Lepr Rev (1992) **63,** Supplement, 61s–65s

Defining a case of leprosy

V K PANNIKAR

Introduction

In leprosy, as in many other diseases, there are situations where the definition of a 'case' is uncertain. Some diseases can be diagnosed with certainty at autopsy only, such as Alzheimer's disease, and hyaline membrane disease. For some other conditions, such as cervical dysplasia and the adult onset of diabetes, there is a continuum from normal to abnormal with no clear demarcation line between them.

A Dictionary of Epidemiology[1] defines a case as 'a person in the population or study group identified as having a particular disease, health disorder, or condition under investigation'.

There have been attempts to provide an operational definition by assigning levels of certainty to the diagnosis of a number of different diseases. The Expanded Programme for Immunization (EPI) has produced guidelines to grade various EPI diseases as 'suspect', 'probable' or 'certain'.[2] To formulate a definition of a 'case' that would cover all aspects of a disease would be difficult, since it would be voluminous and academic, and probably of very little practical value. The usefulness of a definition that is meant to serve as a basis for action—an operational definition—may be determined by its practical applicability, not by the degree of its completeness. An operational definition must be judged in the light of its stated purpose, and what is relevant is whether it contributes to meeting the agreed purpose, which is control of leprosy in the community. It is widely recognized that the diagnosis of leprosy is often difficult. It has even been said that the absence of a clearly-stated 'case' definition calls into question much of the leprosy literature in so far as it renders results incomparable and unreproducible. Newell[3] remarked that 'there is no definite, finite or absolute test, sign or finding which can be said to divide a person with leprosy infection or leprosy illness from the rest of the population'.

The disease

Leprosy is often defined as 'a chronic disease of man resulting from infection with *Mycobacterium leprae* and affecting primarily nerves, skin and mucosa of the upper respiratory tract'. In the absence of any reliable tools for detecting the subclinical stages of the infection process, the emphasis for diagnosis of the disease is on clinical manifestations. The most remarkable thing about leprosy is the enormously wide variation in the

0305-7518/92/063061s+05 $01.00

way the disease affects different individuals: in some patients the disease involves only one peripheral nerve, or causes a single skin lesion which persists indefinitely or disappears of its own accord, while in others it produces a variety of skin lesions, together with destruction of several peripheral nerve trunks and damage to organs such as eyes, larynx, or bones, etc. Every conceivable variation occurs between these two extremes.

The diagnosis

Most clinical leprosy comes to our attention through the recognition of certain skin or nerve lesions. The very slow onset, history of long duration, absence of any irritation or itching and history of contact are very suggestive. Leiker[4] states that: 'it is a general rule that the diagnosis of leprosy would always be considered as a possibility whenever in a chronic skin disease or neurological disorder, another diagnosis cannot be made with full confidence, or the patient does not respond to the treatment which is normally effective'. The diagnosis of leprosy is based on the demonstration of one or more of the following cardinal signs:

- characteristic skin lesions;
- sensory loss in the lesion or area;
- thickened nerves; and
- presence of AFB in skin smears.

The histopathological diagnosis of leprosy is based on cellular infiltration of nerve branches and/or the presence of intracellular acid-fast bacilli.

The definition

The Sixth WHO Expert Committee on Leprosy[5] defined a case of leprosy as 'a person showing clinical signs of leprosy, with or without bacteriological confirmation of the diagnosis and requiring chemotherapy'.

