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Editorial

EVOLUTION OF THE LEPROSY PROBLEM IN SOME AFRICAN AREAS DURING THE 1980-89 DECADE

Ten years have now elapsed since leprosy control has been radically changed by the introduction of combined treatment regimens (commonly called «MDT», for multidrug therapy). The two reasons for the introduction of these combined regimens were the increasing prevalence of dapsone resistant *Mycobacterium leprae* (11) resulting from dapsone monotherapy applied for 25 years, and the very long duration of treatment: a variable number of years in paucibacillary leprosy (PB) and life long in multibacillary leprosy (MB). This was the result of the mainly bacteriostatic activity of dapsone.

Curiously, not a single controlled prospective trial had ever been undertaken to define the optimal duration of dapsone treatment even in PB leprosy.

The discovery of the rapidly bactericidal activity of rifampicin (RMP) (8) opened new perspectives in the treatment of leprosy, the more so when other drugs active against *Mycobacterium leprae* became available, resulting in MDT regimens (1, 4, 7, 11).

Since 1980-1981 intensive programmes of leprosy diagnosis and treatment were introduced in the République Fédérale Islamique des Comores, in Burundi, in Rwanda and the Haut Zaire and Uele regions of Zaire. Case detection was always based on spontaneous presentation, but the diagnoses were documented by standardized clinical, bacteriological and histopathological examinations.

At the start there was also a considerable backlog of «old cases» in all areas and in many centers, some of which had suffered serious political difficulties in their past, many patients were on the registers whose original diagnosis was poorly documented, had taken dapsone for many years, had no signs of active disease and in whom microscopy was now negative for *Mycobacterium leprae*. At first these patients were continued on dapsone monotherapy but by 1982-83 it became clear that some reasonable and acceptable action had to be taken for these patients or ex-patients. Except in Rwanda, it was decided to administer to all these patients a single dose of 1,500 mg RMP, to declare them (bacteriologically) cured and to invite them to show up if they suspected any relapse. On the island of Grande Comore, (Comores archipel), where no new cases had been diagnosed during the previous 2 years a single 1,500 mg dose of RMP was thus given in 1982 to 120 patients, of whom 36 were old MB cases. Only one new case of PB leprosy was diagnosed between 1982 and 1989. It was concluded that the island was leprosy free.

In Burundi a single dose of 1,500 mg RMP was administered in 1983-1984 to 900 ex-MB patients. The relapse rate was 1.2 per 100 patient years of

follow-up (17 relapses were diagnosed after 2 years, 13 after 3 years, 14 after 4 years, 13 after 5 years, 12 after 6 years, 6 after 7 years).

In Rwanda the Ministry of Health decided recently to stop all treatment in bacteriologically negative old MB patients who had been treated with dapsone monotherapy of 10 years or more.

Follow-up is too short to evaluate the outcome.

In the Haut Zaire region of Zaire, the 1,500 mg single dose RMP was administered to 743 such patients, with a relapse rate of 1.4 per 100 patient-years of follow up (1 after 1 year, 13 after 2 years, 19 after 3 years, 13 after 4 years, 5 after 5 years). All relapsing patients were treated with standard combined therapy. The strategy was acceptable but it is not clear whether the administration of the single 1,500 mg dose of RMP was of any benefit.

Intensive chemotherapy has thus been going on in all these countries for almost a decade, but what was the evolution of the endemy in these areas? (2, 5, 6, 9, 10).

For an infectious agent to maintain itself in a population of hosts, it is necessary for each infectious patient to produce, before being cured or dying, at least one infectious patient. Lacking the equivalent of the tuberculin test it has not been possible in leprosy to define the number of persons whom an infectious patient infects in the course of his disease and the percentage of subjects who, among those infected, will become patients and in particular, infectious patients.

In tuberculosis it is estimated that each infectious patient infects 10-20 subjects during the mean 2 years that he remains infectious. The average figure for the risk of evolution from infection towards disease is 10 %, this risk being concentrated especially in the first two years after infection. If an infectious patient infects 10-20 subjects, if 10 % of these become patients of whom 50 % will be infections themselves, one case of infectious tuberculosis would have to infect 20 persons for one new infectious case to appear.

