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Field Workers' Forum

THE DIAGNOSIS OF LEPROSY: CLINICAL AND BACTERIOLOGICAL

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One of the continuing basic problems of leprosy control is that the diagnosis is made in only about one third of those estimated to be suffering from the disease. In 1966 it was thought that nearly a million new cases might appear in the subsequent 5 years in endemic areas with a prevalence of 0.5 per 1000 or more, but in fact the number actually diagnosed and registered was only about half this expected total (WHO 1966, 1970). For between two and three million children estimated to need leprosy treatment in UNICEF-assisted countries, the proportion who have been diagnosed, registered and treated for any reasonable length of time may be considerably lower. Editorials in the *Leprosy Review* (1970, 1971) have drawn attention to countries where as few as '. . . 6000 out of 80,000 . . .' and again '. . . 1 in 20 of the estimated 250,000 suffering from the disease . . .' are receiving treatment. In fact, in any part of the world where leprosy is prevalent, a penetrating analysis of the registered patients by an experienced observer is likely to reveal that the situation is even worse than is suggested by the national or regional total. This total is often an accumulated figure, unrevised by the health authorities over the decades, giving little emphasis to the number of new cases per month or year. It will not infrequently be found that it is composed largely of in-patients in leprosaria (many of whom have no medical need to live in an institution), together with a high percentage of those who are advised to "trudge weary miles every week (on insensitive feet) to obtain a supply of an anti-leprosy drug that will have no effect whatever on neuropathic ulcers." (Editorial, *Leprosy Review,* 1973). Even those who have been fortunate enough to participate in a vigorous and well-supported out-patient service, and who can look back impartially on 5–10 years' of hard work, may have to admit the unspectacular effect of their control programme and to ask if the fault lies mainly on the side of the patient, or the service provided. While such factors as the defaulter rate amongst bacilliferous cases (itself a neglected subject, still calling for the most serious study), may be important, concealment of disease by the patient – whether wilful or from ignorance – may clearly block diagnosis at the outset. Yet the reasons for this have been poorly investigated; one of the few detailed studies of this aspect of leprosy control (Giel and van Luijk, 1970) failed to identify factors in Ethiopia accounting for either concealment or default, and amongst 377 papers at the recent Tenth International Leprosy Congress in Bergen (1973), the subject was barely discussed.

If one cane use the word "fault", where does it lie? Numerous publications describe extraordinary delays and confusions in diagnosis in patients seen in America and Europe, often with exotic or subtle presentations. These are salutory, yet somewhat misleading, for in the endemic areas such errors are not important factors in the overall low level of diagnosis. The clinical diagnosis may on occasion be difficult, but it is not usually so. Guide-lines to the recognition of leprosy have been so fully published over the years that it would be out of place to repeat them here. Furthermore, there is now an increasingly valuable array of teaching material in the form of short textbooks*, a memorandum, and a guide to leprosy control†, films‡, colour transparency teaching sets§, and other texts and audio-visual aids‖. Surely any doctor called upon to diagnose leprosy owes it to his professional conscience to obtain and also make freely available to his staff a number of these inexpensive sources of information. Despite the excellent range of basic knowledge which these will provide however, a few clinical and bacteriological points still merit emphasis.

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*(a) *Handbook of Leprosy* (1971) W. H. Jopling. Publisher: William Heinemann Medical Books Ltd., 23 Bedford Square, London WC1 B 3HT. Price £1.20.

(b) *Leprosy for Students of Medicine* (1973) A. Bryceson and R. E. Pfaltzgraff. Publisher: Churchill Livingstone, Ravelston Terrace, Edinburgh, Scotland, U.K. Price £1.50.

(c) *Leprosy* (1970) S. G. Browne. Publisher: J. R. Geigy, S. A. Basle, Switzerland. Available in English, French, German and Spanish.

(d) *Leprosy, diagnosis and management* (1973) H. L. Arnold and P. Fasal. Publisher: Charles Thomas, Springfield, Illinois, U.S.A. Price $14.75.

(e) *Leprosy for practitioners* (1974) S. J. Yawalkar. Publisher: Popular Prakashan, Bombay. Price Rs 40 (£2.2).