The problem

a A long history of disease, a slow and insidious onset combined with the absence of irritation and itching are highly suggestive of leprosy but not diagnostic unless supported by signs like sensory loss, thickened nerves, or AFB in the skin smears. However, in practice, eliciting partial sensory loss and judging thickening of nerves is difficult and services for skin-smear examinations in leprosy endemic areas is generally unsatisfactory.

b Leprosy control programmes, as well as field-based epidemiological studies, have relied on the identification of leprosy by clinical diagnosis. There is considerable inter- and intra-observer variation observed in the diagnosis of leprosy, especially in PB cases. This has serious implications when comparing leprosy situations in different areas or in the same area at different points of time.

c Histopathological examination does not always help in the diagnosis of early leprosy.

d There is no independent 'gold standard' for the diagnosis of leprosy. Neither serology nor skin tests have a high enough degree of sensitivity and specificity to be useful in confirming or eliminating all suspect cases of leprosy.

e The clinical diagnosis of leprosy as observed in a total population survey seems to present greater difficulties than it does among self-reporting patients. In a survey, in about 35% of actively-found suspects, leprosy could not be confirmed. The difficulty applies almost entirely to PB leprosy, because diagnosis of MB leprosy could usually be established on the basis of results of skin smears.

f Under field conditions, the diagnosis and classification of leprosy are generally the responsibility of paramedical workers. It is necessary to determine the proportion of underdiagnosis and misdiagnosis in the findings of paramedical workers.

g In countries with a specialized programme for leprosy there is a tendency towards overdiagnosis, especially if case detection targets are imposed. In countries with integrated programmes, leprosy is often underdiagnosed because of lack of training and motivation.

h At present leprosy patients 'needing' or 'underoing' treatment, those who have 'completed MDT treatment', those who 'require surveillance', those who are 'under surveillance', those with 'deformities and disabilities', and those who 'need care' are sometimes grouped together as 'cases of leprosy'. Lack of distinction between these categories continues to be a source of error in computing and comparing statistics necessary for planning and organizing leprosy control programmes.

i The clinical diagnostic criteria often vary with individual examiners and their diagnostic prejudices.

j In a vast majority of PB cases the disease manifests itself as one or two inconspicuous skin lesions, which may disappear spontaneously.

k In the minimal lesions, there appear to be a real doubt as to whether many of the lesions are indeed those of leprosy, especially in areas where the prevalence of other dermatological conditions causing changes in the colour and texture of the skin are common.

l The initial 'indeterminate' class, though widely used, often in the absence of cardinal signs to diagnose 'early' or 'suspect' lesions in the field, is poorly defined and a constant source of disagreement between leprologists and pathologists.

Points for discussion

a The differential diagnosis in the absence of positive skin smears is often based on the examination of peripheral nerves. In such cases the diagnosis of leprosy should not be considered unless definite loss of sensation can be demonstrated in skin areas innervated by the corresponding nerve.

b Patients in whom a presumptive diagnosis is made on the basis of other evidence (such as non-anaesthetic skin lesions, history of contact, etc.) may be kept as 'suspect cases'. Wherever possible, these can be entered in a separate register to facilitate follow-up procedures.

c An individual who had been afflicted by the disease, presenting without any sign of clinical activity and with negative bacteriological findings should not be referred to as a 'case', and not even as an 'ex-case'.

d The programme should promote self-detection through health education, as self-reported patients generally have established disease and also are more inclined to attend for treatment regularly. In practice, the majority of established cases (both PB and MB) self-report. It is only the minimal or doubtful lesions which are detected by active surveys.

e It is important that standardized diagnostic criteria are laid down, which will be as valid, unambiguous, reproducible and simple enough to be adopted by the field workers.

f The real issue for control is rather an operational one:

Who is at risk of developing deformities and disabilities?
Who is capable of transmitting the disease to his/her contacts?

This calls for a definition which is robust enough to minimize false 'positive' diagnoses.

g In established leprosy, there is firm agreement between clinical and histopathological diagnoses. However, in early disease there is much disagreement.

h The diagnosis of leprosy is a serious matter and a wrong diagnosis may unnecessarily put the patient and his family through great mental agony. Therefore, if there is even the slightest doubt, the patient should be kept under observation until further evidence confirms the disease.

The self-healing

The majority of patients with one or two lesions self-heal with no sequelae, do not need chemotherapy, and run the risk of stigmatization. In Cochrane's study 70% of indeterminate leprosy cases self-healed. Lara & Nolasco,[6] reported that all types of lesions showed a tendency towards healing. Nearly 78% of the lesions healed spontaneously and 12·5% showed incomplete healing.

