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A Case of Meningococcal Meningitis in Tokyo and A Carrier Rate of *Neisseria meningitidis* in Those Close to The Patient.

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Abstract: Serogroup B *Neisseria meningitidis* was isolated from a 3-year-old girl with acute meningitis. The patient was completely recovered from the disease by the successful treatment by ampicillin and cefotaxime. From nasopharyngeal swab culture, *N. meningitidis* was isolated from her parents and 5 out of 93 pupils and kindergarten staff. The isolates from the parents were serogroup B and those from the pupils of the kindergarten were serogroup A. Since the mother of the patient reported an episode of common cold-like symptoms a few days before the patient's illness, we speculate that the mother was the possible source of infection.

Key words: *Neisseria meningitidis*, Case report, Epidemiology

INTRODUCTION

Recently the annual incidence of meningococcal meningitis in Japan is very low, in particular the disease rarely affects young children (Ministry of Health and Welfare, Japan, 1988-93). We experienced a case of meningococcal meningitis in Tokyo. The patient was a 3-year-old girl. The present paper deals with the clinical course and laboratory data of the patient, and the carrier rate of *N. meningitidis* in those close to the patient.

CASE REPORT

A 3-year-old girl visited a nearby clinic with cough and high fever (39.4°C) on 28 May, 1989. Cefaclor 400mg/day was administered. In the evening she had general convulsions, and visited Tokyo Women's Medical College Hospital. Febrile convulsion was diagnosed, and was allowed to return home. In the midnight of 31 May, she developed headache and active vomiting, and was admitted to Tokyo Women's Medical College Hospital.

On admission, consciousness was alert, and neck stiffness was observed. Deep reflexes were exaggerated. No petechiae was seen on the body surface.

The cerebrospinal fluid (CSF) examination revealed the cell count of 1,400/3-field (polymorphonuclear to monocytic ratio=13:1), and Gram negative diplococci were detected on the CSF smear. Peripheral white blood cell count was 13,400/ μ l (neutrophil=91.5%). The erythrocyte sedimentation rate was 45mm/hr and CRP being 10.4mg/dl. The EEG and brain CT were normal.

As a birth history she was born with 1,860g of weight at 36th week pregnancy. Her mother reported an episode of common cold a few days before the patients got sick.

On 1st June, *N. meningitidis* was isolated from the patient's CSF, and she was transferred to Tokyo Metropolitan Toshima General Hospital. Ampicillin and cefotaxime at a dose of 2.7g/day (200mg/kg/day) respectively were administered 6-hourly. On 1st June, the CSF cell count reduced 1,100/3-field, and ampicillin 4g/day, P.O. alone was continued 4-hourly. On 7th June, the CSF cell count was reduced 27/3-field, and *N. meningitidis* was negative in the CSF smear and culture, therefore, ampicillin was stopped. On 14th and 21st June, *N. meningitidis* was not detected from the CSF smear and culture, and the patient was discharged. No neurological deficit remained after discharge.

EXAMINATION OF *N. MENINGITIDIS* IN THOSE CLOSE TO THE PATIENTS.

N. meningitidis isolated from the patient was serogroup B. The pathogen was sensitive to benzylpenicillin, cephalexin, tetracycline and erythromycin, and was resistant against lincomycin. The microbial examination of nasopharyngeal swab was conducted to her parents, two brothers, 87 pupils and 6 nursing staff at a kindergarten she went to. Serogroup B *N. meningitidis* was isolated from her parents. The drug-sensitivity pattern of isolates was exactly the same as that of patient. Five children (5.7%) of kindergarten were identified to be positive for serogroup A *N. meningitidis*. The drug-sensitivity pattern was the same as that of the patient strain.

DISCUSSION

In the present paper, we reported a case of meningococcal meningitis. The patient, 3 years old of age, was diagnosed by the CSF examination and successfully treated, though she was first diagnosed simply as a febrile convulsion.

Although recently the incidence of meningococcal infections is very low in Japan, the

present paper reminds us of the utmost severity of meningococcal meningitis.

Serogroup B *N. meningitidis* was isolated from both the patient and her parents. A pattern of drug-sensitivity of isolates was exactly identical. These laboratory data suggest that the patient was infected from either of her parents, although examinations of subtype and enzyme electrophoretic profile of the isolates were not carried out. The fact that patient's mother previously had common cold-like symptoms a few days before the patient got sick also supports our speculation. Feigin (1983) reported that the risk of meningococcal infection by daily contact in the kindergarten is as less as 1/1,000. Therefore, none of 93 children and kindergartners might be luckily contaminated with the pathogen from the patient.

The incidence of meningococcal infections in Japan bear two characteristics. Firstly, the incidence rate is remarkably lower than that in other industrialized countries. Total number of cases reported during the recent 6-year is only 73 in Japan (Ministry of Health and Welfare, Japan, 1988–93), whereas the mean annual attack rates are 1.2/10⁵ in USA (1975–1980) and 2.0/10⁵ in Finland (1976–1980) (Scheld, 1990). Secondly, meningococcal infections in Japan occur less frequently in children. In Japan, only 25% of the reported cases are under 5 years old, whereas approximately 55% of the cases occur under 5 years group in the United States and Finland during nonepidemic conditions. The difference may be explained by "antibiotics abuse" in Japan. Pediatricians are inclined to use antibiotics easily for the treatment of common cold-like symptoms. Such a tendency makes it more difficult to isolate pathogens like *N. meningitidis*.

Interesting enough, our nasopharyngeal carriage rate (5.7%) was comparable to data from North America. Although the rate may fluctuate according to living conditions, age and epidemic status, and it is 3–10% in an American civilians in a nonendemic period (Swartz, 1985). In USA the carriage rate is 0.5–1% in children of 3–48 months of age, and in healthy children over 2 years old the rates vary around 2–5%, and about 5% in those 14–17 age group (Feigin, 1983). Therefore, it is strongly supposed that there are many unidentified cases of meningococcal infections, especially in acute meningitis of children in Japan. In order to detect those masked cases, a latex agglutination tests (LAG, RPLA, so on) is recommended. This is a sensitive and easy test to perform, and enables the quick diagnosis, even with treated cases (Igari, 1993).

Recently identification of the pathogen of *N. meningitidis* is likely to be determined by a serotype of isolate. It is noteworthy that group B organisms, particularly B: 15 have been recognized as primary strains of serious local outbreaks in Denmark (Samuelsson et al., 1992), Netherlands (Scholten et al., 1992) and Chile (Cruz et al., 1990).

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