Histoid leprosy originally described by Wade ([3]) is a variant of lepromatous leprosy. It is characterized by the development of firm, hemispheric, dome-shaped, well-defined nodules on an apparently normal-looking skin. Many cases occur during a relapse after dapsone monotherapy or may arise *per se* without any prior chemotherapy. The nodules tend to arise in unusual body sites, such as the lower back, loins or axillae or over the chest and neck ([1]).

Clinical and histopathological features of the nodules in our patient suggested a diagnosis of histoid leprosy. The lesions appeared as a relapse of lepromatous leprosy, probably due to inadequate dosage and duration of dapsone monotherapy. The possibility of infection with dapsone-resistant *Mycobacterium leprae* also exists in our case, although we could not prove it due to the lack of facilities for animal inoculation studies. WHO/MDT resulted in complete clinical cure of leprosy in this patient, although a few dead bacilli persisted at the site of the nodules.

Another interesting feature observed here was the presence of histoid nodules on the lip mucosa. Unlike the nose lesions which were skin-colored and appeared in clusters, the lip lesions were discrete and coppery-red. This color variation is probably due to the increased vascularity and decreased melanization of the lip mucosa. Involvement of the mucous membrane is quite unusual in histoid leprosy, although rarely nodules have been reported to develop on the mucosal surface of the hard palate and glans penis ([2]), and may also occur in the nasal mucosa ([4]).

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Minimal Inhibitory Concentrations of Lomefloxacin and Minocycline Against Drug-Sensitive and Drug-Resistant Isolates of *M. tuberculosis* Compared on L-J and 7H11 Media

To The Editor:

Rifampin derivatives, ß-lactam antibiotics with ß-lactamase inhibitors, and fluoroquinolones are the newer and highly promising drugs against tuberculosis. Among them, little is known about the activity of lomefloxacin, a new difluoropiperazinyl quinolone ([10, 11, 14]), and minocycline, a long-acting tetracycline derivative, against *Mycobacterium tuberculosis*. Minocycline has been studied with respect to its effect on *M. leprae* only ([4, 6–8]).

In the present study, we have tested a total of 97 *M. tuberculosis* strains for their susceptibility to lomefloxacin and minocycline by the minimal inhibitory concentration (MIC) method using both Lowenstein-Jensen (L-J) medium and 7H11 medium to see if the high protein content of L-J medium would have any effect on the MICs. The strains tested included 46 *M. tuberculosis* strains resistant to S (streptomycin) H (isoniazid) R (rifampin) /HR and 51 susceptible to SHR isolated from patients. Their susceptibility to ciprofloxacin

TABLE 1. *Frequency distribution of MICs of lomefloxacin on L-J and 7H11 against 46 drug-resistant (SHR/HR) and 51 drug-sensitive (SHR) strains of* M. tuberculosis.

MIC μg/ml	L-J		7H11	
	No. SHR/HR res. strains	No. SHR sens. strains	No. SHR/HR res. strains	No. SHR sens. strains
0.5	0	0	0	0
1.0	0	0	0	0
2.0	1	2	5	5
4.0	11	8	14	18
8.0	16	23	13	14
16.0	17	18	14	14
32.0	1	0	0	0
Total	46	51	46	51

and ofloxacin had been determined previously in our Centre ([17]).

Lomefloxacin (Torrent Phamaceuticals) and minocycline [Cyanamid of Great Britain Limited (Lederle), kindly provided by Dr. M.D. Gupte, Officer-in-Charge, CJIL Field Unit, Avadi] at the final concentrations of 16.0, 8.0, 4.0, 2.0, 1.0, 0.5 and 0.25 μg/ml, and 64, 32, 16, 8, 4, 2 and 1 μg/ml, respectively, were tested in L-J medium and 7H11 medium containing oleic acid-albumin-dextrose (OADC) enrichment using standard procedures. The inoculated media were incubated at 37°C with the 7H11 plates kept in 5% CO_2, and read at the end of 4 weeks. The lowest concentration of the drug which inhibited growth to <20 colonies compared to at least ++ (numerous discrete colonies) growth on drug-free medium was taken as the minimal inhibitory concentration (MIC).

