Histologic and Lymphangiographic Studies in Patients with Clinical Lepromatous Leprosy

F. O. Raasch, Jr., K. M. Cahill and Latif Kamal Hanna

It is common knowledge that lymph nodes are often enlarged in lepromatous leprosy (1, 2, 5, 6, 7, 9, 12, 16, 18).

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.

1 Received for publication 25 April 1969.
2 From Research Project M.R. 600-20-0095R, 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. 288452.
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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. Grouselly, 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) 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 perilymphatics; (5) presence of caseation and/or suppuration; (6) distribution and quantity of bacteria.

Table 1 summarizes the histopathology. Lymphocytes 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 locally 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>
<thead>
<tr>
<th>Case No.</th>
<th>Age</th>
<th>Time since clinical diagnosis</th>
<th>Node size (cm.)</th>
<th>Capsule</th>
<th>Retrinitis</th>
<th>Lepra cell infiltration</th>
<th>Follicles</th>
<th>Medullary cords</th>
<th>Giant cells</th>
<th>Periph. sinuses</th>
<th>Bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>34</td>
<td>2mo/0</td>
<td>1.2</td>
<td>N</td>
<td>N</td>
<td>None</td>
<td>Mod.; predom. epithelioid</td>
<td>None</td>
<td>Medullary compressed</td>
<td>Occ.</td>
<td>Open but compressed</td>
</tr>
<tr>
<td>2</td>
<td>35</td>
<td>10y/10y.</td>
<td>2.9</td>
<td>N</td>
<td>N</td>
<td>Marked</td>
<td>Few small</td>
<td>Prominent</td>
<td>None</td>
<td>*</td>
<td>Rare focus</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>6y/4y.</td>
<td>2.7</td>
<td>One focus of infiltr.</td>
<td>N</td>
<td>N</td>
<td>None</td>
<td>Few</td>
<td>Few small</td>
<td>None</td>
<td>*</td>
</tr>
<tr>
<td>4</td>
<td>33</td>
<td>8y/8y.</td>
<td>2.7</td>
<td>Poorly defined</td>
<td>N</td>
<td>N</td>
<td>Mod.; predom. epithelioid</td>
<td>Few small</td>
<td>Medullary compressed</td>
<td>Occ.</td>
<td>*</td>
</tr>
<tr>
<td>5</td>
<td>35</td>
<td>5y/2y.</td>
<td>3.0</td>
<td>Mild infiltr.</td>
<td>N</td>
<td>Mod.</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>*</td>
</tr>
<tr>
<td>6</td>
<td>43</td>
<td>1.5y/0.5y.</td>
<td>2.5</td>
<td>N</td>
<td>N</td>
<td>Marked</td>
<td>Few</td>
<td>None</td>
<td>None</td>
<td>*</td>
<td>Few</td>
</tr>
<tr>
<td>7</td>
<td>23</td>
<td>1y/0.6y.</td>
<td>2.4</td>
<td>N</td>
<td>N</td>
<td>Marked</td>
<td>Few small</td>
<td>None</td>
<td>None</td>
<td>*</td>
<td>Mod.</td>
</tr>
<tr>
<td>8</td>
<td>19</td>
<td>4y/2y.</td>
<td>2.9</td>
<td>N</td>
<td>N</td>
<td>Marked</td>
<td>Few small</td>
<td>None</td>
<td>Occ.</td>
<td>Marked compression</td>
<td>Mod.</td>
</tr>
<tr>
<td>9</td>
<td>20</td>
<td>1y/1y.</td>
<td>1.0</td>
<td>N</td>
<td>N</td>
<td>Marked</td>
<td>Few small</td>
<td>None</td>
<td>Occ.</td>
<td>Marked compression</td>
<td>Few to mod.</td>
</tr>
<tr>
<td>10</td>
<td>24</td>
<td>6mo/5mo.</td>
<td>2.7</td>
<td>N</td>
<td>N</td>
<td>Mod.</td>
<td>Mod. small</td>
<td>None</td>
<td>None</td>
<td>*</td>
<td>Marked compression</td>
</tr>
</tbody>
</table>

N = Normal
Fig. 2. Normal lymphangiogram (25-year-old male). AFIP Neg. No. 69-2277.

Fig. 3. Lymphangiogram 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 (14). The cut surface has been variously described as opaque and yellow-white with abscess formation (17), yellow to yellow-brown (14), light brown with yellowish streaks (14), 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 (14). 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 (14) 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, Bassomano (14) failed to find bacilli while Furniss (14) found no bacilli in two of 48 cases. No necrosis was noted and, as emphasized by Tildes (14), illustrates the relative passiveness with which the tissue seems to accept the Mycobacterium leprae.
in lepromatous leprosy, although Karat et al. (11) have recently reported an acute necrotizing lepromatous lymphadenitis.

Gass and Rishi (*) examined 17 bone
marrow of lepromatous patients and found
them all to contain bacilli. Fite (6) de-
scribed 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 in-
creased marrow plasma cells may be corre-
lated 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 his-
tologic findings of compressed but not obli-
trated sinuses. There were no filling de-
fects as has been reported in diseases
causing replacement fibrosis, such as filari-
asis (5), avascularity or necrosis, such as in
tuberculosis (10), or carcinoma (14).

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 num-
  ber 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 ga-
ñilgos linfáticos inguiuales de 10 enfermos le-
promatos. Todos los casos mostraron cierto
grado de infiltración lepromatosa mientras que
el número de microorganismos varió grande-
mente. La punción de médula ósea de la mitad
de los enfermos no mostró organismos ácido-
resistentes. La linfangiografía confirmó el au-
numento ganglionar y la falta de obstrucción
del flujo linfático.

RESUME

Description des lésions histologiques des
ganglions inguinaux chez 10 malades atteints
de lépre lepromatuse. Tous les ganglions
examind ont présenté un certain degré d’in-
filtation lepromateuse, 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-organismes acido-résistants.
La lymphangiographie confirme l’augmen-
tation de volume des ganglions et l’absence
d’obstruction du courant lymphatique.
Acknowledgments. The authors would like to thank Dr. Labib Amin, Director, Al-Azaib Lepraisum and Dr. Edward Matta and Yousef Youskie, staff physicians at the Lepraisum for their kind cooperation and assistance with the patients and Dr. Chapman H. Bluford and Wayne M. Meyers of the Leonard Wood Memorial for their advice in preparation of the article.

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