

SPECIAL ARTICLE

AXILLARY LYMPH NODES IN CARCINOMA OF THE
BREAST*

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There are various factors which affect the prognosis of carcinoma of the breast. However, the most dependable index of the advance of the disease is the state of the axillary lymph nodes. Several different techniques are used by various authors ¹⁻⁶ to study the axillary lymph nodes.

Material and Method

During the years covered by this report (1959 to 1964), 55 patients with carcinoma of the breast were operated on by the author himself or by residents under his supervision, using the technique described by Haagen-sen. ⁷ In the course of each operation, the key points - that is, the lateral superior and the medial superior points of the specimen - were marked in order to help localize each group of lymph nodes. Nine of the 55 patients were excluded from this study because of insufficient information regarding the lymph node dissections.

The specimens of these 46 cases were carefully studied by the author. Gross examination, serial sections of the breast, and the dissection of the axillary content from the specimens were done either by the author himself or by pathology residents under the author's supervision. Clearing of the axillary lymph nodes and their histological examination were done by the residents of the Department of Pathology, Ankara University Medical Faculty, and checked by Drs. Eranıl and Tanay, Professors of Pathology at Ankara University Medical Faculty. All slides of the 46 cases were also reviewed by the author after the clearing of each had been completed.

The technique we use in studying axillary lymph nodes is essentially that which was first applied by Monroe ⁶ in 1948, whereby the axillary content is cleared and rendered transparent. In Dr. Stout's laboratory,

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where the author had the opportunity of studying axillary lymph node pathology, this technique was adopted in 1951. However, instead of cedar-wood oil, we use sunflower seed oil since the former is very expensive in Turkey. This was done at the suggestion of Dr. N. Eranıl, Professor of Pathology and head of the Department of Pathology at Ankara University Medical Faculty.

Clearing Technique: The specimen of the radical mastectomy is thoroughly washed in running water. The axillary content is dissected from the specimen (Figure 1) and a drawing of it is made. This drawing will be used



Figure 1. Axillary content dissected from the radical mastectomy specimen.

to mark each lymph node individually during clearing. The axillary tissue is pinned out on a cork board and fixed in formalin solution for 24 hours. It is then incubated at 62 C for a total of 72 hours, being placed in 80 per cent alcohol the first 24 hours, in 95 per cent alcohol the next 24 hours, and in absolute alcohol the last 24 hours. The specimen is squeezed strongly by hand at each change of alcohol in order to express the liquified fat. After this procedure has been completed, the axillary content is immersed in the sunflower seed oil and kept in the incubator for 24 hours, after which the specimen becomes transparent and is ready for clearing. If it is then put in a glass tray full of sunflower seed oil and illuminated from below, the lymph nodes can be easily seen and dissected out (Figure 2). Each lymph



Figure 2. Axillary content which has been rendered transparent and illuminated from below. The lymph nodes can easily be seen.

node is marked on the diagram of axillary content previously drawn. The apparatus used to illuminate the transparent axillary content is shown in Figure 3 A and B. At least two sections are made from each lymph node, and more are made if there is a suspicious appearance. Only the involved lymph nodes are then marked on the diagram of the surgical pathology sheet according to their location in the axillary content and to the degree of invasion (Figure 4). If the lymph node is largely or completely involved by the tumor, it is considered gross involvement and is shown completely shaded in the diagram. If the tumor has invaded only a small portion of the node, for example, the marginal sinus, it is considered minute involvement and is shown partially shaded on the diagram. The total number of lymph nodes, the total number in each group, and the number, location and degree of invasion of the involved nodes are all indicated on the pathology sheet below the diagram.

Because of a technical error in the clearing of one specimen, individual lymph nodes were not plotted separately on the diagram, except for the one central group node which looked suspicious and was histologically proven to be involved by the tumor. We could not include this case in Table 2 because of the lack of statistical data, but we did include it in the series.