Noordeen[7] reported that 103 of 270 (38%) tuberculoid cases showed spontaneous healing. Sirumban[8] found that the rate of healing in untreated PB leprosy to be 22·4% per year. The healing time in these studies was about 2 years.

If we take the analogy from tuberculosis, only 10% of infections may manifest as clinical disease. This may also be true for leprosy.

The 'initial' or 'early' or 'minimal' or 'indeterminate' lesions are probably signs of infection rather than early signs of the disease itself.

Summary

The biological and technical hurdles confronting the development of new diagnostic tools are manifestly great in leprosy. Leprosy diagnosis in the field, for control as well as for research purposes, will have to remain, for the time being, predominantly clinical.

It is important that the significance and relevance of diagnosing so-called 'early' lesions must be viewed in the context of the objectives of leprosy control. All evidence suggests that the majority of these 'cases' are not likely to progress in the individual, nor is there any evidence that these 'cases' are of any importance for the transmission of the disease. At its best, such 'cases' may be a sign of temporary infection which will disappear

spontaneously within a few months without leaving any residual signs. It is more likely that the majority of these are not cases of leprosy.

In making such a diagnosis its ethical implications on the individual, his family and the local society must be considered, given the intense social stigma this diagnosis will generate; besides the cost of treatment and the potential risk of serious side-effects due to treatment.

It may be justifiable to have a broad definition if the incidence of leprosy is still high and all reported cases are to be accepted as valid. But once the backlog of cases has been detected and, as a result of control efforts, the number of new cases begins to decrease, there is a need to narrow the case definition for national statistics. When the disease is on the verge of elimination, the case-definition may be more rigorous (by adding verification procedures/investigations before accepting for inclusion in the national statistics).

It is evident that active case-finding programmes and sample surveys detect a large number of self-healing early lesions or non-leprosy conditions which do not contribute to the main objective of leprosy control. It is unjustified to continue with active case-finding programmes if the proportion of progressive/advanced new cases has reached a low level. Moreover, in integrated programmes, based on the PHC system, the customary distinction between active and passive case-finding is no longer valid, as the health infrastructure is expected to have reached the doorsteps of the population.

This is not an attempt to advocate 'late' case detection, because it is well known that in many diseases, including leprosy, the cost of treatment for advanced cases is high and the success rate is low. What is important is to develop standardized and valid criteria for the diagnosis of leprosy, so that those who need treatment are easily identified and treated, and those who are not affected by leprosy escape the unnecessary burden of stigmatization. In general, leprosy progresses very slowly and it is possible to detect established cases before they develop serious deformities or disabilities, through community health education programmes. Additionally in programmes where MDT has been implemented vigourously, it has renewed the community's confidence in health services and has promoted self-reporting to a great extent.

References

[1] *A Dictionary of Epidemiology*. Last JM (ed.). Oxford University Press, 1983.
[2] *Provisional guidelines for the diagnosis and classification of the EPI target diseases for primary health care, surveillance and special studies*. EPI/GEN/83/4, WHO, Geneva.
[3] Newell KW. An epidemiologist's view of leprosy. *Bull WHO*, 1966; **34:** 827–857.
[4] Leiker DL. In *Leprosy*. Hastings RC (ed.). Churchill Livingstone, 1985.
[5] WHO Technical Report Series, No. 768, 1988 (WHO *Expert Committee on Leprosy*: sixth report).
[6] Lara CB, Nolasco JO. Self-healing lesions. *Int J Lepr*, 1956; **24:** 245–263.
[7] Noordeen SK. Evaluation of tuberculoid leprosy in a community. *Leprosy India*, 1975; **47:** 85–93.
[8] Sirumban P. Healing time in untreated paucibacillary leprosy. A cross-sectional study. *Int J Lepr*, 1988; **56:** 223–228.