†(a) *Memorandum on Leprosy Control* (1971) S. G. Browne. Issued jointly by OXFAM (274 Banbury Road, Oxford OX2 7DZ; U.K.), LEPRA (50 Fitzroy Street, London W1P 6AL; U.K.) and the Leprosy Mission, (50 Portland Place, London W1N 3DG, U.K.). Currently (1975) under revision.

(b) *A Guide to Leprosy Control* (1966) W.H.O. Avenue Appia, 1211 Geneva, Switzerland. New edition currently (1975) in preparation.

(c) *Guidelines for the Campaign Against Leprosy* (1970) Medical Commission of the European Federation of Anti-Leprosy Associations (ELEP)4, rue Saint-Geoffroy, F 80, Amiens, France.

‡(a) *Leprosy.* Science Service, Berlin 31, Sächsische Str., 26, Germany. 30 minutes. 16 mm Eastman-Color Kodak: price DM 2000. ½-inch magnetic tape (Philips): price DM 500.

(b) *Leprosy.* British Leprosy Relief Association (LEPRA), 50 Fitzroy Street, London W1P 6AL. 35 minutes. ½-inch magnetic tape.

§(a) Netherlands Leprosy Relief Association, c/o Royal Tropical Institute, Mauritskade 63, Amsterdam. "Leprosy: Various Aspects." 48 coated slides, daylight viewer and textbook. Price about £3. (D. L. Leiker).

(b) Medical Recording Service Foundation (Royal College of General Practitioners) Kitts Croft, Writtle, Chelmsford, CM1 3EH, England. "Leprosy in the Tropics." 48 colour transparencies and tape recording. (S. G. Browne).

(c) US Public Health Service Hospital, Carville, Louisiana, U.S.A. "Clinical Aspects of Leprosy." 60 colour transparencies and text. (John Trautman).

(d) Institute of Child Health, 30 Guilford Street, London WC1N 1EH, England. "Leprosy in Childhood." 24 colour transparencies with text: price 75p., or 50p. to those working in developing countries. Slide Tape Tutor £4–£5. (Colin McDougall).

‖(a) Ernst-Rodenwalt Institute, Viktoriastrasse 11-13, Koblenz, Germany (Professor K. F. Schaller).

(b) Fontilles Leprosarium, Alicante, Spain (Dr José Terencio de las Aguas).

(c) ALERT (All-Africa Leprosy and Rehabilitation Training Centre), P.O. Box 165, Addis Ababa, Ethiopia (Dr Felton Ross).

(d) Central Leprosy Teaching and Research Institute, Chingleput, Tamil Nadu, India (Dr C. G. S. Iyer).

Clinical

(1) The first step is to decide whether the patient has leprosy or not. Thorough examination in good light and a knowledge of the cardinal signs are essential. Yet this step is not enough; minimal information on first diagnosis must include;– classification, state of activity, bacteriological findings if available, and disability grading. These vital facts must be recorded, dated and signed; without them, subsequent assessment by others will be gravely hampered. Furthermore, in practice one recording of these facts is not enough; the patient must carry away a personal note of his diagnosis, classification, treatment and next date of attendance. He must be registered locally and centrally and there must be appropriate forms for his transfer to other parts of the country. Setting up and–even more difficult–actually maintaining such a system may seem administrative (and tedious) rather than medical practice. Yet without it, your diagnosis is hardly worth making.

(2) The key words for diagnosis are; *prepared mind–observation–fingertips–simple test for anaesthesia.* If you are not in some way mentally alerted to the possibility of the disease, you may miss it. You need to use your eyes, all over the patient's body surface, and in good illumination, and follow this by palpating the relevant superficial nerves for enlargement, asymmetry or tenderness. Testing lesions or areas of apparently normal skin for anaesthesia can be done expertly with a wisp of cotton wool or even a blade of grass; it is not the apparatus that matters, but the way you do the test, listen to replies, and draw your conclusions.