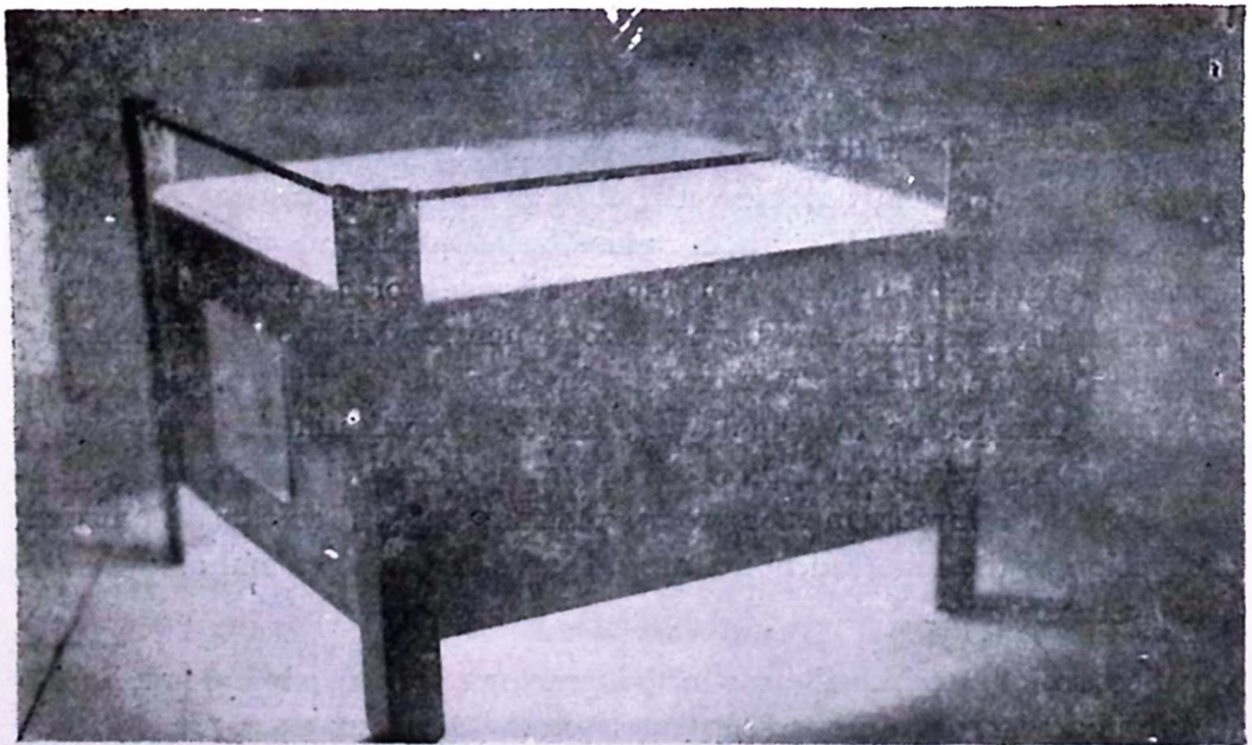
