

The Value of Nasal Smears in Lepromatous Leprosy¹

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Bacterioscopic examination of material obtained from the mucosa covering the nasal septum has long been a standard procedure in leprosy, but its value is often questioned (²). Some of the objections raised to nasal smearing must be recognized as valid: for instance, it very rarely provides early evidence of leprosy infection, and patients object more to ungentle manipulation in the nose than to multiple slit-scrape examination of the skin. On the other hand, some objections, such as the risk of perforation of the septum and the possibility of confusion of *M. leprae* with acid-fast contaminants present in the nasal fossae, have little foundation. The crucial questions remain: do nasal smears provide additional information that will assist materially in the diagnosis of leprosy, in the assessment of its gravity, in the evaluation of the response to treatment, and in indicating freedom from infectivity?

This paper reports an analysis of the results of the bacterioscopic examination of material obtained from the nasal mucosa in 100 patients suffering from lepromatous leprosy admitted to the Research Unit, Uzuakoli Leprosy Settlement, and attempts to answer these and certain related questions.

ROUTINE PROCEDURE

Material for bacterioscopic examination is obtained from six skin sites (two from the active edge of a lesion, two from the ear lobes, and two from apparently normal skin), and from each side of the nasal septum. To provide a reasonably dependable baseline, examinations are made at first fortnightly, then at monthly intervals, and, as bacilli become fragmented and scanty,

at three month intervals. In the analysis that follows of "initial smear" results, it is understood that the average of the first three examinations is meant. The Bacterial Index (B.I.) is expressed according to Dharmendra's notation, the maximum being 4.0. Under a binocular microscope, individual bacilli (not in globi) are examined and classified as the basis for the calculation of the Morphologic Index (M.I.), which is the average of the percentages of "solid rods" found in typical fields in each of the sites examined.

For good results to be achieved consistently, and for the patients' continued acceptance of an unpleasant procedure (which, however, should not cause pain), technic is all-important. In a good light, a Thudicum's speculum is inserted well into the nostril in such a way as to display the nasal septum. A swab dipped in spirit is passed gently over the mucosa to remove excess mucus. With a blunt spud—a bicycle spoke beaten out into a fusiform extremity serves excellently—the septal mucosa is stroked firmly under direct vision, and the material thus obtained is placed on a microscope slide and stained in the usual way. A small pledget of cotton wool is inserted into the nostril to absorb any capillary oozing.

In order to achieve accuracy, consistency and comparability of results, the same experienced technician was responsible for practically all the examinations that form the basis of this study. From the data accumulated, the following questions may be answered for adult patients suffering from lepromatous leprosy in Eastern Nigeria.

Is the nasal mucosa precociously involved, i.e., can *M. leprae* be demonstrated in nasal smears before they appear elsewhere? In no patient in this series was the nasal mucosa the only site to show bacilli, although in some of the patients the dis-

¹ Received for publication September 21, 1965.

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ease, on clinical grounds, was considered to be early. This fact may have a bearing on the portal of entry of the bacilli into the human body. While tuberculoid disease is seen not infrequently in Eastern Nigeria, originating at the mucocutaneous junction in the nose or upper lip and extending to the adjacent skin, in lepromatous disease it is apparently very rare for the nasal mucosa to be the site of initial lesions.

Is there any possibility of confusing acid-fast contaminants with *M. leprae*? This theoretic objection carries little weight in practice. If the mucus is cleansed from the surface of the mucosa, and firm pressure is exerted with the scraper either on the hyperemic mucosa, or, better still, on a localized swelling in the mucosa, then almost certainly globi will be found in the patient suffering from lepromatous leprosy, in addition to numerous single acid-fast organisms of typical morphology and staining properties interspersed with tissue cells. There is usually slightly more capillary oozing from the mucosa than from the subcutis, but with care the amount should not be so great as to interfere with subsequent staining of the material obtained, or with ready recognition of the organisms.

