

REGIONAL DIFFERENCES IN LEPROSY

LEPROSY AMONG CHINESE IN MALAYA

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Regional differences in leprosy constitute major difficulties in our common understanding of the disease. The incidence of lepra fever, tuberculoid reaction, ulcerative tuberculoid leprosy, leprotic affections of the eye, peripheral nerve involvement and leprotic alopecia varies so markedly as to make the commonplaces of one area the rarities of another. Again the relative proportion of tuberculoid and lepromatous leprosy in different countries, and even districts, is often in marked contrast. It seems probable too that the incidence of " uncharacteristic " cases shows the same variety in distribution. Lastly the disease seems to vary in virulence in different places even within the same types.

The three factors which appear to influence variations in the course of the disease are race, climate and social conditions.

Race. Differences apparently due to race are strikingly illustrated in Malaya where the course of the disease can be observed among Chinese, Malays and Indians. Leprosy is much more virulent among Chinese than among Indians.* Malays appear to be intermediate in type. At least three-quarters of the cases among Indians are tuberculoid, many of them mild, and a proportion self-healing. On the other hand, possibly only one-third of the Chinese cases are tuberculoid, and self-healing is rare.

*Except where otherwise stated the terms Chinese, Malays and Indians throughout this article refer to these races living in Malaya.

Leprotic alopecia is not uncommon among L₃ Chinese, while it is exceptional among Indians. Cases of ulcerative tuberculoid leprosy are found among Chinese, whereas the condition is unknown among Indians. Lepromatous reaction is both commoner and more severe among Chinese.

Climate. Malaya has the humid tropical non-seasonal climate in which leprosy flourishes. The mid-day temperature is always about 90° F., humidity verges on saturation point, and vegetation is luxuriant.

Social Conditions. The standard of living for the common people was, before the war, higher than in most places in India or China.

It will be seen that the climate favours the spread of the disease, while improved social conditions tend to hinder it. Further analysis only increases the contradiction. The vast majority of immigrant Chinese and Indians come from areas where the incidence of leprosy is five per mille and over, and the incidence of the disease among the Malays (the native inhabitants) probably approaches five per mille. In Indians born in Malaya the incidence of the disease drops sharply to about one per mille. It would therefore appear that under improved social and hygienic conditions the disease tends to die out among Indians. On the other hand no such difference is observed between immigrant Chinese and Chinese born in Malaya. The leprosy rate here remains about the same. The profoundly different social habits and characteristics of the three races do not appear to afford any obvious clue to the differences in the disease.

We are left with the suggestion that Chinese shew a greater inherent racial susceptibility to leprosy than Indians or Malays—an answer which is both vague and unsatisfactory.

We can but observe therefore three general factors which affect leprosy in the different races in Malaya; a genetic variation inducing racial differences, the effect of a hot, humid, non-seasonal climate favouring the spread of the disease, and, lastly, the influence of general standards, habits and diets of the community.

Assuming therefore that "regional" differences in leprosy may be genetic, climatic or social, there are also general variations existing in all countries in the course of the disease in different age-groups. A composite picture of leprosy as it affects any given community can thus be obtained only by a differential study of such age-groups.

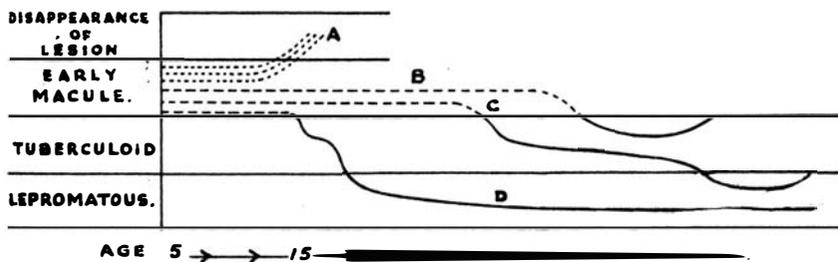
Leprosy among Chinese in Malaya is here described because (a) it is a study of the disease in a defined racial group, (b) the course of the disease and its implications on treatment, public health control, and classification appear to be in considerable contrast to those in other countries.

Among Chinese in Malaya at least 20 per mille of the age-group 5-15 shew early macules. These macules have the following characteristics:—

1. They are roughly circular and vary from 1-5 centimetres in diameter.
2. They appear on the body areas normally attacked by leprosy.
3. Clinically they closely resemble the earliest new manifestations of the disease in known leper children, and which in these leper children develop into new and frank lesions of leprosy.
4. They are hypopigmented, or sometimes on light coloured skins, hyperpigmented and faintly reddish brown in appearance.
5. There is faint erythema on close examination.
6. There is anæsthesia to very light touch.
7. No reddening of the lesion area is elicited by friction, in contrast to friction-reddening of the surrounding normal skin.
8. No bacilli are found, and the histology shews only moderate round-celled infiltration.

Such a lesion is regarded as presumptive evidence of early leprosy. It seems probable that in the majority of cases comprising this child group, the lesion is abortive or self-healing. It is however possible, and it seems a reasonable hypothesis, that the children with these early transient lesions form a primarily sensitised group which may, under adverse conditions or superinfection, develop leprosy in adult life.