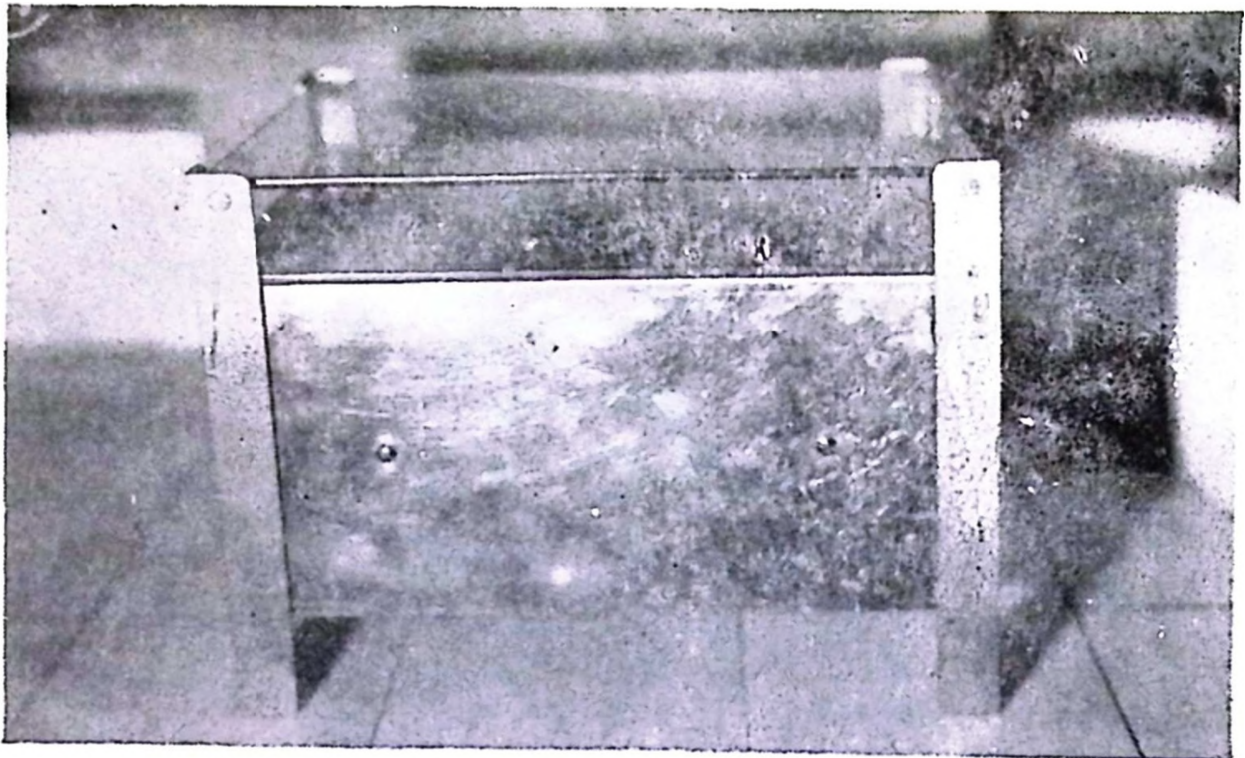