(3) In an endemic area, any unusual or persistent lesion on the skin, especially if it does not respond to "routine" treatment, should be regarded as leprosy until proved otherwise. Indeed any skin lesion which is not obviously congenital, fungal or "simple" infective should be similarly suspected. Yet take care before making a diagnosis which may consign the patient to years, possibly a life-time of drug treatment for leprosy. If you have recently arrived, you will in fact gain, not lose, respect by asking the opinion of an experienced medical assistant. Never hesitate, if your facilities or experience are in doubt, to send the patient a hundred miles for an expert opinion. Our dermatological colleagues can give invaluable guidance in puzzling cases of lupus, psoriasis, syphilis, avitaminosis and the like.

(4) With great frequency, and the more one looks for it, the initial symptom of leprosy is numbness or anaesthesia (Cochrane, 1965). Any unusual symptom which could be arising in dermal nerves, or any unusual motor or sensory finding in named peripheral nerves, is to be regarded as leprosy until proved otherwise.

(5) An unusual or persistent complaints in the eye, nose or joints should lead to a suspicion of leprosy, and call for further careful investigation.

Bacteriological

In an effort to back your diagnosis with the finding of acid-fast bacilli, slit-skin smears remain indispensible as a general routine. The techniques have been described in detail (for instance Bryceson and Pfaltzgraff, 1973) and it is here appropriate to add only a little advice and a few words of warning.

(1) If you are going to use slit-skin smears, and particularly if you expect technicians with limited educational background to produce reliable results year in, year out, you must be entirely familiar with every step of the technique, from

the rational selection of skin sites to the final interpretation of numbers and morphology or bacilli.

(2) The block selection of personnel with limited para-medical knowledge and interests, to be trained in a few weeks as "Laboratory Technicians", and then posted to remote corners of the endemic area, is likely to be disastrous. They will need constant encouragement and supervision. If you are unable to question your staff—even in the most diplomatic way possible—about the bleeding they are producing in taking skin smears*, the age of their carbol-fuchsin and the thick golden scum which floats on its surface, the strength of the decolouriser, and the reason why they have casually taken to using a weak solution of haematoxylin (in alchol!) instead of methylene blue as the counterstain—your ignorance will be apparent, and results of little value.

(3) Good smears and wonderful staining are valueless if the microscope column is floating loose on its rack-and-pinion, or the technician has not been shown how to centre the light source, or the latter is inadequate.

(4) Writing a request for "skin smears" to be taken by the patient to a laboratory in which you have not previously established your precise technical needs, is likely to be misleading. Positive smears are diagnostic of leprosy provided someone has checked the staining and interpretation on a large number of specimens over weeks or months. Negative smears need even more thought. They may be negative because the selection of lesions is wrong, staining is faulty, or the search for bacilli too short. Obvious though it may be, it bears repeating that experience reveals an excellent correlation between clinical and bacteriological findings. Any discrepancy should alert one to the need for repeating both forms of examination.

(5) Although there are occasional exceptions, particularly in Asia, leprosy in the indeterminate, tuberculoid and borderline-tuberculoid range is nearly always non-bacillary on slit-skin smears. Negative findings on smears are therefore frequently compatible with the clinical diagnosis of leprosy.

(6) Don't be misled into setting up a staining and microscope service simply because it is advised by "experts" sitting (quite comfortably in some cases) in far-off places. Some of the very real difficulties in maintaining reliable staining of *Myco. leprae* have been described in detail (Ridley and Ridley, 1971). If you are faced with a decision between doubtful laboratory results and your own clinical observations, stick to the latter; bad laboratory work is far worse than no laboratory work at all.

Before commenting on the use of biopsies in diagnosis, it is here relevant to recall that recent years have seen an expansion of research on the large number of bacilli to be found in (1) the nose, and (2) the circulating blood of lepromatous patients. Numerous studies (Pedley, 1970, 1973; Davey and Rees, 1973, 1974; McDougall *et al.*, 1974; Davey and Barton, 1973) have drawn attention to the intense pathology in septum and turbinates of the lepromatous nose, and the large numbers of apparently viable bacilli excreted into the environment from nasal mucus. A nose-blow smear or suitable scraping may now be considered important as an aid to diagnosis and the assessment of infectivity. The possible application of all this to the early detection of lepromatous leprosy has yet to be worked out,

*It is the compressing thumb and first finger which need watching; they must render the skin avascular before incision, and maintain this during the taking of the smear. On the other hand, when the skin is released, *slight bleeding* is reassuring that the correct depth has been sampled for bacilli.

