Septicaemia and Meningitis Caused by Neisseria mucosa varietas heidelbergensis

Summary: A case of septicaemia and meningitis caused by Neisseria mucosa var. heidelbergensis in a severely handicapped and retarded 5-year-old girl is reported. The infection was successfully treated with antibiotic therapy. It is presumed that the portal of entry of the causative agent was the inflamed nasopharyngeal mucosa.

Introduction

While Neisseria gonorrhoeae is the cause of the most common bacterial infections, the "saprophytic" or non-fastidious species of the Neisseria genus are very rarely the causative agents of disease. For example, N. mucosa could be isolated on only three occasions from cerebrospinal fluid (4, 6). It therefore seemed justified to report on a case which showed the clinical features of acute meningococcal septicaemia.

Description of the Case

Clinical data: The onset of illness in a five year old girl one morning was characterized by sudden restlessness and crying. During the morning the temperature rose to about 40°C and vomiting later occurred. Despite administration of erythromycin by the family doctor a purpuric rash appeared in the afternoon, especially on the legs. The child was then admitted to hospital with a preliminary diagnosis of meningitis.

The case history revealed that the child was born by pelvic presentation after a pregnancy complicated by hyperemesis and depressions. The child suffered from scoliosis, torticollis and asynclitism, tetraplegic spasticity with pes equinus. The child was late sitting, walking and talking. At the time of hospitalisation speech was still slurred. The child was said to have always been of a weak constitution. Six months previously a tonsillectomy had been performed due to recurrent tonsillitis. The girl has worn an otophone for three years on account of conductive deafness. The child also had strabismus of her right eye.

At the time of admission the girl was severely ill. She was completely apathic with sunken eyes, poor skin turgor, and peripheral cyanosis. Petechiae varying from the size of a pin-head to that of a rice grain were evident mainly on the limbs but also on the buttocks; a few isolated spots were found on the trunk. Marked neck rigidity was accompanied by a positive Babinski and Brudzinski sign. Tendon reflexes were exaggerated. General enlargement of the lymph nodes, pharyngitis, and purulent rhinitis were additional symptoms.

After admission a cell count of the cerebrospinal fluid (CSF) revealed 35 cells/mm³. Protein and sugar content were normal. In the blood the white cell count was 46,000 cells/mm³, 23% of which were neutrophilic band cells. The sedimentation rate was 41/70 mm, the platelet count 104,000/mm³. As meningitis and septicaemia were suspected, therapy was begun with gentamycin in combination with ampicillin. Fluid and electrolytes were replaced, and sedatives given.

Despite this therapy, the condition of the child worsened during the first 24 hours so that a second lumbar puncture was performed. The CSF contained 2,325 cells/mm³. Protein and sugar content were again normal. In addition, the child then received penicillin G by continuous intravenous infusion (10⁶ U/kg body weight). Within ten hours a marked improvement was noticed. There was no further extension of the petechiae. On the fourth day after admission the blood contained only 18,000 leucocytes/mm³ (7% neutrophilic band cells). The platelet count rose to 170,000/mm³. Gentamycin and ampicillin were consequently discontinued on the seventh day. The patient was treated from then on with penicillin G only, and from the twelfth day onwards with chloramphenicol for a further ten days. At that stage no cells were counted in the CSF. There were no further complications. On discharge, the

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blood cell count was normal and the sedimentation rate only slightly increased (18/34 mm). The EEG was very arrhythmical and showed abnormal series of theta-waves.

**Bacteriological data:** A blood culture taken before therapy was sterile. The CSF of the first puncture (on the day of admission), which appeared microscopically to contain no bacteria, yielded only one colony composed of gram-negative, oxidase-positive diplococci. The preliminary diagnosis was therefore that of *Neisseria meningitidis*. Subsequent CSF specimens rendered no growth. Specimens of pharyngeal and nasal discharge were not taken for examination.

Further differentiation of the isolated strain showed fermentation of glucose, maltose, fructose, and sucrose, but not of lactose and mannitol. Polysaccharide was produced from sucrose, and gas from nitrate and nitrite. A yellow pigment could be extracted from the colonies using methanol. Spectrophotometrically this pigment showed the four characteristic peaks between 400 and 300 nm (Figure 1). All these properties proved that this microorganism was a strain of *N. mucosa* var. *heidelbergensis* (2).

**Discussion**

If any bacteriologically examined specimen yields only one colony the finding is always evaluated with caution. Nevertheless, we believe for the following reasons that in this case the cultured organism does not represent a contamination, but is the causative agent of a septic infection: (1) The colony grew in the inoculation streak, (2) *N. mucosa* would be even more unusual as a contaminant than as an infectious agent, (3) the negative microscopical findings of the CSF suggest a *Neisseria* meningitis. It must also be remembered that the patient received an antibiotic (erythromycin) before admission to hospital. In this case, the typical picture of acute meningococcal septicaemia was caused by an organism closely related to *N. meningitidis*.

Meningitis caused by *N. mucosa* has so far been observed on three occasions. Véron et al. (6) reported successful treatment in a 12-year-old girl in North Africa. Two additional cases were observed by Sirot and Cluzel (4): one in a six months old infant, and the other in a three year old child. The somewhat more common cases of meningitis caused by *Diplococcus mucosus* must not be equated with infections caused by *N. mucosa*, since *D. mucosus*, contrary to the provisional classification by Murray (3), does not belong to the *Neisseria* genus. Nowadays, it is known to be identical with the so-called *Bacterium anitratum* (which has numerous synonyms).

*N. mucosa* was described for the first time by Véron et al. (5, 6). It differs from the other species of the *Neisseria* genus in its ability to denitrify nitrates. In 1971 *N. mucosa* was divided by Berger (2) into two different varieties. One of these, the *heidelbergensis* variety, produces a yellow pigment.

As one of the two strains of Sirot and Cluzel (4) formed yellow colonies, the case we report — one of the four meningeal infections known to date which have been caused by *N. mucosa* — may be considered as the second case of meningitis caused by *N. mucosa* var. *heidelbergensis*. In addition, despite a negative blood culture our case was complicated by a septicaemia, recognized by a characteristic purpuric rash accompanied by thrombopenia.

The rhinopharyngitis observed can be assumed to have served as the portal of entry of the causative agent or as the primary lesion, although this could not be confirmed by bacteriological examination. In this context it seems of interest to note that among the ten pathogenic strains of Véron et al. (5, 6) five were isolated from cases of rhinopharyngitis. It is