Promising New Carbapenem Antibiotics for Treatment of Neonatal Meningitis due to *Campylobacter fetus*

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**Introduction**

*Campylobacter fetus* is a rare etiological agent of neonatal meningitis. However, it is a clinically significant bacterium because many cases of neonatal meningitis caused by *C. fetus* result in death or severe sequelae\(^3\).

Recently, two new carbapenem antibiotics, meropenem (MEPM) and panipenem (PAPM), which possess relatively good ability to penetrate into the cerebrospinal fluid and a lower risk of inducing seizures than imipenem (IPM), have been developed in Japan\(^2,^3\).

We evaluated the *in vitro* antibacterial activity of the drugs against clinically isolated *C. fetus* by determining the minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC).

**Materials and Methods**

Of the 10 *C. fetus* strains used in the study seven were isolated from cerebrospinal fluid, two from stools and one from blood. Three of the patients were neonates, one was a preschool child and six were adults.

The MIC was determined by the microdilution broth method\(^4\). Mueller-Hinton broth was used and the microtiter plates were incubated at 37°C in a 10% CO\(_2\), 10% O\(_2\) and 80% N\(_2\) atmosphere for 48 hr. The final inoculum contained approximately 10\(^5\) colony-forming units (CFU)/well, which was equal to 10\(^6\) CFU/ml. The MBC was the lowest concentration that produced 99% killing compared with the initial inoculum of the MIC cultures.

**Results and Discussion**

The MIC and MBC of both MEPM and PAPM were 0.03 µg/ml ≥ for all 10 *C. fetus* clinical isolates. On the other hand, the MIC of IPM was 0.03 µg/ml ≥ for the 10 isolates and the MBC was 0.03 µg/ml ≥ for seven isolates and 0.06 µg/ml for three.

We have reported\(^5\) that *C. fetus* was not satisfactorily susceptible *in vitro* to several antibiotics used for the treatment of meningitis and that IPM, the first carbapenem introduced in the clinical field, was the only promising drug according to *in vitro* evaluation of antibacterial effects. We have to be careful, however, in using IPM for meningitis because it has the ability to cause seizures as a
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MEPM and PAPM were found to have strong bacteriostatic and bacteriocidal effects *in vitro* on the *C. fetus* clinical isolates. We believe that the drugs are very promising for treatment of neonatal *C. fetus* meningitis although the safety of the antibiotics has not been established in neonates.

These drugs were well tolerated in infants although the number of clinical trials is still limited\(^6,7\). We hope the clinical efficacy and safety of the antibiotics for treatment of *C. fetus* meningitis in neonates and infants will be confirmed.

References


*Campylobacter fetus* による新生兒髄膜炎の治療薬剤として
期待される新しいカルバペネム系抗生物質

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