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Lymphangiographic Studies in a Series of 55 Patients with Malignant Melanoma

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Summary

55 patients with malignant melanoma were examined by means of lymphography before operation, re-exploration and histological examination.

To achieve optimal roentgen diagnosis it is important to visualize all regional lymph nodes by opacifiing the anterior as well as the posterior superficial lymph system per extremity. The condition that the number of faulty diagnoses has to be within acceptable limits, was fulfilled only by applying supplementary tomography.

An adequate excision of lymph nodes without previous lymphography appears to be exceptionally difficult, and for this reason alone, pre-operative lymphography should be undertaken.

Introduction

The radiological differential diagnosis between normal lymph nodes and those involved with metastatic disease may offer serious difficulties, particularly if the lesions are not extensive. An absolute correlation probably never can be achieved, but the procedure may have significant value if the number of false positive and negative interpretations can be kept within reason.

An opportunity to examine this point is given in patients with malignant melanoma where the lymphographic diagnosis and pathological correlation after lymph node dissection follows in short sequence. In addition, a second reason why melanoma is suitable for assessment of the accuracy of the interpretation is because in melanoma inguinal and axillary lymph nodes are frequently examined; these are the nodes which are most difficult to interpret correctly because of fatty and fibrose replacement of lymph node tissue.

Technical remarks

In order to visualize all the inguinal lymph nodes it is necessary to inject both superficial and deep lymph chains. When standard lymphography of the dorsal foot is used the deep inguinal lymph nodes frequently are not visualized. However, the latter can be visualized if a second channel located behind the ankle is cannulated and infused. This point is demonstrated in Figure 1. It is obvious therefore, that in order to be able to assess all the regional nodes more than one lymph vessel system must be identified and cannulated (5). Also, in order to better delineate lymph nodes, particularly their shape, structure, and exact location, tomography is used as a supplementary method of examination (1–4, 6–7).

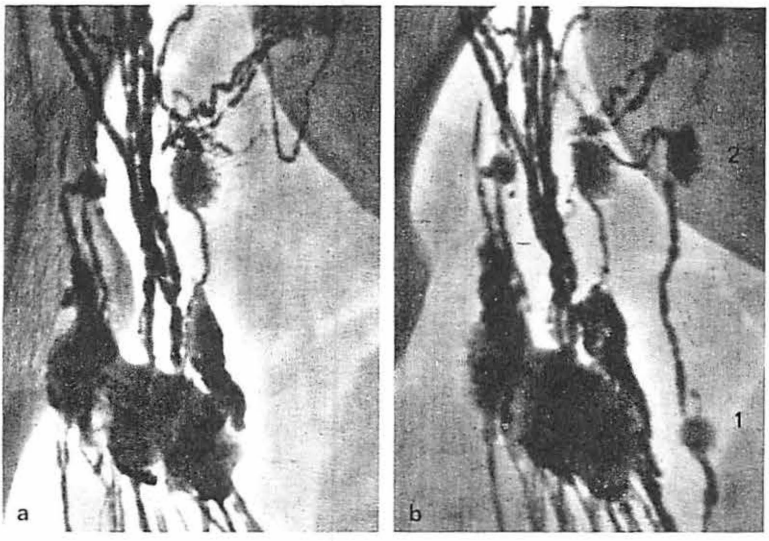


Fig. 1a and b Lymph nodes in the right groin after the injection of lymphatics of the anterior superficial system (a). After injection of contrast medium into the lymphatics of the posterior superficial system some deep inguinal lymph nodes (1) and (2) also become visible. (b).

Case Material and Results

55 Patients with malignant melanoma, aged 9 to 65 years were examined by means of lymphography (1963 to 1972). All patients underwent an operation and the removed lymph nodes were examined histologically. The patients were divided into the following groups:

Group I : 26 patients with untreated melanoma without apparent metastases on physical examination;
Group II : 13 patients with untreated melanoma with clinically and histologically proved lymph node metastases;
Group III : 6 patients with local skin-metastases after surgical therapy;
Group IV : 10 patients with metastases in the lymph drainage area after surgical therapy.

