CLASSIFICATION OF LEPROSY
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Since 1931, that is to say since we have specialized in leprosy, much ink has flowed on the problem of the classification of leprosy and without much success. For leprologists are not yet able or willing to agree on one classification that might at last be adopted by all.

1. Primary Classification
At the present moment there are four primary classifications in existence, which are more or less widely accepted. They are: the classifications of the 1st WHO Expert Committee on leprosy and of Madrid which only differ in a few details; the Indian classification; the classification worked out by the Japanese leprologists; and finally Cochran's classification. Needless to say, we have no intention of proposing a fifth.

We are of the opinion, with Ross INNES 5 that the WHO and Madrid classifications are acceptable, in spite of several imperfections. They seem to us to be markedly clearer and more practical than the others. What are the criticisms that are most frequently levelled at them?

First of all, the nomenclature used in the primary classification is not unanimously accepted. Thus although the expression "tuberculoid leprosy" is used by the vast majority of leprologists, DAVISON and his co-workers 3 have just recently proposed its suppression, on the ground that the histological structure characteristic of this form is transient. This objection does not appear to us to be valid. The exact classification of a patient ought to be made on his admission to antileprosy treatment and it is not permissible to modify this classification "a posteriori", solely because histological changes have intervened in regressive lesions.

It has been fully established that the histopathology of the cutaneous lesions of tuberculoid and lepromatous patients is gradually modified, and before the cure is complete it is possible to detect the picture of an ordinary non-specific chronic inflammation. It would be a grave error to try at this stage to classify these patients as indeterminate leprosy (as we saw certain leprosy services doing), making the claim that the histology of their lesions is analogous with that of the pathological changes that take place in indeterminate leprosy.

It is obvious that it is not possible to relabel a tuberculoid or lepromatous patient as indeterminate if the only reason for doing so is that the histology of the regressive skin lesions shows the picture of ordinary chronic inflammation.
While the term "lepromatous" is universally accepted, the word "indeterminate" has been strongly criticized. We cannot understand why it should be considered useless in leprosy classification. Since the descriptions "tuberculoid leprosy" and "lepromatous leprosy" are terms based on histological data, the expression "indeterminate leprosy" seems to us to be correct and intelligible, for it is based just as much on histological observations. A case of indeterminate leprosy is a patient presenting the indisputable clinical signs of leprosy, but whose lesions show the histological picture of an ordinary chronic inflammation. This patient may be called "indeterminate" if one takes into account the more distinctive "determinate" histology of tuberculoid lesions and, more markedly, of lepromatous lesions. Furthermore the definition "indeterminate" implies that we are dealing with a frequently unstable form. On the other hand we feel there is no profit in describing indeterminate leprosy as a "group" (Madrid classification). It is in fact a clinically defined initial "form" of the disease which may either remain unchanged or evolve to the end into one of the other two forms.

We feel that the terms "tuberculoid", "indeterminate", and "lepromatous" ought to be retained in the primary classification of leprosy. They are already known and accepted by the majority of leprologists and it seems unlikely to us that simple and easily understood clinical definitions could be found to replace successfully the present histologically based terms. Our test of the other classifications is that of the WHO and Madrid classifications and also those recommended by the Indian leprologists and by Cochrane in India. We feel that this is
an illogical procedure but strictly speaking it is admissible, since it does not cause any confusion when classifying patients. On the other hand we cannot allow borderline leprosy to be included in the different classifications under completely different names. Thus both the Latin-American leprologists and Cochran prefer the terms “dimorphic” or “dimorphous”, while the Indian and Japanese leprologists use “intermediate” and “atypical”. This would not matter much if all the terms had exactly the same meaning, but unfortunately this is not the case.

Borderline leprosy is described by Wade as an unstable intermediate stage between major tuberculoid leprosy and lepromatous leprosy, and capable of progressing towards major tuberculoid leprosy, from which it derives, or of evolving towards the lepromatous form. Now although the Madrid classification admits this definition and gives exactly the same meaning to the word “dimorphic”, Cochran groups under the heading “dimorphic” not only Wade’s “borderline” cases, but also patients in the intermediate phase between the clinical beginning of leprosy, which is always, according to this author, potentially lepromatous (we certainly do not share this opinion) and tuberculoid leprosy. In the Indian and Japanese classifications the borderline cases are put together with cases of indeterminate leprosy in a group called respectively “intermediate” and “atypical”.

