

NETILMICIN IN THE TREATMENT OF PSEUDOMONAS AERUGINOSA MENINGITIS*

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Aminoglycosides have a broad spectrum of activity and are among the most useful drugs currently available for treating serious infections due to *Pseudomonas aeruginosa*¹. Netilmicin, a newly developed aminoglycoside, has been administered intramuscularly and intravenously for a variety of infections (e.g. infections of the urinary tract, skin, soft tissue, bone, and of the gastrointestinal/hepatobiliary and central nervous systems), septicemia, and pelvic inflammatory disease^{2,3}.

This paper describes a case of *Pseudomonas aeruginosa* meningitis treated with netilmicin intravenously and intrathecally.

Case Report

Ş.V., a three-and-a-half-month-old girl was admitted to Hacettepe Children's Hospital on November 6, 1980, after four days of high fever, vomiting and seizures which lasted 20-30 minutes each time.

Physical examination revealed a lethargic child with a temperature of 38.2°C and a pulse rate of 156/min. Weight and height were 6,200 g and 64 cm, respectively. With the exception of a tense and bulging fontanelle the physical examination was noncontributory.

Hemoglobin was 8.25 g/dl and the white blood cell (WBC) count was 15,000/mm³ with a differentiation of 54% granulocytes and 46% lymphocytes (Table I). Platelets were present on the peripheral blood smear.

Urinalysis revealed trace proteinuria and microscopic pyuria. Bacterial throat and stool cultures yielded no pathogens. However *Klebsiella aeruginosa*, 100,000

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colony/ml, grew in a urine culture and were found to be sensitive to trimethoprim-sulphomethoxazole, keflin, gentamicin and ampicillin.

TABLE I
Hematologic Findings of the Patient

Day of the disease	Hemoglobin (g/dl)	White blood cell count	Differential	Platelets
5th	8.25	15,000/mm ³	54% G*, 46% L**	In groups
11th	9.00	12,000/mm ³	60% G, 40% L	In groups
17th	9.00	16,000/mm ³	72% G, 28% L	In groups
23rd	10.00	8,000/mm ³	58% G, 42% L	In groups

* G = Granulocyte

** L = Lymphocyte

Cerebrospinal fluid (CSF) findings (Table II) were compatible with bacterial meningitis, and the patient was treated with penicillin G (500,000 u/kg, intravenously in six divided doses) and chloramphenicol (100 mg/kg iv).

Since there was no significant clinical improvement and no changes in the CSF findings on the sixth and ninth days after admission (Table II), chloramphenicol was discontinued and the patient was given penicillin G (1,000,000 u/kg/day) and gentamicin (5 mg/kg/day). On the ninth day a CSF culture grew *Pseudomonas aeruginosa* which was resistant to gentamicin and penicillin and sensitive to netilmicin, carbenicillin (500 mg/kg/day) and netilmicin (4 mg/kg/day in two divided doses iv) were started, and the latter was also introduced intrathecally (1 mg/day) for six days. Since her clinical condition and laboratory findings improved and her urinalysis became normal and sterile, the patient was discharged with a prescription of netilmicin (4 mg/kg im) for four more days (Table II). She was examined in the outpatient department a week later and found to be completely recovered.

Discussion

All the complaints of this well-developed infant could be related to her urinary infection, but because of her lethargy and the tense and bulging fontanelle, cerebrospinal fluid was obtained which indicated bacterial meningitis. Although the cultures of the first two specimens did not reveal any organism, later *Pseudomonas aeruginosa* was cultured. This is one of the most prevalent organisms in purulent meningitis of very young babies in Turkey. Since her meningitis did not respond to appropriate doses of penicillin + chloramphenicol and penicillin + gentamicin, we

TABLE II
Cerebrospinal Fluid Findings with Different Antibiotic Treatments

Day of the disease	Cell	Protein	Sugar	Simultaneous blood sugar	Culture	Antibiotic
5th	250 G [*] 70 L ^{**}	300 mg/dl	20 mg/dl	70 mg/dl	—	Penicillin + Chloramphenicol
11th	300 G 60 L	250 mg/dl	30 mg/dl	80 mg/dl	—	Penicillin + Chloramphenicol
14th	360 G 50 L	320 mg/dl	10 mg/dl	50 mg/dl	P.aeruginosa	Penicillin + Gentamicin
16th	300 G 60 L	—	—	—	—	Carbenicillin + Netilmicin
17th	300 G 60 L	—	—	—	—	Carbenicillin + Netilmicin
18th	240 G 60 L	—	—	—	—	Carbenicillin + Netilmicin
19th	200 G	—	—	—	—	Carbenicillin + Netilmicin
20th	120 G 40 L	140 mg/dl	30 mg/dl	70 mg/dl	—	Carbenicillin + Netilmicin
21st	80 G	—	—	—	—	Carbenicillin + Netilmicin
23rd	10 G	100 mg/dl	60 mg/dl	100 mg/dl	—	Carbenicillin + Netilmicin

• G = Granulocyte

** L = Lymphocyte

were inclined to accept that *Pseudomonas aeruginosa* was most likely responsible for her meningitis, which improved steadily following carbenicillin and netilmicin administration. An evaluation of the specific role of netilmicin in the treatment of this case was not possible because of the antibiotic combination, but the penicillin and aminoglycoside combination seems to be justified in the treatment of infections due to gram-negative bacteria, since the synergistic effect of these antibiotics has been demonstrated⁴.

Netilmicin has been administered safely for the treatment of newborn meningitis⁵. This is possibly the first intrathecal administration of this antibiotic.

The levels of netilmicin in different body fluids have been studied and its penetration into the cerebrospinal fluid was not found to be constant. Therefore it was given intrathecally as well as systemically⁶. Our experience in this case might indicate that netilmicin could be used intrathecally in the treatment of meningitis as it has already been used intravenously in children^{7,8}. Although intrathecal administration of antibiotics in the treatment of meningitis of very young children is still debatable, we believe that every effort should be made to investigate the value of this practice since the prognosis of meningitis in these children is guarded.

Summary

A three-and-a-half-month-old girl with *Pseudomonas aeruginosa* meningitis treated successfully with netilmicin is presented. To the best of our knowledge, this is the first intrathecal administration of netilmicin.

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