Pathologic Lymphogram

The changes seen in the pathological lymphograms were not specific enough to permit specific diagnosis of melanoma. Appearances were similar to those seen in metastases of other carcinomas or sarcomas. On the lymphogram, lymph vessels may be dilated, and delayed drainage is occasionally seen. Collateral lymph vessels or laterally displaced lymph vessels may be identified. On the lymphadenograms and on tomograms one may find enlarged nodes, nodes with marginal sinuses interrupted on one or more places, or when more extensive disease is present, only small parts of the nodes remain visible. Metastases may also start in the center of the nodes. These nodes will be enlarged, the internal structure disappearing, however, the marginal sinus may remain intact for a long period of time. Even in very large conglomerations of involved lymph nodes small amounts of contrast medium can usually be identified. The afferent lymph channels may remain visualized for a long time period. Normal lymph nodes may be displaced by the involved ones.

Table 1

	Malign. melanoma		X-ray diagnosis				Pathological diagnosis	
			lympho-adenogram		tomogram			
			pos.	neg.	pos.	neg.	pos.	neg.
Group I	leg	(21)	18	3	15	6	12	9
	arm	(2)	2	–	1	1	1	1
	vulva	(3)	1	2	2	1	2	1
Group II	leg	(10)	9	1	10	–	10	–
	arm	(2)	2	–	2	–	2	–
	vulva	(1)	–	1	1	–	1	–
Group III	leg	(6)	4	2	3	3	3	3
Group IV	leg	(10)	9	1	10	–	10	–

Group I

Lymphography was performed on 26 patients with untreated melanoma who clinically had no demonstrable metastases. There were 21 patients with a melanoma of the leg, 2 with a melanoma of the arms and 3 with a melanoma of the vulva. Of this group of patients the positive and negative findings on the lympho-adenograms and supplementary tomograms as well as the histological diagnosis are presented in Table 1. In 18 patients tomography identified pathological lymph nodes. The locations of the metastases in the lymphatic system are presented in Table 2.

It is obvious that the most important finding from Table 1 is that the number of faulty diagnoses on the lympho-adenograms after supplementary tomography was reduced considerably. In these three patients fat and fibrosis were wrongly interpreted as beeing metastases in subinguinal and inguinal regions. One of these cases is cited below.

Patient 1. 57 year old male with malignant melanoma of the left heel. No clinical evidence of metastases. On the lympho-adenograms and supplementary tomograms (Fig. 2a, b) one enlarged, affected lymph node (1) was seen in the subinguinal region. The internal structure had for the greater part disappeared, indicating extensive tumour replacement. The inguinal lymph node (2) showed some marginal defects, due to metastases. The other lymph nodes in this region were normal. The lymph nodes in the iliac region and abdomen had a normal appearance. Because of the lymph-angiographic findings, the patient was explored and the iliac, inguinal and subinguinal lymph nodes on the left side were extirpated. Pathological examination showed that lymph node (1) was largely occupied by metastases, lymph node (2) contained fat and fibrosis, the other lymph nodes were normal.

Table 2

	Group I			Group II			Group III	Group IV
Site of metastases	leg (15)	arm (1)	vulva (2)	leg (10)	arm (2)	vulva (1)	leg (3)	leg (10)
popliteal	2			1				
subing. and ing.	15		2	10		1		3
low iliac	5		1	8		1	3	10
high iliac	2		1	5		1		6
paralumb. and aort.	1			3				2
axillary		1			1			
sub. and supra clav.								