It is evident that a unique word is necessary for an international classification and the most appropriate term, one which avoids confusion during the classification is Wade’s term “borderline” unless the word “dimorphic” be henceforth used only as a synonym of the word “borderline”.

Certain authors describe borderline leprosy as “bipolar”, basing their description on Rabbel who considers the tuberculoid and lepromatous forms as the “polar” types of the disease. But in geography the north pole never changes into the south pole, and equally in electricity the positive and negative poles are not interchangeable. Thus the description “polar types” which Rabbel gives to the tuberculoid and lepromatous forms of leprosy seems to us to be very questionable since poles are immovable. Now it is no longer possible to claim that tuberculoid leprosy is an immutable form which never evolves towards lepromatous leprosy. The polar conception of leprosy and, therefore, the expression “bipolar”, ought to be abandoned. It would be more logical to substitute the word “extreme” for “polar”, the tuberculoid and lepromatous forms of leprosy being thus defined as the two extreme types of the disease that we do not approve of the inclusion proposed by Wade and by the Indian leprologists, of a pure polyneuritic form in the primary classification.

* Certain Brazilian authors even use the adjective “infrapolar” to describe lepromatous leprosy.
We would then have in the same group patients with tuberculoid or indeterminate leprosy, as well as lepromatous cases who only show polyneuritic lesions since their cutaneous lesions have disappeared. It is inconceivable this group should be given a place in the primary classification since this classification has the precise object of defining the principal forms of the disease with a view to an orderly scientific classification of patients. And for the rest, this procedure is hardly to be recommended from a clinical point of view since the prognosis and the necessary duration of treatment differ greatly for tuberculoid, indeterminate and lepromatous patients.

We know that it is sometimes difficult to classify correctly patients who have pure polyneuritic leprosy, but this is a rare occurrence. A positive Mitsuda reaction permits us to exclude the lepromatous form, and if it is strongly positive allows us to assert that we are dealing with a tuberculoid leprosy. A weakly positive lepromin reaction, however, indicates rather an indeterminate leprosy, especially in patients with a moderate and even hypertrophy of nerve trunks. As for subjects insensitive to lepromin, indeterminate leprosy is probably what exists, unless the cutaneous stigmata or alopecia of the eyelashes indicate that we have a lepromatous patient whose cutaneous lesions have disappeared. In fact pure nerve leprosy in lepromatous cases probably does not exist, or, if it does, remains purely neuritic only for a short time since the skin is rapidly invaded by M. leprae in this form of the disease.

In very rare cases which cannot be classified by a result of clinical methods and the result of the lepromin reaction, the classification is helped by the histological examination of a small biopsy taken of a swollen nerve. In this way we were able to establish a diagnosis of tuberculoid leprosy in three lepromin-positive patients who showed only a single unilateral facial paralysis with a mild hypertrophy of one or of several cervical nerves. These biopsies had absolutely no harmful consequences. In two of these patients treatment with diaminodiphenylsulphone brought only a slight improvement, but in the third the facial paralysis had practically disappeared after 11 months of treatment.

We think that patients with polyneuritic leprosy, whether pure or secondary, ought to be classified under one of the three forms of leprosy—tuberculoid, indeterminate, or lepromatous. In case of doubt the patient could be placed provisionally in the group that seems the most likely one, but with a question mark until the classification has been confirmed or rejected by a histological examination.

The adoption of a binary classification which savors the primary classification could be achieved by using, in their biological sense, the terms "benign" and "malignant". In our opinion this binary
classification has above all the advantage of avoiding the continual repetition of the words "tuberculoid", "indeterminate", and "lepromatous" in the literature. However, this division might not fit exactly in the case of borderline leprosy, though in fact this unstable variety cannot be called biologically malignant until it has definitely evolved towards the lepromatous form. The terms benign and malignant seem to us to be preferable to lepromatous and non-lepromatous, proposed by certain authors.

