SUSCEPTIBILITY OF CAMPYLOBACTER FETUS SUBSP. JEJUNI, ISOLATED FROM PATIENTS IN JAKARTA, INDONESIA TO ANTIMICROBIAL AGENTS

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Susceptibility of *Campylobacter fetus* subsp. *jejuni*, isolated from patients in Jakarta, Indonesia to ten antimicrobial agents

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The activity of ten antimicrobials was tested against 28 *Campylobacter fetus* subsp. *jejuni* isolates cultured from the stools of human gastroenteritis and suspected typhoid fever patients from Jakarta, Indonesia. Erythromycin, tetracycline, chloramphenicol and gentamicin were the most active, benzylpenicillin, ampicillin and mecillinam were moderately active and cephalothin, sulfamethoxazole and trimethoprim totally inactive.

Introduction

*Campylobacter fetus* subsp. *jejuni* is now accepted as another pathogen causing primarily gastroenteritis (Bengtsson & Uhnou, 1978; Bokkenheuser et al., 1979; De Mol & Mosmans, 1978; Ringertz et al., 1980) and also producing colitis and bacteraemia (Longfield et al., 1979; Willoughby et al., 1979; Skirrow, 1977). Antimicrobial sensitivity studies (Vanhoff et al., 1978; Vanhoff et al., 1980) have shown that *Camp. fetus* subsp. *jejuni* is generally sensitive to easily achievable serum levels of gentamicin, erythromycin, tetracycline and chloramphenicol. It is usually resistant to the penicillins and cephalosporins. The purpose of this study was to determine the minimum inhibitory concentration (MIC) of ten antimicrobials, commonly used in Indonesia, against *Camp. fetus* subsp. *jejuni* isolated from the faeces of gastroenteritis and suspected typhoid fever patients in Jakarta, Indonesia and to compare the MIC values with those reported for *Camp. fetus* subsp. *jejuni* isolated in other parts of the world.

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Materials and methods

Isolates
The 28 Camp. fetus subsp. jejuni strains used in this study were cultured from the faeces of 19 gastroenteritis and five suspected typhoid fever patients examined at the Infectious Diseases Hospital and four children suffering from gastroenteritis in an orphanage, Jakarta, Indonesia, during July-October 1979. An inoculum of faeces was streaked on a Campylobacter selective medium (BVTP) consisting of 5% defibrinated sheep blood—trypticase soy agar medium (BBL) containing 10 mg/l vancomycin, 5 mg/l trimethoprim lactate and 2500 iu/l polymyxin B sulphate (Oxoid). The cultures were incubated at 48 h at 43°C in an atmosphere of approximately 5% oxygen, 10% carbon dioxide and 85% nitrogen obtained by a Gas-Pak system without catalyst (BBL). Identification of Camp. fetus subsp. jejuni was based on the Gram stain, rapid, tumbling motility, reduction of nitrate to nitrite, oxidase and catalase activity and sensitivity to nalidixic acid (30 μg disc).

Susceptibility testing
The antibiotic minimum inhibitory concentration (MIC) was determined using an agar dilution method described by Vanhoff et al. (1978). Briefly, growth was taken from a 48 h culture of Camp. fetus subsp. jejuni and added to thioglycollate broth (Difco). The broth culture was incubated overnight at 37°C and some of the inoculum added to fresh broth to give a final level of 10^6–10^7 organisms per ml. Approximately 2 μl of the suspension was applied with a Steers (1959) multipoint inoculator to the surface of antibiotic containing agar plates. These were incubated 48 h at 37°C in a Gas-Pak jar without catalyst and containing anaerobic Gas-Pak envelopes. The MIC was the lowest antibiotic concentration that prevented visible growth. The antibiotic medium consisted of Mueller-Hinton agar (Difco) when testing ampicillin and tetracycline (Bristol), cephalothin and erythromycin (Eli Lilly), benzylpenicillin (Wyeth), gentamicin (Schering), chloramphenicol (Parke Davis) and mecillinam (Leo Pharmaceutical). Mueller-Hinton agar plus 5% lysed horse blood was used when testing trimethoprim and sulphamethoxazole (Burrough’s Wellcome).