Figure 3 A and B. The apparatus used to illuminate the transparent axillary content from below. A. Light turned off. B. Light turned on.

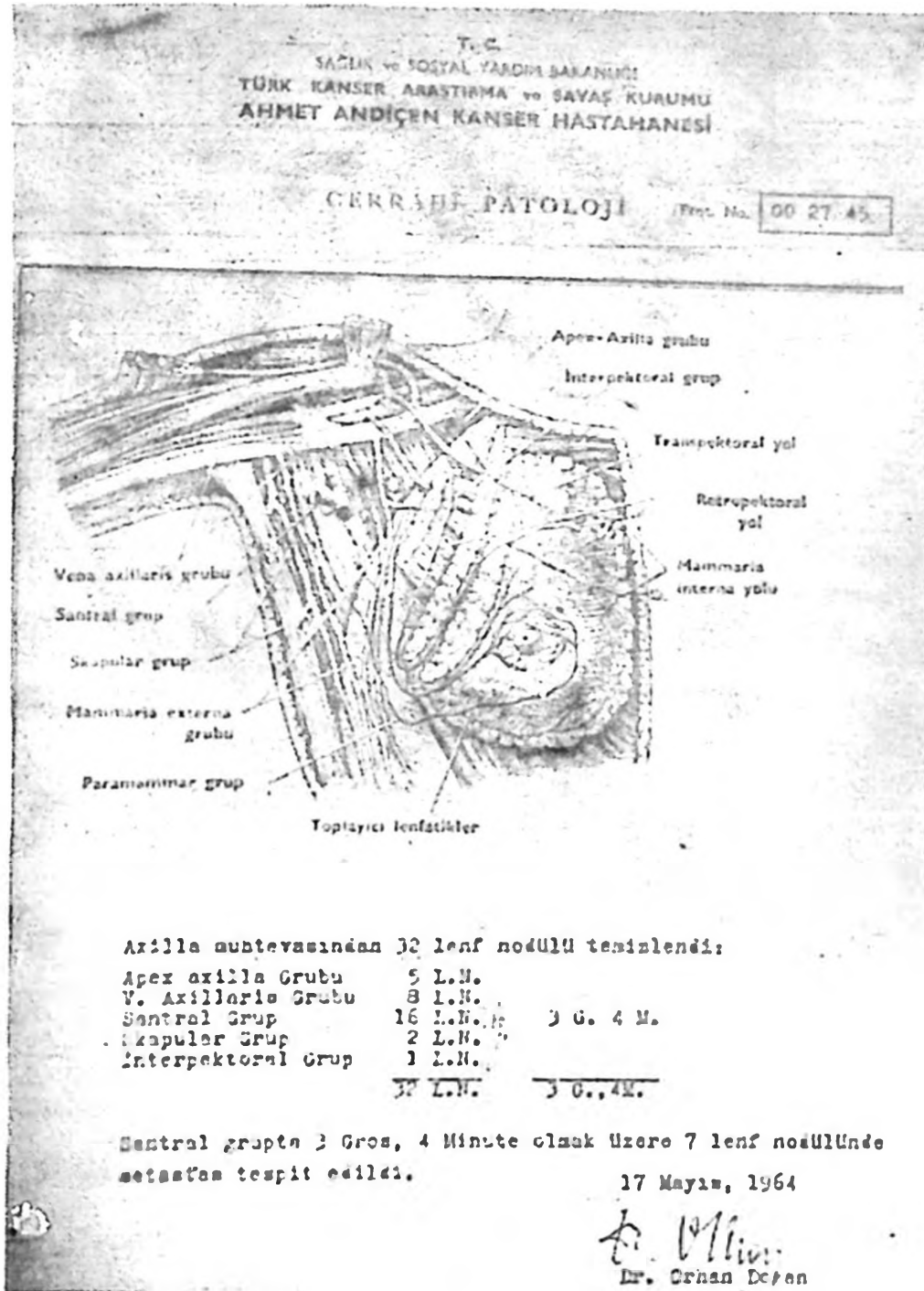


Figure 4. Surgical pathology sheet for axillary clearing. Gross involvements are shown completely shaded, minute involvements are partially shaded.

Results

One thousand forty-three lymph nodes were cleared from the 46 radical mastectomy specimens. The maximum number of nodes found in a single case was 47, the minimum, 4, and the average per case was 22.7. This is 14.6 less than the average reported by Pickren in his series.⁸ We were unable to establish any relationship between the number of lymph nodes and the age of the patient (Table 1).

TABLE 1

NUMBER OF AXILLARY LYMPH NODES IN RELATION TO AGE

Age	Number of cases	Average number per case
30-35	7	31.6
36-40	9	23.7
41-45	8	21.4
46-50	11	22.4
51-60	6	15.7
61-70	5	20
Total	46	22.7

We studied the lymph nodes according to the five anatomical groupings, listed below, which have been used in Dr. Stout's laboratory for many years:

1. Subclavicular or apex of axilla group
2. Axillary vein group
3. Central group
4. Interpectoral group
5. Scapular group

The anatomical location of these groups of lymph nodes is shown in Figure 5. The actual number of lymph nodes in each of these groups is shown in Table 2.

TABLE 2

NUMBER OF LYMPH NODES IN THE AXILLARY NODE GROUPS 45 CASES*

Node group	Total number of nodes found	Average number
Apex of axilla	154	3.4
Axillary vein	254	5.6
Central	534	11.9
Interpectoral	15	0.3
Scapular	62	1.4

* One case in which 24 lymph nodes were found and which were not assignable to node groups is not included.

