Brief Reports

SUCCESSFUL TREATMENT OF HOSPITAL ACQUIRED *KLEBSIELLA PNEUMONIAE* MENINGITIS IN A NEONATE WITH CIPROFLOXACIN

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Ciprofloxacin, a new synthetic fluoroquinolone with broad spectrum bactericidal activity has been successfully used for treating multidrug resistant Gram negative infection in children(1-3) but there are no reports of use of ciprofloxacin in neonatal meningitis in Indian literature. We report our experience of treating a neonate with multidrug resistant *Klebsiella pneumoniae* meningitis and septicemia successfully with ciprofloxacin.

Case Report

A full term appropriate for date male neonate was hospitalized at 12 hours because of birth asphyxia and at admission had features of stage II hypoxemic-ischemic encephalopathy. He was managed conservatively with steady improvement in neurological status. On eleventh day of hospital stay, he developed lethargy, sclerema, generalized bleeding and recurrent attacks of seizure. The abdomen was mildly distended with an enlarged liver but spleen was not palpable. Anterior fontanelle was flat and there was no increase in head circumference or focal neurological deficit. Investigations revealed low absolute neutrophil count, thrombocytopenia, conjugated hyperbilirubinemia (total serum bilirubin 17 mg/dl with conjugated fraction of 12 mg/dl) and elevated serum transaminases (SGOT/PT–65/50). The cerebrospinal fluid (CSF) examination revealed 90 cells/mm^3 with 85% polymorphonuclear leucocytes, CSF sugar of 27 mg/dl (corresponding blood sugar 85 mg/dl) and protein of 60 mg/dl. Both blood and CSF grew *Klebsiella pneumoniae* on culture which was sensitive only to ciprofloxacin and resistant to all other commonly used antibiotics including third generation cephalosporins. Cranial ultrasound did not show any evidence of ventriculitis or brain abscess.

The baby was managed with intravenous fluid, intravenous cefotaxime and amikacin in antimeningitis doses, anticonvulsants, inotropic agents, and single volume exchange transfusion with fresh whole blood for sepsis and bleeding tendency. As he continued to deteriorate and based on sensitivity report, his antibiotics were changed to ciprofloxacin, which was administered in a dose of 10 mg/kg/day in two divided doses as an infusion over ½ hour period. He showed steady improvement; seizure and bleeding tendencies became passive by third day and icterus by seventh day of starting ciprofloxacin

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therapy. Absolute neutrophil count and platelet count, serum transaminases returned to normal by sixth day and repeat CSF was sterile on fourth day of the therapy. He did not develop any complications of meningitis, nor he had any adverse effect of the drug including that of renal impairment during the whole course of therapy.

At time of discharge, he was accepting breast feeds, was neurologically normal and did not have any abnormality on cranial ultrasound. The baby is being followed regularly.

Discussion

Quinolones other than nalidixic acid have not been approved for use in children primarily because of their potentiality to cause irreversible cartilage damage of weight bearing joint in immature animals(2). In the index case, we did not have any other option but to use ciprofloxacin as he had meningitis with multidrug-resistant *Klebsiella pneumoniae* sensitive only to ciprofloxacin. It is a well known fact that ciprofloxacin associated arthropathy is dose dependent and species specific(2) and like nalidixic acid may not lead to articular cartilage damage, in human beings. Ciprofloxacin has been used previously in premature and very low birth weight babies to treat septicemia without any adverse effects(4).

Ciprofloxacin penetrates tissues well and therapeutic concentrations in the CSF have been achieved even in the subjects without inflammation of meningitis(5). Bannon *et al.* and Isaacs *et al.* have already reported the successful treatment of meningitis with ventriculitis in neonates caused by multidrug resistant *Enterobacter cloacae* strains and *Pseudomonas aeruginosa*, respectively(4,6). In neonatal ventriculitis 60-70% of peak plasma concentrations of the drug were achieved in the CSF 14 times the inhibitory concentration of the organism(4). Minimum inhibitory concentration of the organism in our baby was not measured as the baby showed steady improvement and did not develop any complication during the therapy.

In addition to articular cartilage damage, the unwanted side effects of ciprofloxacin include hepatic and renal impairment. No such side effects were observed in our patient; rather the hepatic dysfunction because of septicemia which the baby had, improved with ciprofloxacin therapy.

With the benefit of this experience, we suggest the use of ciprofloxacin in neonatal meningitis in instances of proven infection with multidrug resistant organisms.

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