reaction to *Leishmania donovani* antigen ([4]). Therefore, follicular keratotic plugging could be a manifestation of localized keratinocyte proliferations as a result of DTH reaction having a similar immunopathological connotation as reactional leprosy. However, to the best of our knowledge, such keratotic follicular papules in relation to the plaque lesion of PKDL have not been reported earlier.

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Successful Treatment of a Lepromatous Patient with Clarithromycin

To the Editor:

In 1992, we initiated a clinical trial in lepromatous leprosy of clarithromycin designed to evaluate clinical response and the killing of *Mycobacterium leprae* by an initial 1-g dose followed subsequently by 1 g daily for 3 months. For these purposes we had planned to recruit eight previously untreated BL/LL patients but, unfortunately, after the completion of but one trial patient the San Francisco laboratory was closed; since there are only a few published pilot trials ([1, 4]) of the use of clarithromycin in leprosy patients and none by these same methods, we report the results from our sole patient.

The patient, a 24-year-old Filipino male, had a family history of leprosy and had noted a generalized nodular eruption for the preceding year. No nerve enlargement or deformation were noted and Semmes-Weinstein monofilament testing was within normal limits. An ophthalmologic exam revealed bilateral keratitis and beaded corneal nerves confined to the left eye. Slit-skin smears from six sites yielded an average bacterial index (BI) of 3.7. Skin biopsy was reported by the Ridley-Jopling classification as "polar LL."

Initially, the patient underwent clinical evaluation, had a routine hemogram, and

THE TABLE. *Viability of* M. leprae *as determined by mouse foot pad inoculation of skin biopsies from the treated patients.*

Time after therapy initiation	*M. leprae* growth[a] in four foot pad harvests	*M. leprae* growth[a] in single foot pad harvests/ total no. foot pads harvested
Pretreatment	+	2/10
1 week	+	8/10
3 weeks	−	NA[b]
5 weeks	−	0/10
9 weeks	−	NA
13 weeks	−	0/10

[a] $>10^5$ *M. leprae*/foot pad was observed.
[b] NA = Data not available.

blood chemistries were performed. After informed consent was obtained, the patient underwent a skin biopsy and took a single 1-g dose of clarithromycin. The viability of *M. leprae* in the pretreatment biopsy and its sensitivity to dapsone (0.0001%, 0.001%, and 0.01%) and clarithromycin (0.001%, 0.01%, and 0.1%) were determined. Following a skin biopsy performed 1 week after this single initial dose of clarithromycin, the patient was treated with clarithromycin 1 g daily for the next 3 months. Clinical evaluation and skin biopsies for *M. leprae* viability were performed on all subsequent clinic visits, i.e., 2 weeks, 1 month, 2 months, and 3 months after beginning daily therapy. From the pretreatment biopsy and subsequent ones 5000 *M. leprae* were inoculated into both hind feet of groups of female BALB/C mice (Jackson Laboratories, Bar Harbor, Maine, U.S.A.). The viability of *M. leprae* from these biopsies was determined from pools of four hind foot pads (two mice) harvested 12 months subsequently, as well as at times from 10 individual foot pads. In both instances viable *M. leprae* were considered to be present in the initial inoculum if $>10^5$ *M. leprae*/foot pad were harvested.

Four days after the initial single clarithromycin dose the patient experienced a 2-min episode of abdominal cramps which resolved spontaneously and did not recur. On clinical evaluation a week after the single clarithromycin dose there was no observed change in the nodular skin lesions. By 2 weeks of daily therapy there was a decrease in infiltration, perhaps as much as 50% in some lesions. Over the subsequent 2½ months, skin infiltration continued to decrease, with leprous nodules becoming progressively softer and flatter. However, by completion of therapy the infiltrated nodules were still apparent and slightly hyperpigmented. At that time the patient was switched to our usual regimen of daily dapsone 100 mg and daily rifampin 600 mg. During the course of the trial no other side effects, no reactional states, and no laboratory abnormalities were observed. The patient's pretreatment *M. leprae* isolate grew in both the four mouse foot pad pools and in some mouse single feet, and was found fully sensitive to dapsone (0.0001% in the diet). This patient's *M. leprae* were inhibited by clarithromycin 0.01% and 0.1%, but not 0.001% in the diet. Previous studies utilizing other *M. leprae* isolates in mice have reported inhibition of *M. leprae* multiplication to require a dietary concentration of clarithromycin as low as 0.001% and as high as 0.1% (2, 3, 5).