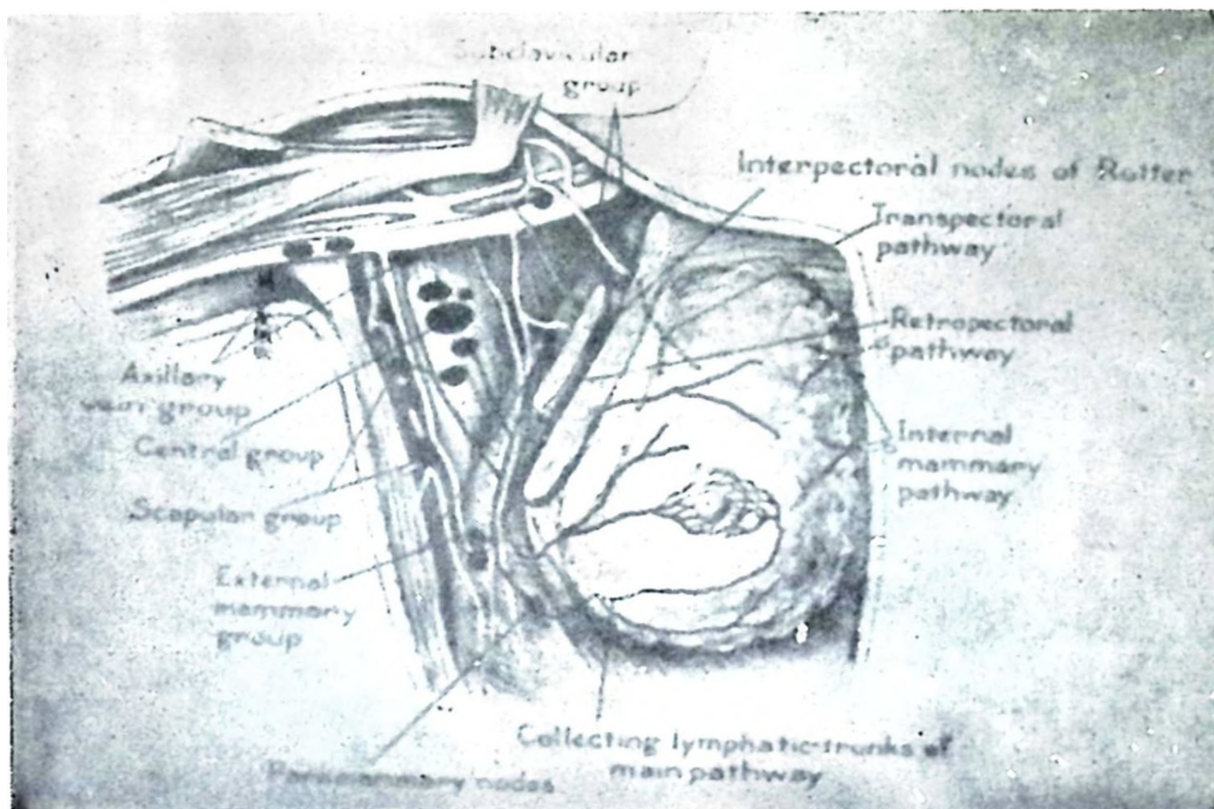


Figure 5. Axillary node groups. (From C.D. Haagensen, *Diseases of the Breast*, Philadelphia, W.B. Saunders Co., 1956. By permission of W. B. Saunders Company.)

Our data indicates that the central group of nodes is the most numerous and the axillary vein group the next most numerous. These findings are contrary to those reported by Pickren.⁸ Twenty-two of our 46 patients had palpable axillary lymph nodes, and 16 of these 22 (73 per cent) proved to have axillary lymph node metastases. Of the 24 patients who had no palpable axillary lymph nodes, six (25 per cent) had axillary lymph node metastases. The total number of patients with axillary node metastases was 22 (48 per cent, Table 3).

TABLE 3

THE RELATION BETWEEN THE CLINICAL AND HISTOLOGICAL FINDINGS OF THE AXILLARY LYMPH NODES

Clinical findings	Number of cases	Number of cases with lymph node metastasis	Per cent
Palpable lymph nodes	22	16	73
Negative axilla	24	6	25
Total	46	22	48

The Haagensen-Stout criteria of operability were strictly followed in this series of radical mastectomy cases. From the data it is apparent that the disease had already reached the axillary lymph nodes in almost half of the cases. In this series, 114 of 1043 lymph nodes were found to be invaded. Most of the lymph node metastases were located in the central group of nodes (Table 4).

TABLE 4
METASTATIC LYMPH NODES IN THE AXILLARY NODE GROUPS

Node group	Number of nodes	Per cent
Apex of axilla	6	5.3
Axillary vein	21	18.4
Central	83	72.9
Interpectoral	3	2.6
Scapular	1	0.8
Total	114	100.0

Summary

In this report the author presents the results of a study of axillary lymph node involvement in 46 radical mastectomy specimens. The average number of lymph nodes per case was 22.7, with the central group of nodes the most numerous. Most of the lymph node metastases were located in this central group. Seventy-three per cent of the patients who had clinically palpable lymph nodes had actual metastases. The incidence of axillary lymph node metastasis among the entire group was 48 per cent.

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