

FROM THE DEPARTMENTS OF SURGERY II (DIRECTOR: PROF. R. ROMANUS), PATHOLOGY II (DIRECTOR: PROF. S. RANSTRÖM), RADIOTHERAPY (DIRECTOR: PROF. M. STRANDQVIST), ROENTGENDIAGNOSTIC DEPARTMENT II (DIRECTOR: PROF. I. WICKBOM), AND DEPARTMENT OF RADIOPHYSICS (DIRECTOR: ASSOC. PROF. H. SKÖLDBORN), GOTHENBURG, SWEDEN.

LYMPHATIC SPREAD OF MAMMARY CARCINOMA

Role of non-interpectoral lymph nodes on dorsal surface
of pectoralis major muscle and of interpectoral nodes

by

A. HULTBORN, L. HULTÉN, B. ROOS, M. ROSENCRANTZ, B. ROSENGREN and
CH. ÅHRÉN

Removal of both pectoral muscles has formed a part of the standard technique in radical mastectomy for nearly three-quarters of a century. The interpectoral nodes are extirpated in this way, and the lymphatic plexus in the retromammary space between the mammary gland and the anterior fascia on the pectoralis major muscle, the so-called deep fascial plane, is also removed. This has been considered necessary for the local eradication of the disease. It has also been stated that removal of the pectoral muscles is necessary for an adequate dissection of the axilla.

The efficiency of axillary dissection with preservation of one or both pectoral muscles will not be discussed in this paper. Supporters of these modified forms of radical mastectomy have paid little attention to the fact that the interpectoral nodes are difficult to remove in these types of operation. ROSENQVIST & ERWALD

Submitted for publication 9 January 1970.

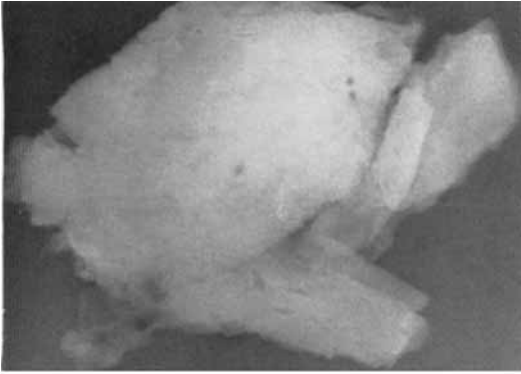


Fig. 1. Specimen roentgenogram of pectoral muscles with three black spots produced by ^{198}Au -emission in three histologically proved lymph nodes (dorsal surface of specimen facing the film).



Fig. 2. Specimen roentgenogram of the breast and the pectoral muscles. A black spot produced by ^{198}Au -emission in one histologically proved lymph node on the dorsal surface of the pectoral muscle facing the film; this node contained marginal metastasis.

(1963) and ROSENQVIST (1966), who in Sweden recommended the modified radical mastectomies, declared that the interpectoral nodes seem to be of no importance as a metastatic station in carcinoma of the breast.

The lymphatics in the retromammary space — deep fascial plane (GRAY) — have been studied by injection of dyes and radioactive tracer into the mammary gland by TURNER-WARWICK (1959). This author concluded that the minute lymphatics on this fascial plane are of no importance in the pathways of lymphatic drainage of the breast and play no part in the early spread of mammary carcinoma. A few quite large lymphatics leave the posterior surface of the breast, accompanying the larger perforating blood vessels. They pass across the retromammary space, entering the pectoralis major or intercostal space, with no suggestion of a plexiform arrangement. These penetrating lymphatics, which pass vertically, are in the opinion of TURNER-WARWICK of considerable importance.

The aim of the present investigation was to determine whether the lymph from

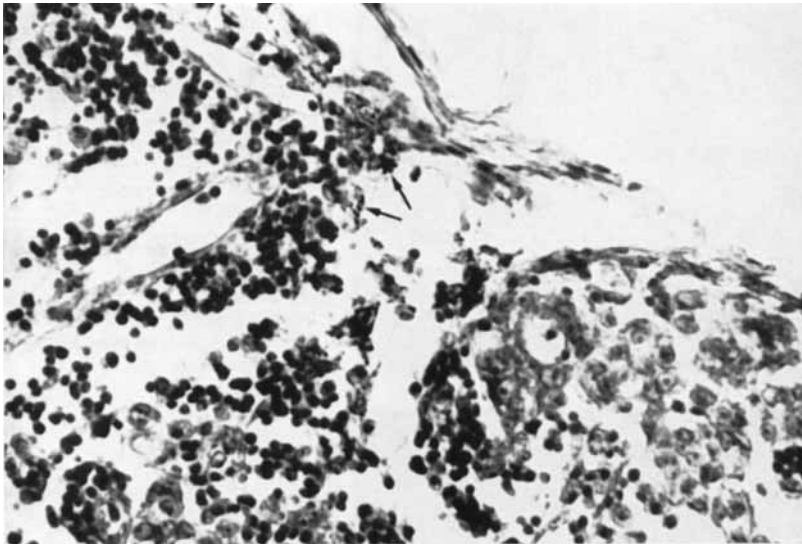


Fig. 3. Histologic section of the lymph node referred to in fig. 2, with marginal metastasis. Aggregates of ^{198}Au are indicated by arrows. van Gieson $\times 210$.

the mammary gland drains to regional lymph nodes outside the axillary, internal mammary and supraclavicular nodes and furthermore if such nodes are left behind in modified radical mastectomy with preservation of the pectoral muscles.