In a certain proportion of the children with these early macules—possibly 20-25%—a tuberculoid lesion develops. I have never observed the development of a lepromatous lesion directly from the early macule. The important feature of the development of tuberculoid leprosy in such children is this. *The earlier the onset of tuberculoid leprosy from the appearance of the early macule, the earlier and more probable is the subsequent development of lepromatous change.* Conversely, the greater the time-lag between the early macule and the tuberculoid lesion, the less the likelihood of lepromatous development. (See graph.)



Course of Leprosy as seen in Chinese:—

- Graph A. Children with early macules which are apparently self-healing.
- Graph B. Cases in which there is a considerable time-lag between the early macule and the onset of tuberculoid leprosy. The tuberculoid lesion, when it appears, tends to be benign in character.
- Graph C. Cases in which there is a more moderate time-lag between the early macule and the onset of tuberculoid leprosy. Here there is a later possibility of the disease becoming lepromatous.
- Graph D. Cases in which there is a relatively rapid development of tuberculoid leprosy after the appearance of the early macule. Here the tendency to lepromatous development is greater and the intermediate tuberculoid phase is correspondingly short.

In the age group 16-40 the incidence of leprosy is probably at least 6 per mille. The proportion of tuberculoid and lepromatous cases is difficult to estimate for three reasons.

1. There is a considerable group which is extremely difficult to assess. This group can be divided into at least two types:—

(a) It is not a rare thing to find cases which shew typical tuberculoid lesions in one part of the body and equally typical lepromatous lesions at the same time in another part. The commonest example is the case with lepromatous infiltration of the ear and tuberculoid lesions on the trunk. (The photographs, sections and other material illustrating this and other aspects of leprosy in Malaya were destroyed by the Japanese.)

(b) In many cases the lesions both clinically and histologically appear to be at a stage intermediate between tuberculoid and lepromatous leprosy, shewing characteristics of both in the same section. In some cases a lesion may appear to be essentially tuberculoid in character, but containing considerable numbers of bacilli.

2. The long term observation of many tuberculoid cases shews a steady degeneration to the lepromatous type.

3. In almost every case of lepromatous leprosy among Chinese where a reliable history can be obtained, the evidence

suggests that the condition when first observed was tuberculoid and later became lepromatous.

It is therefore difficult to proportion the incidence of tuberculoid and lepromatous leprosy in this group, in that a considerable proportion of cases are not static but are drifting from tuberculoid to lepromatous, and the evidence seems to suggest that most if not all of the lepromatous cases have previously passed through a tuberculoid phase.

In the age group over 40 the incidence of the disease is probably 2-4 per mille, and the relative incidence of tuberculoid leprosy is very much higher than in the previous age group. The tendency to lepromatous change is also very much less.

To recapitulate, we have thus five types of evolution of the disease—

1. The early macule in children, disappearing after a time in the majority of cases. The after history of these cases of apparently abortive leprosy is not yet known.

2. The onset of tuberculoid leprosy soon after the appearance of the early macule, and the likelihood of an early subsequent development of lepromatous leprosy.

3. A delayed onset of tuberculoid leprosy, with consequent delay and decreasing likelihood of the case becoming lepromatous.

4. The onset of tuberculoid leprosy in adults which, in a certain number of cases, evolves through uncharacteristic phases to become lepromatous. Observation appears to warrant the conclusion that this is the normal development of lepromatous leprosy among Chinese.

5. The onset of tuberculoid leprosy after the age of forty. The disease here runs a comparatively non-virulent course, with much less tendency to lepromatous change.

Two other features of tuberculoid leprosy among Chinese require consideration.

- (a) It is very noticeable that patients with major tuberculoid lesions are more liable to lepromatous change than those with minor leprides. There would seem to be a certain optimum of cellular reaction in tuberculoid leprosy beyond which the process may be regarded as a dangerous acceleration, leading to exhaustion of the mechanisation of defence, and consequent bacillary proliferation.

- (b) The second interesting feature of tuberculoid leprosy among Chinese is the incidence of nerve thickening. Nerve

thickening is less evident among Chinese tuberculoid cases than among Indians, but it has also an interesting relation to age. In tuberculoid Chinese children nerve thickening is a rarity, and again in elderly lepers it is uncommon. The condition is essentially a feature of the 16-40 group.

The above outline of the course of leprosy among Chinese has certain important implications on treatment, prevention and classification.

Treatment. The approach to treatment of tuberculoid leprosy in Chinese is, or should be, on the basic assumption of the dangers of lepromatous change outlined above. In a number of places tuberculoid leprosy is regarded as, to a considerable extent, self-healing, and little is required in the way of specific treatment beyond some intradermal infiltration of the local lesion. In dealing with Chinese leprosy such a course would be inadequate, mis-directed, and even irresponsible. In these cases intradermal infiltration is *not* advisable until late in the course of treatment. The condition must be treated systematically and the lesion itself must not be obscured, for it is essential during the first months at any rate, to watch for the slightest signs of lepromatous change. Only when the patient is clearly out of danger of such lepromatous change should intradermal infiltration be instituted, and even then it may not be necessary. This statement should not be taken to convey any suggestion that intradermal injections are not of considerable value in many phases of the disease.

