Histologic and Lymphangiographic Studies in Patients with Clinical Lepromatous Leprosy[1, 2, 3]

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It is common knowledge that lymph nodes are often enlarged in lepromatous leprosy ([1, 2, 5, 6, 7, 9, 12, 14, 15, 16]).

This study defines the histology of the inguinal lymph nodes and bone marrow of lepromatous patients classified clinically as having lepromatous leprosy and relates this to the lymphangiographic findings in five of these cases.

MATERIALS AND METHODS

Ten males, clinically diagnosed as having lepromatous leprosy and having palpable inguinal lymph nodes, were selected from the Abu Zabaal Leprosarium near Cairo, U.A.R. Unfortunately, the authors did not have the opportunity to confirm the clinical diagnoses by skin biopsies. The legs were thoroughly inspected for other infections which might cause lymph gland enlargement. The patients ranged from 17 to 43 years in age and averaged 29.2 years. The time from initial clinical diagnosis varied from two months to 10 years and averaged 3.7 years. The length of treatment with 300 mgm. DDS two times a week averaged 3.0 years.

The lymph nodes were removed under local anesthesia using 2 per cent lidocaine. They were sectioned along the longitudinal axis and the cut surface imprinted on alcohol-cleaned glass slides. The nodes then were fixed in Zenker's solution for three to five hours, washed 12 hours in tap water, and placed in 70 per cent alcohol until processing. After processing, the tissue was embedded in paraffin, sectioned at six microns, and stained with hematoxylin and eosin. The Fite-Faraco oil fuchsin acid-fast stain ([13]) was used to detect lepra bacilli in sections and smears. A Wright's stain was also done on the smears.

The bone marrows were aspirated through a Turkel needle from the sternum at the level of the second intercostal space. Some of the marrow particles were smeared on alcohol-cleaned glass slides. The remainder were allowed to clot and placed in Zenker's fixative. The sections and smears were stained in the same manner as the lymph nodes.

Lymphangiography was performed according to the method described in detail by Cahill and Kaiser ([4]). The web spaces between the first three toes were anesthetized with 2 per cent lidocaine. Then 0.3 ml. of isotonic, 10 per cent patent blue dye was injected deeply into the web spaces. This area was massaged for 5-10 minutes allowing the lymph channels to selectively pick up the dye. In light-skinned individuals the channels may be seen percutaneously and a small, longitudinal incision made over one of these. With darker skins the channels are rarely seen and must be located through a two centimeter transverse incision on the dorsum of the foot about six centimeters proximal to the web spaces.

A 0.5 to 1.0 cm. length of lymphatic duct was isolated by blunt dissection and cannulated by a size 30 S.W.C. needle attached

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2 From Research Project MR 005.20-0095B, Bureau of Medicine and Surgery, Navy Department, Washington, D.C. The opinions and assertions contained herein are the private ones of the authors and are not to be construed as official or as reflecting the views of the Navy Department.

3 All the histologic material was lost in mailing from the United Arab Republic to the United States. Thus, the photomicrographs are from an equivalent case on file at the Armed Forces Institute of Pathology, Acc. No. 788452.

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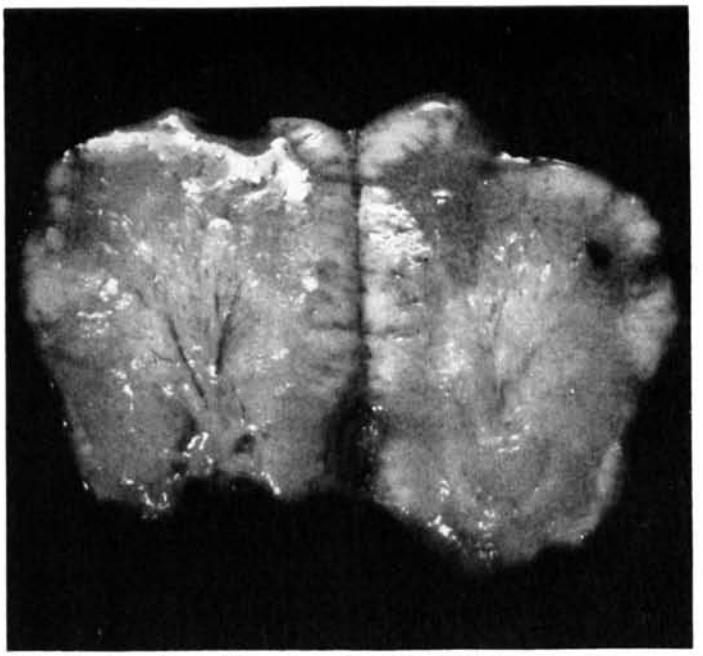

FIG. 1. Longitudinal section of lymph node. Official U.S. Navy Photograph.

to a three foot length of 1.4 mm. (outside diameter) polyvinyl tubing. The contrast medium, an ethyl ester of poppy seed oil containing 38 per cent iodine, was injected at a constant rate of one milliliter every 8-10 minutes. Six milliliters were injected into a lymphatic of each foot. The incisions were closed with 000 silk or Dermalon suture. X-rays were taken within an hour after injection and repeated in 24 and 72 hours. The patients were placed at bed rest with leg elevation for the next 24-48 hours. No untoward reactions were noted.

