Meningitis caused by *Pseudomonas paucimobilis*

V. HAJIROUSSOU, B. HOLMES, J. BULLAS, AND C. A. PINNING

*From 1 Manor Hospital, Moat Road, Walsall, West Midlands WS2 9PS and the 2 National Collection of Type Cultures, Central Public Health Laboratory, Colindale, London NW9 5HT, UK*

**SUMMARY** This appears to be the first report of meningitis due to *Pseudomonas paucimobilis* and the first report of a clinically significant isolate of this species in the UK. Characteristics by which the species may be recognised are given, and attention is drawn to the possible confusion of *Ps. paucimobilis* with other yellow-pigmented pseudomonads and *Flavobacterium* species.

*Pseudomonas paucimobilis* is a species described only recently (Holmes et al., 1977). The strains on which the description of the species was based had been recovered largely from human clinical specimens and the hospital environment, but none was known to be the causative agent of infection. Although the clinical significance of *Ps. paucimobilis* remained unknown we now report what is, as far as we know, the first case of meningitis due to this species.

**Case report**

A 39-year-old male epileptic was admitted on 24 June 1978. He had had epilepsy for three years and was currently treated with phenobarbitone 60 mg and phenytoin 100 mg three times a day. He complained of headache for two days and had started to have convulsions on the day of admission. This was controlled with a single dose of 20 g diazepam intravenously. However, he remained very drowsy 6 hours later, and the axillary temperature was found to be 39.3°C (103°F). Clinical examination showed neck stiffness and a positive Kernig's sign.

A lumbar puncture was performed and turbid fluid obtained, giving the following results: white cells 0.2 × 10⁹/l (200/mm³), 95% lymphocytes, 5% neutrophils; protein 0.4 g/l (40 mg/100 ml), glucose 3.7 mmol/l (67.2 mg/100 ml); the blood glucose level was 4.7 mmol/l (85 mg/100 ml). Gram and Ziehl-Neelsen films were initially reported as negative. However, 48 hours later repeat examination of the original Gram-stained film revealed numerous Gram-negative rods. Other tests included haemoglobin 15.4 g/dl, white cell count 12.8 × 10⁹/l (12 800/mm³), 82% neutrophils showing toxic granulation and a shift to the left. A chest film was normal.

Received for publication 2 March 1979

**Bacteriology**

Cultures of cerebrospinal fluid and blood, taken before the start of treatment, were incubated aerobically at 37°C on blood agar. After 48 hours cultures of both specimens yielded a moderately heavy pure growth of a yellow-pigmented, non-fermentative, Gram-negative, rod-shaped bacterium which could not be identified by routine laboratory tests. The isolates were sensitive to rifampicin.

Three isolates, two from cerebrospinal fluid and one from blood, were submitted to the National Collection of Type Cultures for computer-assisted identification. There, a set of 68 characteristics were determined for each isolate using methods described previously (Holmes et al., 1975). In these tests the three isolates yielded identical results (Table), thereby indicating that the isolates represented a single strain. On the results of these characteristics, in conjunction with an unpublished probability matrix, the isolates were identified as *Ps. paucimobilis*. The isolates proved typical of the species except in their ability to produce an alkaline reaction on Christensen’s citrate medium and in their inability to produce acid from salicin in ammonium salt sugar medium.

Cultures of swabs taken from the nose, throat, ear, and axilla of staff examining specimens in the laboratory, and from the houseman who performed the lumbar puncture and took blood for culture
Table  | Characteristics of the three isolates of Pseudomonas paucimobilis examined

| Isolates positive in:                  |  | Isolates negative in:                  |  |
|----------------------------------------|  |----------------------------------------|  |
| Acid from the following ammonium salt sugars: |  | Acid from the following ammonium salt sugars: |  |
| glucose                                | lactose | Acid from glucose (10 g/100 ml) | Growth at 42°C |
| arabinose                              | maltose | Acid from lactose (10 g/100 ml) | Growth on cetrime agar |
| cellubiose                             | sucrose | Arginine deimidase | Growth on MacConkey agar |
| ethanol                                | xylene | Casein digestion | Growth on Simmons' citrate agar |
| fructose                               | Aesculin hydrolysis | Fluorescence on King's medium B | Indole production |
|                                        |  | Gas from PWS glucose | Lysine decahydroxylase |
|                                        |  | Gelatinase production* | Malonate utilisation |
|                                        |  | Gluconate oxidation | Motility§ |
| From PWS glucose                       | Growth at 5°C |  |  |

PWS = peptone water sugar.
* By stab and plate methods.
† By both lead acetate paper and triple sugar iron agar methods.
‡ At both 37°C and room temperature (18°C-22°C).

from the patient described above, proved negative for *Ps. paucimobilis*.

Discussion

Two of the strains on which the original description of *Ps. paucimobilis* was based were representative of a group that had been designated group IIk, biotype 1 by workers at the Center for Disease Control, Atlanta, USA (Tatum et al., 1974). This implies that group IIk, biotype 1 and *Ps. paucimobilis* are the same taxon, and thus, even before the description of *Ps. paucimobilis*, isolates belonging to the species were being recognised in human clinical material, principally from blood, environmental sources, spinal fluid, urine, and various wounds and abscesses (Tatum et al., 1974). Although they would have been labelled unclassified non-fermenters when first received, after several isolates had been collected, strains were recognised as belonging together in a distinct taxon, provisionally as group IIk, biotype 1, but later as *Ps. paucimobilis*. However, because initial isolates of the taxon were labelled only as unclassified non-fermenters, clinical details were not requested on receipt of the strains, and consequently none was known to be implicated as a cause of infection. Also group IIk, biotype 1 was little recognised outside the USA, but since the naming of *Ps. paucimobilis* the species has become more widely known and recognised in clinical laboratories, and clinically significant isolates have been recognised: from a leg ulcer in Australia (Peel et al., 1979) and from a septicemia in the USA (Slotnick et al., 1979). The case herein reported appears to be the first of a clinically significant isolate of this species in the UK and the first report of this species as a cause of meningitis.

