiotic treatment consisted of IV chloramphenicol and tetracycline for a total of 21 days of each drug. There was continued improvement in the CSF and there were no more convulsions after the 10th day of treatment. The baby was discharged on the 40th day of life when neurological examination was entirely normal; follow-up at 9 months showed development to be normal with no evidence of residual neurological dysfunction.

Case 2. A baby girl born at term after an uncomplicated pregnancy and delivery. Birthweight was 4.02 kg. Nine days after birth the mother developed a febrile illness associated with a thick vaginal discharge. She was started on oral ampicillin and septrin, and continued to breast feed the infant who remained well. At 15 days the child became irritable and developed a fever of 38.0°C (rectal). Three days later she developed 'head retractions' and vomiting. She was admitted to hospital at 21 days; she was feeding poorly, febrile, irritable, and had generalised hypotonia. A lumbar puncture confirmed the diagnosis of meningitis (Table 2). Blood and urine cultures were sterile. Peripheral WBC was 26 100/mm³ (26.1 × 10⁹/l) (93% neutrophils). She was started on gentamicin (4 mg/kg per day) and cloxacillin (62.5 mg/kg per day) together with phenobarbitone and hydrocortisone. There was a transient improvement but she deteriorated 2 days later. Antibiotics were changed to ampicillin (250 mg/kg per day) and cloxacillin (250 mg/kg per day). Again transient improvement was noted although CSF showed a persistent heavy pleocytosis. Bacteriological culture of CSF, however, remained sterile. At age 32 days the child deteriorated once again with seizures, pyrexia, and vomiting. She was transferred to The Hospital for Sick Children where repeat lumbar puncture was performed and CSF cultured for *Mycoplasma*. Gentamicin (6 mg/kg per day) was again given and cloxacillin was stopped in favour of

Table 3 Sensitivities of two strains of *Mycoplasma hominis* to antimicrobial drugs

Case	Ch	Ery	Gent	Tet	Clind	Amp	TMX
1	S	R	PR	S	NT	R	R
2	R	R	S	S	R	R	R

Ch = chloramphenicol, Ery = erythromycin, Gent = gentamicin, Tet = tetracycline, Clind = clindamycin, Amp = ampicillin, TMX = trimethoprim, R = resistant, PR = partially resistant, = sensitive.

chloramphenicol (25 mg/kg per day). Seizures were controlled with phenytoin (7 mg/kg per day) and rectal paraldehyde. Three days later *Mycoplasma* was identified from the CSF and later shown to be *M. hominis*. Oxytetracycline was started (20 mg/kg per day) and chloramphenicol stopped when drug sensitivities were obtained for the organism (Table 3). During the next 2 weeks there was clinical improvement with fewer seizures, good weight gain, and persistent improvement in the CSF. Antibiotics were stopped after 21 days of treatment with gentamicin and tetracycline, the latter being given orally for the last 10 days. At discharge the baby, aged 9 weeks, had normal reflexes, good tone, and was beginning to smile. She remained on anti-convulsant treatment in tapering dosage. Follow-up at age 10 months showed that she was developmentally normal for age, but had clinical evidence of a mild right-sided hemiplegia.

Discussion

M. hominis is known to be a cause of paediatric illness and puerperal sepsis (Stokes, 1955; Klein *et al.*, 1969). The 2 cases described also demonstrate its role in neonatal CNS infection. In Case 1 the organism was not isolated until the 15th day of illness when pinpoint colonies were seen on Columbia blood agar (oxoid) and were grown within 48 hours of transfer to PPLO media (Difco nutrient base with 20% horse serum, 6.6% yeast extract, and ampicillin 1000 units/ml). In Case 2, pinpoint colonies showed the typical 'fried egg' morphology that was described by Siber *et al.* (1977). Growth may also be enhanced by incubation with 10% carbon dioxide

Table 2 CSF results in Case 2

Age (days)	Source	RBC (× 10 ⁶ /l)	WBC (× 10 ⁶ /l)	% polymorphs	% lymphocytes	Culture	Protein (g/l)	CSF glucose (mmol/l)
21	Lumbar	NR	4 000	100	0	No growth	3.6	
23	Lumbar	2 200	180	80	20	No growth	1.6	
28	Lumbar	NR	1 400	100	0	No growth	1.6	
30	Lumbar	NR	775	100	0	No growth	1.4	
31	Lumbar	450	1 050	55	45	<i>M. hominis</i>		2.8
33	Left ventricle	131	156	35	64	<i>M. hominis</i>	1.3	1.4
51	Left ventricle	2 506	33	11	89	No growth	0.6	1.7

Conversions as in footnote to Table 1. NR = Not recorded

or nitrogen, but neither method was used in these cases. Both patients probably acquired the infection from their mothers and the meningitis was treated in the conventional way once the diagnosis was confirmed but neither responded despite several changes of antibiotics. It was only after identification of *M. hominis* and the institution of appropriate treatment based on the sensitivities of the organism that there was clinical improvement.

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A clinical comparison of beclomethasone dipropionate delivered by pressurised aerosol and as a powder from a rotahaler

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SUMMARY 14 children with severe asthma were studied for 2 months in a double-blind cross-over trial to compare the efficacy of beclomethasone dipropionate delivered as an aerosol and as a powder from a rotahaler.* Inhalation via the aerosol was satisfactory in 13 patients, each of whom used the rotahaler correctly. Younger children preferred to use the rotahaler. Comparison of daily symptoms, twice daily peak expiratory flow rate (PEFR), and use of salbutamol during the 2 months of the trial showed that control of asthma was equally good, irrespective of the device used to deliver active beclomethasone.

There have been many studies demonstrating that beclomethasone dipropionate aerosol is safe and effective in the long-term management of severe childhood asthma (Morrow Brown and Storey, 1973; Godfrey and König, 1974; Lovera *et al.*, 1976). However, some children have difficulty using pressurised aerosols correctly, and consequently they have been denied the benefit of this form of treatment. Recently beclomethasone dipropionate has

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become available in powder form mixed with a lactose base. It is dispensed in capsules which are used in a rotahaler* (Hallworth, 1977). This device requires less co-ordination for effective use as the patient has only to breathe through it to inhale the powder. We have conducted a 2-month double-blind randomised cross-over trial to determine whether beclomethasone dipropionate dispensed in this way is as effective in controlling symptoms of asthma as the usual preparation delivered as a metred dose from a pressurised aerosol. We also tried to find out if there were any problems associated with the use of the rotahaler in paediatric outpatient practice.

Patients and methods

Seven boys and 7 girls (mean age 9.7 years, range 4.8-15.1 years) were studied. They were all asthmatic and had previously been judged on clinical grounds to require treatment with beclomethasone. Before the trial they had been using beclomethasone regularly for a mean period of 1 year 10 months (range 0-5 years 5 months). 11 of them had failed to respond satisfactorily to treatment with sodium cromoglycate and one had failed to respond to treatment with regular theophylline. Two had