RESULTS

The lymph nodes were usually easily isolated by blunt dissection although they would occasionally lie in a cluster and required some sharp dissection. Grossly, the nodes were rubbery, moderately firm, and moderately friable. They ranged from 1.0 cm. to 3.0 cm. in greatest diameter. The cut surfaces (Fig. 1) of all the nodes were a glistening pink-tan, mottled by irregular pale yellow areas predominantly in the cortex. The lymph node capsules were thin and grossly normal.

In all cases, moderate to abundant numbers of marrow particles were easily aspirated.

The histologic criteria used were: (1) general lymph node architecture; (2) presence, distribution, and type of giant cells; (3) appearance of the peripheral and medullary sinuses; (4) involvement of the capsule and perilymphaphatics; (5) presence of caseation and/or suppuration; (6) distribution and quantity of bacteria.

Table 1 summarizes the histopathology. Lymphoctyes rarely infiltrated the capsule and few bacteria were scattered within the fibrous capsule. Lepra cells were found in all the nodes, predominantly in the cortex where most of the yellow mottling was seen grossly. The cytoplasmic vacuolation of the lepra cells varied from a fine foam to large clear spaces displacing the nucleus. In two cases (Nos. 1 and 4) the spindle to oval epithelioid cells predominated. Giant cells were only occasionally seen and the nuclei were scattered throughout the cytoplasm.

Follicles of all the nodes were reduced in number. In some nodes they were absent. The peripheral sinuses were never completely obstructed but were focally compressed by the lepromatous infiltrate. Some of the medullary sinuses were obliterated by the infiltrate. The number of bacteria varied greatly and was not necessarily related to the number of lepra cells. When

TABLE 1. *Summary of histopathology.*

Case No.	Age	Time since clinical diagnosis / duration therapy	Node size (cm.)	Capsule	Reticulum	Lepra cell infiltration	Follicles	Medullary cords	Giant cells	Periph. sinuses	Bacteria
1	34	2m./0	1.2	N	N	Mod.; predom. epithelioid	None	Focally compressed	Occ.	Open but compressed	Many
2	35	10y./10y.	2.9	N	N	Marked	Few small	Prominent	None	" "	Rare focus
3	17	6y./4y.	2.7	One focus of infilt.	N	Mod.	Few small	Focally compressed	Occ.	" "	Mod. no.
4	33	8y./8y.	2.7	Poorly defined	N	Mod.; predom. epithelioid	Few small	" "	Occ.	" "	Mod. focal
5	35	5y./2y.	3.0	Mild infilt.	N	Mod.	None	" "	None	" "	Mod.
6	43	1.5y./0.5y.	2.5	N	N	Mod.	None	" "	None	" "	Few
7	23	1y./0.6y.	2.4	N	N	Mod. to marked	Few	" "	None	" "	Few
8	19	4y./2y.	2.9	N	N	Marked	Few small	" "	Occ.	Marked compression	Mod.
9	29	1y./1y.	1.0	N	N	Mod. to marked	Few small	" "	None	Marked compression	Few to mod.
10	24	6mo./5mo.	2.7	N	N	Mod.	Mod. small	" "	None	Marked compression	Few

N = Normal

FIG. 2. Normal lymphangiogram (25-year-old male). AFIP Neg. No. 69-2217.

FIG. 3. Lymphaniogram of one of the patients.

there were many bacteria, scattered globi were seen.

The bone marrows on nine of the patients were all normocellular or mildly hypercellular with a slight to moderate increase in plasma cells. A rare foamy histiocyte similar to the lepra cell was found. In five cases slight to moderate numbers of acid fast organisms but no globi were seen; in the other four cases there were no organisms.

Lymphangiograms on five patients showed enlarged nodes, compatible with the clinical findings, but with no obstruction to the lymphatic flow. The nodes, compared to those in a normal lymphangiogram (Fig. 2), were larger and had a granular, homogeneous appearance (Fig. 3). There were no filling defects.

DISCUSSION

The lymph nodes ranged in size from one to three cm. which agrees with the findings of Sharma and Shrivastav (15). The cut surface has been variously described as opaque and yellow-white with abscess formation (17), yellow to yellow-brown (9), light brown with yellowish streaks (5), either uniformly yellow or with yellow cortical foci (15). We found nodes with pale yellow lobulation and mottling (Fig. 2). This most closely agreed with Sharma and Shrivastav (15). There were no abscesses or areas of caseation. Unlike Mitsuda (14) we were unable to estimate the age of the lesion by gross or microscopic examination.