Do nasal smears reflect the bacteriologic state in the skin and ear lobes? *Bacterial index*:—The criterion adopted was a difference of at least 1.0 between the average of the two nasal smears and the combined averages of the smears from the skin and ear lobes. In 49 out of the 100 patients the nasal B.I. was the same as that at other sites; in 28 the nasal smear had a higher index, and in 23 a lower. *Morphologic index*:—The criterion adopted was a difference of at least 20 per cent in the proportion of "solid rods" (morphologically normal bacilli) between the average of the two nasal smears and the combined averages of the smears from the other sites. In 57 patients this index was higher in the nasal mucosa than elsewhere; in 28 it was approximately the same, and in 15 lower.

In rather more than half the patients, globi were more numerous in the nasal smears than elsewhere and they tended to persist longer in the nasal mucosa.

While, therefore, examination of nasal

smears of patients with lepromatous leprosy in Eastern Nigeria will not help materially in making or confirming the diagnosis of lepromatous leprosy, in about half the patients it will provide additional information, indicating that both the B.I. and the M.I. from nasal smears are higher than those from smears from other sites.

Does any additional information accrue from examination of material obtained from the contralateral septal mucosa? In only six patients were there persistent (i.e., for at least three months) significant differences between the two sides, in the height either of the B.I. or of the M.I., or of both together.

Thus, for confirmation of the diagnosis and indication of the gravity of the infection, no additional information is gained from an examination of smears from the contralateral mucosa.

Does the nasal mucosa contain "solid rods" after their disappearance from the skin and ear lobes? The last three monthly smears that were taken before all sites smeared no longer showed solid rods, were analyzed from this point of view. At the time of the last examination, solid rods were still present in seven patients in the skin and ear lobes as well as in the nasal mucosa; in 22, solid rods had disappeared at approximately the same time in these three sites.

In the remaining 60 patients the nasal mucosa alone was the last site to harbor solid rods in 17; and, together with the skin, in three patients, and with the ear lobes in nine. The skin alone was the last site to harbor solid rods in 16 patients, the ear lobes in four, and skin and ear lobes together in 11.

The period during which the last site, or the last two sites, harbored solid rods after they had disappeared from the other site or sites, varied from a few weeks to many months. In general, the number of globi ran parallel with that of the normal bacilli, except that globi tended to be seen in nasal smears longer than in skin or ear lobe smears of comparable bacterial concentration.

Thus, in about half the patients in whom definite differences existed in the rapidity

of disappearance of bacilli from the sites examined the nasal mucosa harbored "solid rods" (either alone or with another site) longer than elsewhere.

In one patient, normal bacilli in considerable numbers, together with globi, persisted in the nasal mucosa for 16 months after they had disappeared from all other sites smeared. In another patient, normal bacilli were present in the nasal mucosa alone for years after they could no longer be found at any other site smeared.

Does the nasal mucosa contain fragmented bacilli after their disappearance from the skin and ear lobes? All acid-fast material had disappeared from all sites at the time of the last examination in 62 patients, in 7 of whom there was no appreciable distinction between the times at which the different sites became negative. In the 55 patients in whom there was some difference, the *last* sites containing acid-fast debris (where only one site was definitely the last) were: nasal mucosa, 3; skin, 6; ear lobes, 12. The nasal mucosa *first* became completely negative in 30 patients, the skin first in three, and the ear lobes first in one patient. Recognizable but degenerate bacilli persisted in the nasal mucosa of one patient for over 24 months after all acid-fast debris had disappeared from skin and ear lobes.

The relation between the initial B.I., of the nasal mucosa and other sites was found to be as follows: When the initial nasal B.I. was higher than that at other sites, acid-fast material was found in the nasal mucosa, when it had disappeared from other sites, in 5 patients out of 15. When the initial nasal B.I. was the same, acid-fast debris was found in 4 out of 22 patients. When it was lower, in no patient was acid-fast material found in the nasal mucosa after it had disappeared from the ear lobes and skin.