The viability of *M. leprae* from sequential skin biopsies is presented in The Table. Single-dose therapy had no measurable effect on *M. leprae* viability. However, no viable *M. leprae* were detected in four mouse foot pools inoculated with skin-biopsy specimens obtained 2 weeks, 1 month, 2 months, and 3 months after the initiation of daily therapy or in any of 10 single mouse foot pads infected with biopsies obtained 1 and 3 months after the inception of daily clarithromycin therapy.

Previously, Ji, *et al.* (4) found that clarithromycin 500 mg daily both alone (12 patients) and combined with 100 mg minocycline (11 patients) eliminated all viable *M. leprae* by 1 and 2 months of therapy. Chan, *et al.*(1) treated nine lepromatous patients with clarithromycin 1500 mg two times daily on the first day, followed by no therapy for 1 week then 1000 mg daily for 2 weeks and, finally, 500 mg daily for 6 weeks thereafter. In that study the results found were remarkably similar to those obtained in our own patient: the initial 3-g dose had no effect on *M. leprae* viability, but in all patients no viable bacilli were found at 3, 5, and 8 weeks after the initiation

of the trial. As in our patient, in both published trials ([1, 4]) the side effects were found to be minimal, and no laboratory abnormalities were detected.

In summary, as in two previously published pilot trials, our single clarithromycin-treated patient had a good clinical response, minimal side effects, and no resultant laboratory abnormalities. Loss of *M. leprae* viability was, as in one of the pilot trials ([1]), not obtained by a single day of treatment. On the other hand, in our patient and the other two studies ([1, 4]), by a few weeks of daily therapy and thereafter all viable *M. leprae* bacilli had been consistently eliminated by the means employed. Thus, as in previous trials ([1, 4]), clarithromycin appeared in our patient to be remarkably efficacious.

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Ocular Leprosy: Do Steroids Complicate Matters?

To the Editor:

Unique to leprosy are acute inflammatory conditions such as reversal reactions (upgrading) and erythema nodosum leprosum (ENL). Associated with these two reactive phases are active neuritis, silent neuritis, arthralgias, and orchitis, all of which necessitate the use of oral steroids. Topical steroid eye drops are used in ocular inflammatory conditions, such as episcleritis, scleritis and iridocyclitis. The type, dosage, delivery and duration of treatment with oral steroids varies with the severity of the condition and the speed with which the inflammation subsides. Most steroid regimens for treating reactive episodes in leprosy patients do not exceed a dosage of 60 mg of prednisolone daily or a duration of 6 months. The dosage of topical steroid eye drops also varies with the severity and the resolution of the inflammation under treatment, but most often does not exceed 12 drops a day or a duration of 1 month.

Oral steroids taken for over a year or topical steroid eye drops applied over a prolonged period are known to produce ocular complications ([3, 4]). One such complication is the forma-tion of a posterior subcapsular cataract. Tissue-culture experi-ments have shown that the presence of steroids in the growth medium adversely affects the growth of human lens epithelial cells ([1]). Reversal of the posterior subcapsular cataract can occur in some patients after stopping chronic steroid therapy ([2]). One other well-known complication is the rise in intraocular pressure producing a secondary open-angle glaucoma. Both complications can occur at any time during chronic corticosteroid administration. The rise in intraocular pressure can be harmful by causing optic nerve damage. Fortunately, discontinuing the ste-