one strain each and by trimethoprim for three strains were reduced (by 2, 6 and 6–7 mm, respectively) after incubation in a CO₂-containing atmosphere compared with those obtained following incubation in the aerobic atmosphere. None of the seven isolates was CO₂-dependent and in all cases, the susceptibility categories for the relevant antibiotics were downgraded from susceptible in the aerobic atmosphere to intermediate susceptibility in the CO₂-containing atmosphere.

The results of this study demonstrate that most pneumococcal and H. influenzae isolates will grow aerobically on primary culture and that CO₂-dependent pneumococci and H. influenzae grow adequately in either a candle or huff jar. In addition, when determining the susceptibilities of pneumococci to oxacillin, erythromycin, trimethoprim and tetracycline, accurate results are obtained for the majority of pneumococci without relying on incubation in an atmosphere containing 5% CO₂. On the basis of this evidence, it is questionable whether CO₂ incubators are necessary for culturing sputum samples when cheaper and equally effective options are readily available.

References


Comparative in-vitro activity of levofloxacin against Chlamydia spp.

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Sir,

Chlamydiae are obligate intracellular, Gram-negative bacteria, four species of which have been identified to date: Chlamydia pneumoniae, Chlamydia psittaci, Chlamydia trachomatis and Chlamydia pecorum. Ch. pneumoniae and C. psittaci cause respiratory tract infections, while C. trachomatis is associated with infections of the upper and lower respiratory tracts, the genitourinary tract and the conjunctiva: the pathogenicity of C. pecorum is uncertain.

Tetracyclines are regarded as the drugs of choice for the treatment of patients with chlamydial infections. However, the well-documented recurrence of symptoms with C. psittaci, the potential for resistance to standard therapy to develop and the existence of strains exhibiting heterotopic resistance to erythromycin, tetracycline and their congeners have stimulated a search for alternative agents. The new fluoroquinolones are characterized by potent in-vitro activities against a broad spectrum of organisms, including Mycoplasma, Legionella and Chlamydia spp. Ofloxacin, in particular, has been shown to be effective and well-tolerated therapy of patients with infections caused by Chlamydia spp. Levofloxacin, the L-isomer of racemic ofloxacin, is approximately twice as active as ofloxacin and possesses pharmacokinetic properties that allow once-daily dosing. In the present study, we compared the in-vitro activity of levofloxacin with those of ofloxacin and three tetracyclines against strains belonging to three chlamydial species.

Three isolates of C. trachomatis (belonging to serotypes D, E and LGV2-434/Bu respectively), one of C. psittaci (6BC) and one of C. pneumoniae (1077–9) were studied. The organisms were propagated in LLC-MK2 cells (a continuous cell line derived from Rhesus monkey kidney tissue) which were grown on coverslip culture in Eagle’s minimum essential medium, supplemented with 10% fetal calf serum, in 24-well microtitre plates. Levofloxacin and ofloxacin were supplied by Hoechst Marion Roussel and tetracycline, minocycline and doxycycline were obtained from Sigma Chemical Co. MICs were determined by inoculating growth medium containing cycloheximide (1 mg/L) and glucose (5 mg/L) with each strain to give a
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Table. In-vitro susceptibilities of five strains of Chlamydia spp. to two quinolones and three tetracyclines

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>C. pneumonia</th>
<th>C. psittaci</th>
<th>C. trachomatis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>LGV2</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>0.5/0.5</td>
<td>1.0/1.0</td>
<td>0.5/0.5</td>
</tr>
<tr>
<td>Ofloxacin</td>
<td>1.0/1.0</td>
<td>2.0/2.0</td>
<td>2.0/2.0</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>0.125/0.5</td>
<td>0.125/1.0</td>
<td>0.125/0.5</td>
</tr>
<tr>
<td>Minocycline</td>
<td>0.125/0.5</td>
<td>0.125/0.5</td>
<td>0.125/0.5</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>0.25/0.5</td>
<td>0.25/1.0</td>
<td>0.25/1.0</td>
</tr>
</tbody>
</table>

The results are shown in the Table. The MICs of levofloxacin, which ranged from 0.5 mg/L to 1 mg/L, were between half and quarter than those of ofloxacin. The MBCs of both quinolones were the same as the corresponding MICs. Of the tetracyclines tested, minocycline and doxycycline exhibited comparable activities which were marginally better than that of tetracycline (the MICs of the former being half those of the latter). In contrast to the quinolones, the MBCs of the tetracyclines were two to eight times the corresponding MICs. The MICs of each antibiotic for each strain tested differed by no more than one two-fold dilution.

The results of the present study are in accord with those of earlier investigations and confirm that levofloxacin and ofloxacin exhibit bactericidal activities against chlamydial strains in a single growth cycle at concentrations identical to the MICs. The bactericidal activities of the tetracyclines, on the other hand, were achieved at concentrations up to eight times the MICs. Studies designed to evaluate the efficacy of levofloxacin, and to compare this efficacy with those of tetracyclines, as treatment of patients with chlamydial infections are under way, controlled clinical trials currently being the only means of comparing the activities of antibiotics belonging to different groups in this clinical setting.

References


suspension containing $5 \times 10^6$ inclusion-forming units (ifu)/L. The inoculated plates were then centrifuged at 1700g for 1 h, after which the medium was removed and replaced with fresh medium containing cycloheximide and serial two-fold dilutions of each antibiotic. Following incubation for 48 h at 35°C, the coverslips were removed and the cells fixed with methanol and stained with a monoclonal antibody to the lipopolysaccharide genus-specific antigen as described previously. The cells were examined with a Zeiss UV microscope at 400 magnification and the MIC was defined as the lowest concentration of each antibiotic at which no inclusions were seen. MBCs were determined as described previously and the MBC was defined as the lowest concentration of each antibiotic allowing no inclusions after re-incubation of the monolayers in antibiotic-free medium for a further 48 h.