There appeared to be some relation between the relative height of the M.I. in the nasal mucosa compared with that at other sites, and the order in which solid rods disappeared from the different sites. Where the initial nasal M.I. (either alone, or with either ear lobes or skin) was appreciably higher than that at other sites, "solid rods"

remained longest in the nasal mucosa in 24 patients out of 52. In the 28 patients in whom the nasal M.I. was approximately the same as that at other sites, the nasal mucosa last harbored solid rods in 7, either alone, or with either ear lobes or skin. Among 15 in whom the initial nasal M.I. was lower, solid rods were seen in the nasal mucosa in two.

Is there any correlation between the absolute height of the B.I. when the patient is first examined, and the proportion of solid rods in the nasal mucosa and at the other sites? No. While some patients may have taken clandestine treatment for leprosy, which might account for a low proportion of "solid rods," it can be asserted confidently that in the untreated patient the proportion of solid rods may vary between the widest limits.

When morphologically normal *M. leprae* reappear after an interval, or when degenerate forms reappear, is the nasal mucosa predominantly involved? There is evidence that the nasal mucosa may be involved precociously when normal or degenerate *M. leprae* reappear for a shorter or longer period after they have disappeared for some months from all sites smeared. Furthermore, the nasal mucosa may be the only site involved. The epidemiologic import of this observation needs no emphasis.

DISCUSSION

It is possible that the evidence afforded by nasal smears may differ from one country to another, since the content of bacteriologically positive lepromatous infiltration of the septal mucosa may vary within wide limits among individuals and among races. Anatomic and physiologic differences also may play a part in determining such variables as the area of susceptible septal mucosa exposed to infection, and the temperature of this mucosa.

In a series of 156 patients with lepromatous leprosy in the Belgian Congo, Browne⁽¹⁾ found that the nasal mucosa was more frequently, and more highly positive bacteriologically than the skin and ear lobes, and that it was commonly the last site to harbor *M. leprae*. He concluded that nasal smears were of value in confirming the

diagnosis, in assessing the response to treatment, and in indicating freedom from infectivity.

SUMMARY

In Eastern Nigeria, bacterioscopic examination of the nasal mucosa in patients with lepromatous leprosy is of real but limited value in providing data concerning the gravity of the infection. The nasal mucosa does not harbor *M. leprae* before they appear in skin or ear lobes.

In half the patients, *M. leprae* persist in the nose when they have disappeared from the skin. Globi are frequently more numerous in the nasal mucosa and persist longer than elsewhere. No additional data of value are furnished by examination of material from the septal mucosa of the other nostril.

RESUMEN

En Nigeria del Este, los exámenes bacterioscópicos de la mucosa nasal en pacientes con lepra lepromatosa, son de valor real pero limitado, en proveer datos concernientes a la gravedad de la infección. La mucosa nasal no alberga al *M. leprae* antes de que aparezcan en la piel o en los lóbulos del oído.

En la mitad de los pacientes, el *M. leprae* persiste en la nariz cuando ellos han desaparecido de la piel. Los globulos son mas frecuentes y numerosos en la mucosa nasal y persisten mas tiempo que en otra parte. Ningun

otro dato adicional de valor es provisto por el examen del material de la mucosa septal de la otra ventana nasal.

RÉSUMÉ

Dans le Nigéria de l'Est, l'examen bactérioscopique du mucus nasal chez des malades atteints de lèpre lépromateuse présente une valeur certaine encore que limitée pour fournir des données sur la gravité de l'infection. Le mucus nasal n'abrite pas *M. leprae* avant que celui-ci ne soit apparu dans la peau ou les lobules de l'oreille.

Chez la moitié des malades, *M. leprae* persiste dans le nez alors qu'il a disparu de la peau. Les globi sont souvent plus nombreux dans le mucus nasal et y persistent plus longtemps qu'en d'autres endroits. L'examen du matériel obtenu de la muqueuse du septum dans l'autre narine ne fournit aucune information supplémentaire.

Acknowledgment. My thanks are due to Dr. S. O. Egwuatu, Chief Medical Officer, Ministry of Health, Eastern Nigeria, for permission to publish this article.

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