The systemic doses of hydnocarpus oil or esters on the other hand should be pushed to the limit of healthy tolerance. In dealing with tuberculoid leprosy among Chinese it has been my custom to *begin* with deep subcutaneous injections of oil or esters, giving 1 cc. for every ten pounds of body weight twice weekly. Thus a patient of 150 lbs. body weight receives 30 cc. a week of oil or esters as a minimum dose. In acute or reacting tuberculoid cases the dose is *increased* by at least fifty per cent. In cases where a major tuberculoid lesion threatens to involve the eyelid, or where there is danger of ulcerative tuberculoid leprosy, the treatment of choice is 60 cc.s a week or more until the condition begins to subside. With this treatment the patient should gain in body weight, appetite and fitness, and lesion-improvement should be expected within three months. A comparison over some years of the results of this intensive treatment with those obtained with weekly injections of 1-5 cc. has clearly demonstrated two things. The improvement is much more marked with high doses. The incidence of lepromatous change is greatly reduced. A protective

and stimulant infiltration of the lesion is only recommended when the natural cellular reaction of that lesion has more or less completely died down.

It has sometimes been suggested that anti-leprosy treatment should not be instituted until the patient's general health has been consolidated and all concomitant disease treated. In Chinese such a delay would be inadvisable, for the tuberculoid phase, especially in children, may be dangerously short. Specific treatment must therefore be commenced at once, and measures to improve the general health must be taken concurrently.

In the treatment of Chinese lepromatous leprosy by hydnocarpus oil or its derivatives the clinical desideratum is the avoidance of lepra reaction, which is so easily precipitated in these cases. Dosage requires to be guided by the erythrocyte sedimentation tests, and the plantar hyperalgesic test. A significant increase in the sedimentation rate, or the finding of plantar pain on heavy stroking are the first indications that the patient is on the verge of reaction, and the dose should be the maximum possible, short of the appearance of these indications. The onset of reaction must be regarded as a dangerous sign of degeneration of the patient's condition, and the aim of treatment must be to stabilise and improve the clinical state by doses calculated to avoid any possibility of excitation of the disease.

Measures taken for the public health control of leprosy are surveys, segregation, and propaganda.

In leprosy everywhere surveys of children of school age are important. Among Chinese their importance is paramount. The long term observation of cases with transient early macules is essential before our picture of the natural evolution of the disease can be anything like complete.

The detection and treatment of those cases among children who develop early tuberculoid lesions is a matter of some urgency for, as has been said, the tuberculoid phase may be dangerously short. Thirdly, it appears administratively safe to assume that each of these cases with early macules has been inoculated by an infective adult. Such adults can in many instances be traced with comparative ease, and they should obviously have first priority in segregation. The policy of segregation should therefore be a direct outcome of the detection of adults from the results of school surveys.

If the above outline of the course of the disease is correct, propaganda should have three closely allied objects. The first is the training of doctors, health and welfare workers and teachers

in the diagnosis of tuberculoid leprosy. The second is the promulgation of the two important facts about tuberculoid leprosy—that it is non-infectious, and that it is curable by skilled treatment. Thirdly, if it is true that lepromatous cases pass through a tuberculoid phase we can, in theory at any rate, break the link leading not only to incurable but to infective leprosy. From this point of view every case of lepromatous leprosy represents a failure on the part of the community both to treat the disease while it was still curable, and to prevent the onset of the phase which is the necessary factor in the production of fresh cases.

Classification. The basis of the ideal classification of leprosy must obviously depend on what we regard as the most essential problem of the disease. Where it is felt that the primary need is for a scientific understanding of leprosy, the classification favoured will be histological and bacteriological. Where facilities for such investigations are lacking the classification may be clinical. Regional variations in leprosy, however, indicate that, within the frame work of any accepted classification, there will be considerable variation in emphasis, and in the need for elucidation. In some centres, for example, the term uncharacteristic, applied to phases outside the typical tuberculoid and lepromatous poles, may be satisfactory and sufficient. In the classification of leprosy among Chinese, however, the term uncharacteristic would need considerable clarification and more positive definition before confusion could be avoided.

In the case of leprosy among Chinese, moreover, the essential need for administration, control and treatment, is a classification based on a recognition of the natural evolution of the disease. The problems of leprosy among Chinese can only be met by a clear recognition of the evolution of the lepromatous stage by gradations from the early macule to the tuberculoid phase, and from the tuberculoid phase to the leproma. From this point of view the simplest and most logical classification would be, primary (the early macule), secondary (tuberculoid) and tertiary (lepromatous). It would of course be recognised that the majority of cases of primary and secondary leprosy never advance to the tertiary stage. Such a classification would, however, give a clear cut and workable formula for understanding treatment and control, as regards leprosy among Chinese in Malaya.