Successful treatment of pan - resistant pseudomonas Aerugınosa menıngıtıs wıth ıntrathecal polymyxın b therapy

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Abstract

Serious treatment problems are experienced in nosocomial infections caused by multi-drug resistant Pseudomonas aeruginosa especially in intensive care units. We report a case of multi-drug resistant Pseudomonas aeruginosa meningitis treated succesfully with intrathecal polymyxin B. As the 26 year old female patient operated in the department of neurosurgery with the diagnosis of hemangioblastoma developed hydrocephalus 14 days after the operation, external dreinage was initiated The patient developed pain and consciousness. CSF findings were WBC 1800/ mm3 (%90 PMN, %10 lympocyte), glucose 21 mg/dl, protein 87 mg/dl. In the CSF obtained from the external drainage, there was growth of Pseudomonas aeruginosa. It was only sensitive to carbapenems and meropenem was initiated at a dose 3x2 gr iv. CSF findings and the patient's clinical condition did not improve and the growth of Pseudomonas aeruginosa continued under meropenem treatment. Pseudomonas aeruginosa has developed resistance to carbapenems and meropenem was stopped. It was only sensitive to polymyxin B was investigated with disc diffusion method and the diameter of inhibition was found to be 15 mm.Polymyxin B administrated intrathecally every other day until two weeks. In the following CSF controls, findings improved and there was no growth. The patient's hydrocephalus was taken undercontrolled external dreinage was ended. Her treatment was completed and she was discharged. She visited our out-patient department montly about one year.

CASE REPORT

Nosocomial infections caused by multidrug-resistant bacteria are creating an

important health problem. Antibiotic resistance has increased at a frightening pace

during last two decads, especially in intensive care units. According to European data

Escherichia coli, Pseudomonas aeruginosa, Enterobacter spp., Klebsiella spp. and

Acinetobacter spp. are the dominating bacteria in those units(1). Some causitive

agents are being isolated most commonly in our country data and these are all

important for their multi drug resistance(2). Serious treatment problems are

experienced in nosocomial infections caused by multi-drug resistant Pseudomonas

aeruginosa especially in intensive care units(3). We report a case of multi-drug

resistant Pseudomonas aeruginosa meningitis treated succesfully with intrathecal

polymyxin B.

As the 26 year old female patient operated in the department of neurosurgery with

the diagnosis of hemangioblastoma developed hydrocephalus 14 days after the

operation, external dreinage was initiated. The patient developed pain and

consciousness. CSF(cerebrospinal fluid) findings were WBC: 1300/mm3(%80 PMN,

%20 lympocyte), CSF glucose: 31 mg/dl, protein:80 mg/dl, and the CSF cultures

yielded methicillin resistant Staphylococcus aureus. Vancomycin 2gr/day and

rifampicin 600 mg/day combination administrated. On the 21 st day of treatment, the

patient's general condition improved. In control LP CSF findings were WBC: 21/mm3,

glucose: 54 mg/dl, protein 54 mg/dl. On the 6 th day after the cessation of the

treatment, she developed fever and nuchal stiffness her general condition

deteriorated, CSF and blood cultures were repeated. CSF findings were WBC 1800/

mm3 (%90 PMN, %10 lympocyte), glucose 21 mg/dl, protein 87 mg/dl. In the CSF

obtained from the external drainage, there was growth of Pseudomonas aeruginosa.

It was found to be resistant to 3 rd and 4 th generation cephalosporins,

antipseudomonal penicilin + beta lactamase inhibitor combinations, to quinolons and

aminoglycoside group antibiotics with disc diffusion method. It was only sensitive to

carbapenems and meropenem was initiated at a dose 3x2 gr iv. CSF findings and

the patient's clinical condition did not improve and the growth of Pseudomonas

aeruginosa continued under meropenem treatment. Pseudomonas aeruginosa has

developed resistance to carbapenems and meropenem was stopped. It was only

sensitive to polymyxin B was investigated with disc diffusion method and the

diameter of inhibition was found to be 15 mm. In the disc diffusion, if the inhibition

zone of Polymyxin B >15 mm, it is accepted as sensitive. As Polymyxin B

preparations were not available in Turkey, they were brought from abroad. The

patient's family was informed about the treatment and written consent was obtained.

As there were no penetration to CSF in iv administration, the treatment was initiated

intrathecally at a dose of 50 000 U/day for three days. Afterwards, it was

administrated every other day until two weeks. In the following CSF controls, findings

improved and there was no growth. The patient's hydrocephalus was taken

undercontrolled external dreinage was ended. Her treatment was completed and she

was discharged. She visited our out-patient department montly about one year.

DISCUSSION

Resistant Pseudomonas aeruginosa meningitis that was treated by Colistine was

reported in Turkey(4). Segal et al utilized iv meropenem and intraventricular

polymyxin B in the treatment of cephalosporin resistant Klebsiella pneumoniae

ventriculitis obtained succesful results(5). There are several case reports about the

treatment of meningitis with intrathecal or intraventricular

use of polymyxins in

patients with gram-negative meningitis(6).

Our knowledge concerning in the utilization of polymyxin B is limited. As the case for

colistin we do not have preparations of polymyxin B in our country either. We do not

observed any side effect during the treatment and the drug was well tolerated by the

patient. Polymyxin B is a polypeptide group antibiotic that has been isolated from

Bacillus polymyxa. Polymyxins are active against selected gram negative bacteria,

including Acinetobacter species, Pseudomonas aeruginosa, Klebsiella spp.,

Enterobacter spp(7). By interacting with the membran phospholipids of the bacteria

and increasing cellular permeability, it has bactericidal effects on cell membrane

through detergent action. The microorganism that are resistant to polymyxin B

possess cell walls that inhibit the entrance of the drug to cell membrane. There is no

cross resistance to other antimicrobials and resistance rarely develops during

treatment. As polymyxin B is bound to cell membrans with high affinity(in local

administration) systemic reactions are very rare. In systemic applications it might

cause nephrotoxicity(albuminuria, nitrogenemia) and neurotoxicity(facial paralysis,

peripheral paresthesia, ataxia). During intrathecal administration there are findings of

meningeal irritation such as fever, headache(increase of proteins and cells in CSF),

rashes, drug fever and trombophlebits. Polymyxin B excreted though the kidneys. It is

not absorbed from the gastrointestinal tract. It does not cross blood-brain barrier, thus

cannot enter CSF. It has limited transmission to body fluids and organs such as

lungs, liver, kidney and sceleteal muscle. Polymyxin B has intravenous, intrathecal

and topical route of administration in treatment. For the intrathecal administrations

performed in adults patients and above two years of age after the first 3-4 days a

single daily dose of 50 000 units/day is given every other day and the treatment is

completed in two weeks(8,9).

The case has been presented for the purpose of emphasizing the role of

polymyxin B in the treatment of pan-resistant Pseudomonas aeruginosa meningitis

for which the treatment choices are limited.

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