On the other hand we do not advocate the use of the terms "open" and "closed" for the classification of leprosy patients. These terms would be grammatically acceptable if they were used as follows: "open" to mean that the nasal mucosa is positive or that the cutaneous lesion is ulcerated, and "closed" to mean that the nasal mucosa is negative and the cutaneous lesion is non-ulcerated. However, at present we find in the "open" group patients with only very few bacilli in non-ulcerated cutaneous lesions and also patients with strongly bacilliferous nasal mucosa and cutaneous lesions, and this seems to us undesirable.

The majority of leprologists consider that patients with few bacilli and negative nasal mucosa can in all intents and purposes be described as non-contagious. All such cases would thus be classified, under the present system, as "open" and so are subject to the sometimes irritating administrative consequences of this designation. One could perhaps use for the Administration in place of the terms "open" and "closed" the following expressions, which would be more easily understood by the non-medical: (in French, "contagieux") contagious (with positive nasal mucosa or highly bacilliferous cutaneous lesions, above all when ulcerated); (French, "presumed non-contagieux") presumed non-contagious (with negative nasal mucosa, few bacilli in non-ulcerated cutaneous lesions); (French, "non-contagieux") non-contagious (negative to bacterial examination).

II. Binary Classification

In order that it might be universally accepted the binary classification should be simple and based principally on clinical observation. The most elementary classification would thus be to subdivide each of the three forms of leprosy into "cutaneous", "neuritic", and "cutaneous-neuritic". But the usefulness of a more detailed classification is undeniable. And thus it is necessary to attempt to define the different varieties of the forms of leprosy. But it should always be borne in mind that there are certain intermediate and transitory stages that exist between different forms and even between certain varieties of leprosy, and which can sometimes be detected only by biological examination. In our opinion these intermediate stages cannot be considered as varieties as we
describe them, and they ought not, except for borderline leprosy, to be taken into account in the binary classification. Similarly the
reactional states, whether of long or short duration, which alter, for
good or for ill, the normal course of the disease cannot be classified
as different varieties. The use of the terms “pre-tuberculoid”, “tuber-
culoid reaction”, “tuberculoid transitional transformation”, “pre-
lepromatous”, “lepromatous reaction” and “nodular erythema” will
permit us to describe these transitory stages of the disease.

The distinction between the different varieties of leprosy is
essentially grounded on the clinical aspect of the cutaneous lesions,
except of course for the purely neuritic cases.

Tuberculoid Leprosy

According to the Madrid classification this form of leprosy is
divided, from the cutaneous aspect, into the three varieties “ma-
cular”, “minor” and “major”. We would add to this list borderline
leprosy.

One may wonder whether there is any profit in considering pure
macular tuberculoid leprosy as a true variety. (We would mention
that in this article we are using the terms “macule” and “macular”
in their strict dermatological sense.) In fact it is rare for an undoubted
case of tuberculoid leprosy to show only typical macular changes.
A careful clinical examination generally allows us either to detect a
very mild infiltration or to recognize previously infiltrated tubercu-
loid lesions that are now regressing. Besides, the most of the strictly
macular erythematous lesions which are included in this variety
exceptionally prove to be purely tuberculoid. They are, more often
than not, pre-tuberculoid or even prelepromatous indeterminate
lesions, whose exact nature can often only be determined by bacterio-
logical or histological methods.

As for the terminology, “macular” is a descriptive word, whereas
“minor”, “major”, and “borderline” indicate different degrees of
the infection. So if we wish to include this variety in the binary
classification it would be preferable to replace the word “macular”
by a more appropriate term. The adjective “atypical” might be sui-
table, since the infiltration, absent from the macule, is one of the
principal clinical characteristics of the tuberculoid cutaneous lesions.

Finally we prefer the term “major tuberculoid” to “reactional tubercu-
loid”, for the latter is often confused with the expression “tuberculoid reaction” by doctors unfamiliar with leprology.

We thus have the following list of varieties of tuberculoid
leprosy:

\[
\begin{array}{ll}
\text{atypical} & \text{(macular, well-defined) (?)} \\
\text{minor} & \text{(micro papular, well-defined)} \\
\text{major} & \text{(infiltrated, in a plaque or a ring, well-defined)} \\
\end{array}
\]
borderline (more or less infiltrated, in a plaque or a ring, ill-defined).