*Ps. paucimobilis*, because of its yellow pigment and because motility is difficult to demonstrate (room temperature in a hanging-drop preparation is recommended, and even then only a very low proportion of the cells may be actively motile), is most likely to be confused with *Flavobacterium* spp. However, *Flavobacterium* spp. usually grow on MacConkey agar, produce caseinase and gelatinase, and show resistance to carbenicillin and gentamicin, characters rarely, if ever, seen in *Ps. paucimobilis*. Yellow-pigmented strains of *P. cepacia, P. maltophilia*, and *P. stutzeri* may also be encountered occasionally, but, as well as all growing on MacConkey agar, they can be further distinguished from *Ps. paucimobilis* by production of caseinase and growth on Simons' citrate in the case of *P. cepacia*, production of caseinase, gelatinase, and decarboxylation of lysine in *P. maltophilia*, and by the wrinkled colonies and nitrate reduction (to nitrogen gas) in *P. stutzeri*.

The role played by *Ps. paucimobilis* in infections is still uncertain although it may be responsible for various opportunistic infections. However, our patient had been previously healthy, had not been on any antibacterial therapy, and had had no recent contact with hospitals. The association of *Ps. paucimobilis* with moist sites suggests that the species is water-borne, and it is therefore possible that initial entry into the body was through the gastrointestinal tract. Failure to recover the organism from staff involved in the collection and examination of the patient specimens reinforces our belief that

Downloaded from http://jcp.bmj.com/ on September 30, 2017 - Published by group.bmj.com
Ps. paucimobilis was the causative agent of meningitis in this patient.

We thank Dr J. Litchfield for permission to report this case and Dr D. Trash for his help.

References


Ps. paucimobilis was the causative agent of meningitis in this patient.


Requests for reprints to: Dr V. Hajiroussou, Manor Hospital, Moat Road, Walsall WS2 9PS, UK.

Reports and Bulletins prepared by the Association of Clinical Biochemists

The following reports and bulletins are published by the Association of Clinical Biochemists. They may be obtained from The Publishing Department, British Medical Journal (ACB Technical Bulletins), B.M.A. House, Tavistock Square, London WC1H 9JR. Overseas readers should remit by British Postal or Money Order.

SCIENTIFIC REVIEWS (price £1.00/$2.00 each)

1 The assessment of thyroid function March 1971 F. V. FLYNN and J. R. HOBBS

2 Renal function tests suitable for clinical practice January 1972 F. L. MITCHELL, N. VEALL, and R. W. E. WATTS

3 Biochemical tests for the assessment of fetoplacental function May 1975 C. E. WILDE and R. E. OAKLEY

4 Test of exocrine pancreatic function March 1977 A. H. GOWENLOCK

5 Assay of cholinesterase in clinical chemistry March 1979 ELSIE SILK, J. KING, and MARY WHITTAKER

TECHNICAL BULLETINS (price £1.00/$2.00 each)

22 Bilirubin standards and the determination of bilirubin by manual and technicon AutoAnalyzer methods January 1971 BARBARA BILLING, RUTH HASLAM, and N. WALD

23 Interchangeable cells for spectrophotometers and fluorimeters September 1971 S. S. BROWN and A. H. GOWENLOCK

24 Simple tests to detect poisons March 1972 B. W. MEADE et al.

25 Blood gas analysers May 1972 K. DIXON

26 Kits for enzyme activity determination September 1972 S. B. ROSALKI and D. TARLOW

27 Assessment of pumps suitable for incorporation into existing continuous flow analytical systems November 1972 A. FLECK et al.

28 Routine clinical measurements of transferrin in human serum September 1973 K. DIXON

29 Control materials for clinical biochemistry (5th edition) September 1973 J. F. STEVENS

30 Notes on the quality of performance of serum cholesterol assays September 1973 S. S. BROWN

31 Determination of uric acid in blood and in urine July 1974 R. W. E. WATTS

32 A survey of amino acid analysers readily available in the United Kingdom September 1974 J. E. CARLYLE and P. PURKISS

33 Definitions of some words and terms used in automated analysis November 1974 A. FLECK, R. ROBINSON, S. S. BROWN, and J. R. HOBBS

34 Measurement of albumin in the sera of patients January 1975 LINDA SLATER, P. M. CARTER, and J. R. HOBBS


36 Factors influencing the assay of creatinine November 1975 J. G. H. COOK

37 A survey of enzyme reaction rate analysers readily available in the United Kingdom July 1977 R. A. SAUNDERS and R. F. BURNS

38 Transport of specimens for clinical chemistry analysis November 1977 P. WILDING, J. F. ZILVA, and G. E. WILDE

39 A scheme for the evaluation of diagnostic kits May 1978 P. H. LLOYD
Meningitis caused by Pseudomonas paucimobilis.

V Hajiroussou, B Holmes, J Bullas and C A Pinning

*J Clin Pathol* 1979 32: 953-955
doi: 10.1136/jcp.32.9.953

Updated information and services can be found at:
http://jcp.bmj.com/content/32/9/953

*These include:*

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/