RESULTS AND DISCUSSION

Lomefloxacin. The MIC for the standard *M. tuberculosis* strain H37Rv was 4 μg/ml on L-J and 2 μg/ml on 7H11. For the other strains, the range of MICs was 2–32 μg/ml on L-J and 2–16 μg/ml on 7H11 (Table 1). A highly significant difference between the mean MICs of lomefloxacin on L-J and 7H11 was observed, MICs being generally higher on L-J. Of the 46 resistant strains, 16 had the same MICs on L-J and 7H11, 22 had higher MICs on L-J and only 8 had lower MICs on L-J (Table 2). Similarly, of the 51 sensitive strains, 21 had the same MICs on L-J and 7H11, 23 had higher MICs on L-J while only 7 had lower MICs on L-J. The geometric mean MICs for SHR/HR-resistant and SHR-sensitive strains were 0.84 and 0.82, respectively, on 7H11, and 0.94 for both resistant and sensitive strains on L-J. The differences in MICs on L-J and 7H11 were highly significant for both resistant and sensitive strains together ($p = 0.0013$), for resistant strains alone ($p = 0.0209$) and for sensitive strains alone ($p = 0.0251$). It has been reported earlier that the MICs of quinolones (norfloxacin, perfloxacin, ciprofloxacin and ofloxacin) may not vary much when the agar or broth dilution methods are used ([15]).

Fluoroquinolones have promising *in vitro* activity and low toxicity and no crossresistance has been reported between fluoroquinolones and other anti-tuberculosis drugs ([12]). In earlier studies comparing the activities of different fluoroquinolones, the activity of lomefloxacin has either been less ([10]) or has compared favorably ([14]). In the present study, the MICs of lomefloxacin (geometric mean MIC 0.94) were significantly higher than those of ciprofloxacin

TABLE 2. *Comparison of the MICs (μg/ml) of lomefloxacin on L-J and on 7H11 media.*

MIC on 7H11	MICs on L-J											
	SHR/HR-resistant strains						SHR-sensitive strains					
	2	4	8	16	32	Total	2	4	8	16	32	Total
2	0	5	0	0	0	5	1	2	2	0	0	5
4	1	2	7	5	0	15	0	4	10	4	0	18
8	0	2	6	4	0	12	0	2	7	5	0	14
16	0	2	3	8	1	14	1	0	4	9	0	14
Total	1	11	16	17	1	46	2	8	23	18	0	51

(geometric mean MIC 0.3) and ofloxacin (geometric mean MIC 0.3) on L-J for the same strains reported in an earlier study from this Centre ([17]). The MIC ranged from 2–16 μg/ml for lomefloxacin compared to 1–4 μg/ml for ciprofloxacin and ofloxacin for the same strains. However, these concentrations of lomefloxacin are probably within the levels achieved in tissues and macrophages because of its pharmacokinetic features, which include a high degree of tissue distribution, a lack of significant metabolism, good oral absorption, long serum half-life, good tolerance on oral administration, and high tissue and intracellular concentrations ([1, 2, 3, 5, 9, 13]). Thus, the activity of lomefloxacin against *M. tuberculosis* merits further study.

Minocycline. The MIC of minocycline was >64 μg/ml for all of the strains tested both on L-J and 7H11. There was more than 1+ growth (>100 colonies) of all the strains tested even at the concentration of 64 μg/ml of minocycline, indicating no activity at all of this drug at these concentrations against the *M. tuberculosis* strains tested. There is to date very meager information on the activity of minocycline against mycobacteria other than *M. leprae*. In an earlier report, of 5 *M. tuberculosis* strains tested, 4 were inhibited at 6.5 μg/ml, and all 5 at 12.5 μg/ml when Ogawa egg medium was used ([16]). The serum level is about 2 g/ml after a single oral dose of 150 mg of minocycline. Thus, the results of the present study suggest that minocycline may not be useful in the treatment of tuberculosis.

SUMMARY

The *in vitro* activity of lomefloxacin and minocycline was tested against 46 strains of *M. tuberculosis* resistant to streptomycin (S), isoniazid (H) and rifampin (R) or SHR and 51 strains sensitive to SHR by the minimal inhibitory concentration (MIC) method on two different media, namely, Lowenstein-Jensen (L-J) and Middlebrook 7H11. The results of the study showed that, irrespective of the medium used, minocycline had little activity against the strains tested and the MIC was >64 μg/ml. The MIC of lomefloxacin in 7H11 medium ranged from 2 to 16 μg/ml. There were highly significant differences in the MICs of lomefloxacin in L-J compared with 7H11. The results suggest that the activity of lomefloxacin against *M. tuberculosis* merits further study.

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