One may however object to this method of classification which is based principally on the degree of the infection while the terminology as present is used to describe the variation of the lepromatous form is certainly clinically descriptive.

Indeterminate leprosy.

In this form of leprosy there are, from the cutaneous point of view, no variations, since all the lesions are strictly macular. At most one might make distinctions on the grounds of colour. But these lesions are almost always hypopigmented.

As for erythematous macules, bacteriological and above all histological methods reveal that we are most often dealing with indeterminate protuberant, or even protelomato us lesions. Finally hyperpigmented macules are extremely rare.

Lepromatous leprosy.

In lepromatous leprosy there are in reality only two cutaneous varieties: lepromatous leprosy with figurate lesions and diffuse lepromatous leprosy.

However, we may find cases, of ordinary recent lepromatous leprosy, with nothing but figurate lesions of the same type. It will therefore be of use for the prognosis and for the assessment of therapeutic results to classify such patients in a more precise way. To do this we might subdivide the variety “figurate” into “papular”, “macular”, “nodular”, and “infiltrated”.

But such patients (that is choosing skin lesions all of the same type), are relatively rare. Most lepromatous patients have, in varying proportions, skin lesions of widely differing types. And this subdivision could only be applied to them with difficulty. But one could then specify that a certain type of lesion is “predominating”.

We may thus list the following binary classification for lepromatous leprosy:

<table>
<thead>
<tr>
<th>Binary Classification</th>
<th>Lepromatous Leprosy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papular</td>
<td>Diffuse</td>
</tr>
<tr>
<td>Macular</td>
<td>“pure” or “predominating”</td>
</tr>
<tr>
<td>Nodular</td>
<td>“pure” or “predominating”</td>
</tr>
<tr>
<td>Infiltrated</td>
<td>“pure” or “predominating”</td>
</tr>
</tbody>
</table>

The essence of this study of leprosy classification is summarised in Table I which is appended. So as not to overload the scheme we have not mentioned the bacteriological, immunological, and histological features of the different varieties and forms of leprosy. Besides, these features are not now in question. These varieties
which do not seem to be absolutely indispensable have been marked with a question mark.

Conclusion

An acceptable classification of leprosy could be rapidly decided on if leprologists would agree to remove from consideration certain regional or personal preferences, to which it is hard to attach any real importance. And this result could be achieved easily since no doctrinal differences exist in clinical, immunological, or histological aspects. It is high time that we attained such a result for it is hard to believe that only a few years from the 90th Anniversary of the discovery of the bacillus by Axenfeld Hansen, leprologists are still searching for an acceptable classification of leprosy.

Acknowledgment

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References

5. Ross Innes, J., “Personal communication” (1960).
### Table I
Classification of Leishmaniasis

<table>
<thead>
<tr>
<th>Tuberculoid</th>
<th>Indeterminate</th>
<th>Lepromatous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutaneous</td>
<td>Cutaneous</td>
<td>Cutaneous</td>
</tr>
<tr>
<td>atypical</td>
<td>atypical</td>
<td>atypical</td>
</tr>
<tr>
<td>macular</td>
<td>macular</td>
<td>macular</td>
</tr>
<tr>
<td>minor</td>
<td>minor</td>
<td>minor</td>
</tr>
<tr>
<td>micropapular</td>
<td>micropapular</td>
<td>micropapular</td>
</tr>
<tr>
<td>major</td>
<td>major</td>
<td>major</td>
</tr>
<tr>
<td>in a plaque or a ring, well-defined</td>
<td>in a plaque or a ring, more or less infiltrated, ill-defined</td>
<td>in a plaque or a ring, more or less infiltrated, ill-defined</td>
</tr>
<tr>
<td>Neuritic</td>
<td>Neuritic</td>
<td>Neuritic</td>
</tr>
<tr>
<td>pure</td>
<td>pure</td>
<td>pure (?)</td>
</tr>
<tr>
<td>secondary</td>
<td>secondary</td>
<td>secondary</td>
</tr>
<tr>
<td>Cutaneous-Neuritic</td>
<td>Cutaneous-Neuritic</td>
<td>Cutaneous-Neuritic</td>
</tr>
</tbody>
</table>

- Hypopigmented, and rarely erythematous or hypopigmented
- "pure" or "predominating"