Such figures are unknown for leprosy. On the basis of relapses occuring after treatment it can be estimated that the highest risk for development of disease after primary infection is during the next 2 to 6 years. The detection data show that in Africa 15-30 % of new cases are multibacillary. But probably only half to one third of the cases classified as multibacillary are infectious, i.e. with the nose mucosa affected and nose blows positive for *Mycobacterium leprae*. The proportion of infectious cases would than be of the order of 5-10 %. Leprosy would indeed be «less infectious» than tuberculosis, and a significantly greater number of persons should be infected by one infectious patient for the infection to maintain itself in a given population. On the other hand, in many endemic areas some infectious leprosy patients probably remain undiagnosed and untreated for a longer time before being diagnosed and therefore could spread the infection for a much longer period than 2 years in tuberculosis.

For the time being the only parameter available is the case detection rate but in how far this reflects the incidence rate is totally unknown.

It is concluded from a low disability rate among newly diagnosed patients that diagnoses are made early in the evolution of the disease, but this still gives no information concerning the undetected cases. Limited population

surveys in Uele, Zaire (10) and Burundi (3) show that undetected cases do exist. In Uele all of them were paucibacillary, but in Burundi, there were also multibacillary cases, all in women.

This illustrates that a segment of the population is untouched by the case detection efforts, as in the rule for all public health efforts. One of the objectives of leprosy control must be to keep this segment as small as possible.

Since in the areas mentioned leprosy control activities were quite constant during the 1980 decade, the evolution may be considered valid.

The most striking fact is that in none of the areas there was a measurable reduction in the detection rate during the 1980 decade, only in Burundi was there a significant decrease in the percentage of PB children.

The highest detection rate is on the island of Anjouan (Comores archipel) where the disease is also very common in children, while both the very low disability rates and the anamnestic information point to early detection (5) (Table 1). The infection rate in children in Anjouan must be very high and the question arises whether these children are infected by adults or whether there is an intense inter-child transmission. The early detection of leprosy in adults points to an important role of the latter mechanism.

TABLE 1
Some epidemiologic parameters on leprosy in various regions

	Detection rate (per 1,000)	MB %	PB % in children	MB % in children	PB % disabilities	MB % disabilities
Comores	0.38	34	44	30	4	2
Burundi	0.03	30	21-9(*)	10	39	29
Rwanda	0.007	38	4	10	21	10
Haut Zaire (Zaire)	0.27	20	3.7	5	13	18
Uele (Zaire)	0.16	33	5	8.6	18	46

(*) first and second half of 1980 decade

PB: paucibacillary leprosy; MB: multibacillary leprosy

Leprosy would then have to be considered part of the numerous other bacteria and viruses intensely transmitted in early childhood in developing countries such as respiratory syncytial virus, cytomegalo-, Epstein-Barr, herpes simplex, rubella, hepatitis B and many others and leprosy in adults would be secondary to a primary infection in childhood.

In the other areas 5-10 % of MB patients are children. Whether this reflects a lower infection rate in children is unknown. In Rwanda, with a very low number of cases, 10 % of MB disease is also in children. In Burundi PB leprosy in children decreased significantly during 1985-89; (6) since the overall detection rate did not change it means that PB disease shifted to the older age groups. Although this might be a sign of improvement, PB disease among children in Burundi now approaches the level in Haut Zaire and Uele where the overall detection rate is 5 to 10 times higher.

If leprosy is partly or mainly a childhood infection, it remains unknown why it is much more widespread in Anjouan than on the African continent, where there are also great differences between countries or regions e.a.

between Rwanda, Zaire and Burundi; and in Burundi where the detection rate is considerably higher in the peripheral lower altitude parts of the country than on the Central high plateaus.

If adult leprosy is mostly the long term result of a childhood infection, this would explain why it takes many years of continuous efforts to see the endemy decrease. Furthermore, rapidly sterilizing treatment regimens would not rapidly improve the endemy, their effect being mainly a better patient compliance and the prevention of both relapses and drug resistance. The main task in leprosy control, the reduction of the virus reservoir through case finding and treatment only slowly leads to a reduction of the endemy. Really short course treatment regimens may be very important through the change in the attitude of the population towards the disease, exactly as short course regimens for the treatment of tuberculosis changed profoundly the attitude of the Western population towards the latter. Long term follow-up in endemic areas remains mandatory for a better understanding of the problem.

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