Eight patients with carcinoma of the breast were subjected to radical mastectomy including removal of the pectoral muscles following injection of ^{198}Au into the parenchyma of the breast and intralymphatic Lipiodol injected into the dorsum of the hand.

The examination procedures of the specimens and analysis of the lymph nodes have been described in detail earlier (HULTBORN et coll. 1970). The post-operative investigations of the specimen included roentgen examination, quantitative measurements of radioactivity, autoradiography and histologic examination.

Results and Discussion

In four of the eight operated patients, seven lymph nodes were demonstrated on the dorsal aspect of the pectoralis major muscle, outside the pectoralis minor. In a fifth patient, one lymph node lay in the plane between the pectoral muscles, i.e. interpectorally. Four of the seven nodes situated dorsal to the pectoralis major had a Lipiodol content (though this could be demonstrated only at microscopy in two lymph nodes), whereas six of the seven nodes contained radioactivity.

Lymph nodes with high radioactivity (blackening the roentgen film) were located on the dorsal aspect of the pectoralis major muscle (Figs 1 and 2). Metastasis was also present in one of these nodes (Fig. 3). Neither radioactivity nor Lipiodol was observed in the lymph node demonstrated interpectorally.

It was found in the present investigation that in five of the eight patients lymph nodes were situated on the dorsal surface of the pectoralis major muscle and in four of them outside the pectoralis minor. In three patients the lymph nodes contained radioactivity.

It may be argued that the distribution of radioactive material does not necessarily reflect pathways for metastatic spread. Notably however, one of these patients also had metastasis in one of the nodes situated on the dorsal aspect of the pectoralis major and outside the pectoralis minor. This patient had a tumour measuring 2 cm $\times$ 3 cm, retraction of the nipple and four axillary lymph node metastases with perinodular infiltration.

The conclusion must thus be drawn that mammary carcinoma may also spread through the deep fascial plane and the pectoralis major muscle to lymph nodes on the dorsal surface of the latter. This means that from a surgical point of view saving the pectoral muscles must be hazardous in the treatment of mammary carcinoma. This attitude naturally presupposes that regional lymphadenectomy contributes to the eradication of the disease.

SUMMARY

Eight patients with carcinoma of the breast were investigated by injection of ^{198}Au into the mammary parenchyma and lymphography via the lymph vessels on the dorsum of the hand. The spread of carcinoma of the breast through the deep fascial plane and pectoralis major muscle to lymph nodes on the dorsal surface of the latter is described. These regional nodes must also be of interest in the choice of the type of radical mastectomy.

ZUSAMMENFASSUNG

Acht Patienten mit Brustkarzinom wurden mittels ^{198}Au -Injektion in das Brustparenchym und mit Lymphographie der Lymphgefäße am Dorsum der Hand untersucht. Die Ausbreitung vom Brustkarzinom durch die tiefe Fascie und den Musculus pectoralis major zu den Lymphknoten dessen dorsalen Oberfläche wird beschrieben. Diese regionären Knoten müssen auch die Wahl von radikaler Brustamputation beeinflussen.

RÉSUMÉ

Huit malades atteints de cancer du sein ont été examinées par injection de ^{198}Au dans le parenchyme mammaire et par lymphographie des vaisseaux lymphatiques du dos de la main. Les auteurs décrivent l'extension du cancer du sein à travers le fascia profond et à travers le muscle grand pectoral jusqu'aux ganglions lymphatiques situés à la face postérieure de ce muscle. Ces ganglions régionaux doivent présenter un intérêt dans le choix du type de mastectomie radicale.

REFERENCES

- Gray's anatomy, pp 924, 1550. Longmans, London 1962.
- HULTBORN A., HULTÉN L., ROOS B. et coll.: Evaluation of regional lymph drainage from mammary gland and hand to axillary nodes. *Acta radiol. Ther. Phys. Biol.* 9 (1970), 489.
- — — — Topography of lymph drainage from mammary gland and hand to axillary lymph nodes. *Acta radiol. Ther. Phys. Biol.* 10 (1971), 65.
- ROSENQVIST H.: Kirurgisk behandling av bröstcancer. (In Swedish.) *Läkartidningen* 63 (1966), 1023.
- och ERWALD R.: Bröstcanceroperationen. (In Swedish.) *Opusc. med.* 2 (1963), 36.
- TURNER-WARWICK R. T.: The lymphatics of the breast. *Brit. J. Surg.* 46 (1959), 574.