but the fact that the nose is known to be heavily involved in some instances when the skin shows little or nothing clinically, could have epidemiological significance. The findings of Drutz (1971, 1972, 1974) and Shankara Manja *et al.* (1972) on the remarkable numbers of *Myco. leprae* circulating in the blood in lepromatous leprosy similarly await practical application in the field of early diagnosis, partly because they rest, as yet, on relatively complicated techniques. But early lepromatous leprosy can easily be missed clinically – at a stage when the blood and nasal mucus may contain large numbers of bacilli. Is it beyond the realms of research possibility that some form of blood test, possibly combined with those recently summarized (Godal *et al.*, 1974) for the immunological detection of sub-clinical infection, may develop as a practical aid to really early diagnosis in the field?

On the question of biopsies, those who work with full clinical and bacteriological information, particularly in various fields of research, have come to realize that they are essential not only to accurate diagnosis and classification, but also to the full understanding of reactions, and response to drugs. At various stages of the disease, slit-skin smears, however well taken and interpreted, will not reveal the full facts. The special value of biopsies has been fully described in the diagnosis of early relapse (Ridley, 1973), paucibacillary leprosy (Leiker, 1971) and lepromatous leprosy after some years of treatment (Harman, 1968). There are numerous other important applications, and it is here appropriate merely to record some thoughts on biopsies in leprosy as they affect diagnosis.

(1) There is far too much leprosy in the world, much of it clinically obvious but yet untreated, to consider biopsies as a routine.

(2) The field of diagnosis should rest firmly on your knowledge of the disease, together with observation, palpating for abnormal nerves, and simple testing for anaesthesia.

(3) If this can be backed by reliable slit-skin smears, so much the better.

(4) If your facilities are ever further developed, the service to the patient and your own level of classification and understanding of the disease (and its reactions) will rise considerable if you can add biopsies of the skin, and in selected instances, of peripheral nerve and scrotum.

(5) While scrotal biopsy is technically no more difficult than skin, it has psychological disadvantages, should be used with care and only when a biopsy of suitably chosen skin has failed to provide the information needed.

(6) Successful nerve biopsy, in which *useful* tissue is obtained without risking damage to the patient, is technically somewhat difficult, and should not be undertaken without prior instruction from an expert. It does not in any case have a "routine" application in the diagnosis or assessment of this disease.

(7) To take biopsies which show evidence of instrumental squeezing, or excessive bleeding, place them in a fixative of unknown composition and age, and submit them for examination without full clinical and bacteriological information is worse than useless. In all these procedures, meticulous attention to detail (Harman, 1973) is the least we can offer not only to achieve success under the microscope, but in consideration for a patient who may already be scarred on the skin, and short of functioning fibres in his nerves.

Despite minor disagreements, those who work at the cutting edge of the leprosy control programme in endemic areas have one undoubted thing in common—they all have too much work. Even if logical emphasis and priority are given to the lepromatous patient, must we still accept (Editorial, *Leprosy Review*,

1968) that it is "quite impossible to treat adequately and render non-contagious all patients with lepromatous leprosy in the world in the foreseeable future"? Are the "masked" and "confluent macular" forms of lepromatous leprosy (Davey, 1942; Browne, 1965) so difficult to detect, except to the experienced observer (and on a fully stripped patient) that they are likely—through nasal excretion of bacilli—to constitute a continuing pool of infection while attention is focussed on paucibacillary patients? Rapid advances in research make such questions hard to answer, but for the moment a few conclusions may be drawn.

(1) Leprosy is not being diagnosed accurately, fully and frequently enough in the endemic areas.

(2) There is an urgent need for a laboratory test, a marker or epidemiological indicator to achieve primary prevention and the detection of very early disease.

(3) There are some "faults" on the side of the patient who is, for various reasons, concealing his disease but

(4) Most of the fault is ours; we pass from one decade into another without facing the true extent of this disease in the world, and without attracting a sufficient number of the right people to help us.

Is there not a strong case—probably long overdue—for research councils, voluntary agencies and universities to set up an intensive research programme to define factors which account for the continuing non-diagnosis of leprosy?

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