Results
Table I, shows the MIC range, MIC_90 and MIC_99 values for the ten antimicrobial agents used in this study. Erythromycin, tetracycline, chloramphenicol and gentamicin were clearly the most active against Camp. fetus subsp. jejuni with an MIC_99 of <0.25 mg/l for erythromycin, tetracycline and gentamicin and 1 mg/l for chloramphenicol and an MIC_99 of <0.25 μg/ml for tetracycline and gentamicin. 2 μg/ml for chloramphenicol and 0.5 μg/ml for erythromycin. The penicillins were moderately active at an MIC_99 range of 4–16 mg/l with mecillinam and benzylpenicillin being the least active. Sulphamethoxazole, trimethoprim and cephalothin were inactive.

Discussion
The results of the ten different antimicrobial susceptibility patterns of the 28 Camp.
### Table 1. Susceptibility of 28 Camp. fetus subsp. jejuni isolates from Jakarta, Indonesia to various antibiotics

<table>
<thead>
<tr>
<th>Drug</th>
<th>MIC Range (mg/l)</th>
<th>Inhibitory concn (mg/l)</th>
<th>MIC&lt;sub&gt;50&lt;/sub&gt;</th>
<th>MIC&lt;sub&gt;90&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin</td>
<td>2–8</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Benzylpenicillin</td>
<td>4–32</td>
<td>8</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Meccillinam</td>
<td>2–32</td>
<td>4</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Cephalothin</td>
<td>&gt;128</td>
<td>&gt;128</td>
<td>&gt;128</td>
<td></td>
</tr>
<tr>
<td>Erythromycin</td>
<td>≤0.25–0.5</td>
<td>≤0.25</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Tetracycline</td>
<td>≤0.25–0.5</td>
<td>≤0.25</td>
<td>≤0.25</td>
<td></td>
</tr>
<tr>
<td>Gentamicin</td>
<td>≤0.25</td>
<td>≤0.25</td>
<td>≤0.25</td>
<td></td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>0.5–4</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Sulphamethoxazole</td>
<td>16–64</td>
<td>16</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Trimethoprim</td>
<td>&gt;128</td>
<td>&gt;128</td>
<td>&gt;128</td>
<td></td>
</tr>
</tbody>
</table>

*Camp. fetus subsp. jejuni* isolates were in general agreement with those reported by Vanhoff et al. (1980) in Belgium, and Walder (1979) in Sweden. Both investigators found that erythromycin, tetracycline, gentamicin and chloramphenicol were all highly active against *Camp. fetus* subsp. *jejuni*. However, approximately 8% of their strains were resistant to erythromycin or tetracycline whereas none of those tested by us were found to be resistant. Otherwise, there did not appear to be a significant difference between the MIC values of the remainder of the antimicrobials tested and the corresponding ones tested by previous investigators.

Currently, erythromycin is considered the drug of choice to treat Campylobacter-caused gastroenteritis, colitis and bacteremia (Longfield et al., 1979; Willoughby et al., 1979). The high activity of this antimicrobial against the isolates we tested would suggest it would also be effective in the treatment of patients in Jakarta suffering from a *Camp. fetus* subsp. *jejuni* infection. None of the gastroenteritis patients in this study were given antibiotic and all but a 2-year old responded to treatment with proper oral rehydration and bed rest. The 2-year old with apparent campylobacteriosis died from severe dehydration before rehydration could be implemented. The patients with symptoms suggestive of typhoid fever were given chloramphenicol empirically at admission before culture results were available. They were later diagnosed as not having typhoid fever but campylobacteriosis. Their symptoms also resolved but whether antimicrobial therapy influenced this or not was difficult to determine.

The results of our study showed that there did not appear to be a major difference between the antimicrobial susceptibility pattern of *Camp. fetus* subsp. *jejuni* isolated in Jakarta, Indonesia and those reported from other areas of the world.

### References


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