Microscopically, the architecture of the nodes was altered by the lepromatous infiltrate (Fig. 4). Only a few follicles remained. Sharma and Shrivastav (15) describe obliteration of many of the sinuses while we found peripheral sinuses compressed and focally obliterated. Lepra cells were rarely found in the peripheral sinuses. The giant cells showed an irregular distribution of nuclei and most likely represent a fusion of several epithelioid cells. The epithelioid cell response in two cases (Nos. 1 and 4) indicates they were probably borderline, although clinically classed as lepromatous.

The number of bacilli had no relation to the duration of the disease or treatment. Figure 5 shows the distribution of the dark staining acid-fast bacteria. In some cases, Basombrio (1) failed to find bacilli while Furniss (7) found no bacilli in two of 48 cases. No necrosis was noted and, as emphasized by Tilden (16), illustrates the relative passiveness with which the tissue seems to accept the *Mycobacterium leprae*

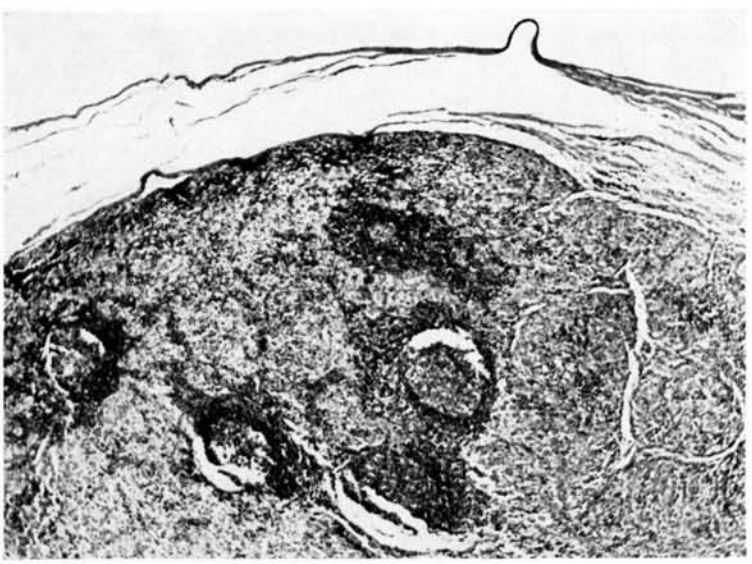

FIG. 4. Low power (42X) hematoxylin and eosin stained section of lymph node. Pale areas are predominantly histiocytes. AFIP Neg. No. 69-1078.

FIG. 5. Low power (42X) Fite-Faraco acid-fast stained section showing the distribution of the dark-staining mycobacteria. AFIP Neg. No. 69-1073.

in lepromatous leprosy, although Karat *et al.* ([11]) have recently reported an acute necrotizing lepromatous lymphadenitis.

Gass and Rishi ([8]) examined 17 bone marrows of lepromatous patients and found them all to contain bacilli. Fite ([6]) described scattered cellular and bacillary foci in the red marrow. In this study over half the marrow smears and sections revealed no acid-fast organisms and none of them showed any diagnostic lesion. The increased marrow plasma cells may be correlated with the commonly found increase of serum gamma globulins in leprosy.

The lymphangiograms outline enlarged glands with unobstructed flow of contrast medium. This correlates well with the histologic findings of compressed but not obliterated sinuses. There were no filling defects as has been reported in diseases causing replacement fibrosis, such as filariasis ([3]), avascularity or necrosis, such as in tuberculosis ([18]), or carcinoma ([10]).

SUMMARY

The pathologic changes in inguinal lymph nodes from 10 lepromatous leprosy patients is described. All cases showed some degree of lepromatous infiltration while the number of organisms varied greatly.

Bone marrow aspirates from over half the patients failed to show the acid fast organism.

Lymphangiography confirms the nodal enlargement and lack of obstruction to the lymphatic flow.

RESUMEN

Se describe la anatomía patológica de ganglios linfáticos inquinales de 10 enfermos lepromatosos. Todos los casos mostraron cierto grado de infiltración lepromatosa mientras que el número de microorganismos varió grandemente. La punción de médula ósea de la mitad de los enfermos no mostró organismos ácido-resistentes. La linfagiografía confirmó el aumento ganglionar y la falta de obstrucción del flujo linfático.

RÉSUMÉ

Description des lésions histologiques des ganglions inguinaux chez 10 malades atteints de lépre lèpromateuse. Tous les ganglions examinés ont présenté un certain degré d'infiltration lépromateuse, tandis que le nombre de microorganismes variait grandement.

Les prélèvements de moelle osseuse effectués chez plus de la moitié des malades n'ont pas montré de micro-organisms acido-résistants.

La lymphangiographie confirme l'augumentation de volume des ganglions et l'absence d'obstruction du courant lymphatique.

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