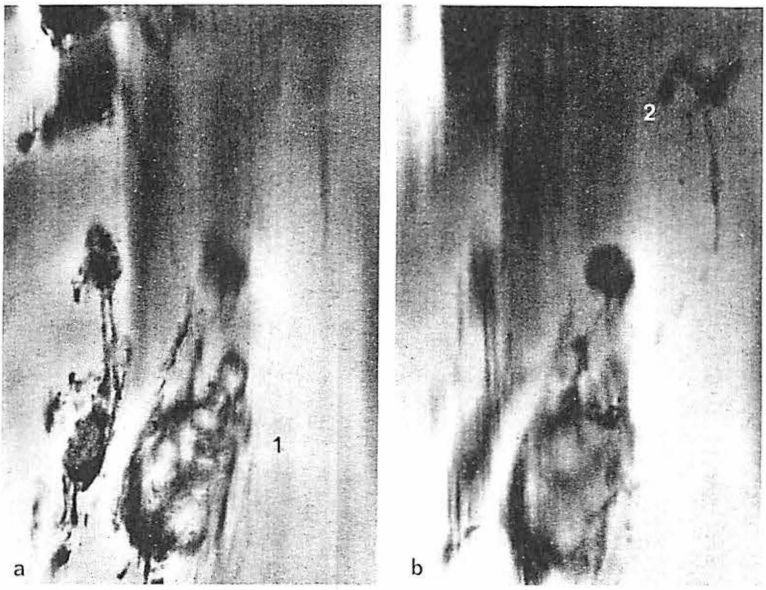


Fig. 2a, b Patient 2: melanosarcoma left heel. Tomograms left groin: the subinguinal lymph node (1) is enlarged and affected by metastases. The inguinal lymph node (2) shows some marginal affection by metastases. The remaining lymph nodes are roentgenologically normal. On histological examination lymph node (2) contained only fat and fibrosis.

In two patients, micro-metastases or very small metastases were histologically demonstrated but not appreciated when the lymphogram was interpreted.

Group II

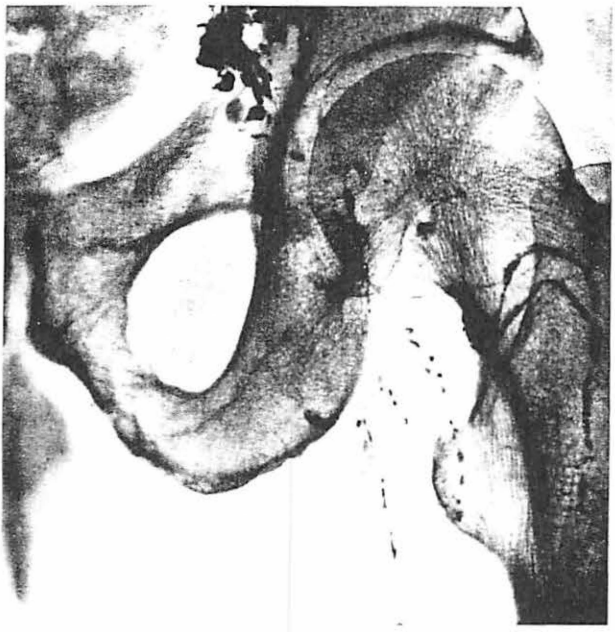
In 13 patients with melanoma, lymph node metastases had already been demonstrated clinically as well as histologically. This group comprised 10 patients with a melanoma of the legs, 2 with a melanoma of the arms and 1 with a melanoma of the vulva. Positiv and negative findings on the lympho-adenograms and supplementary tomograms as well as the histological diagnosis are cited in Table 1.

On the supplementary tomograms pathological lymph nodes were discovered in all the patients of this group. The sites of the metastases are shown in Table 2. In two patients metastases were not distinctly visible on the lympho-adenograms, but were clearly demonstrated by supplementary tomography.

Group III

In 6 patients with malignant melanoma of the legs, local skin-metastases developed after surgical treatment. Clinically there was no evidence of metastatic spread in the lymph drainage system. Table 1 shows the roentgenological and histological findings of this group and in Table 2 is seen that the site of the metastases is situated in the low iliac regions. One wrong interpretation of the lympho-adenograms, was corrected when the tomograms were reviewed.

One patient without lymphogenous metastases will be discussed.



Patient 2: 63 year old male. May 1963, excision of melanosarcoma of the left leg, with removal of inguinal lymph nodes. June 1963, local recurrence excised, with removal of further lymph nodes infiltrated with tumour. Six months later, several melanoma satellites appeared on the left leg, with no indication of either lymphatic or haematogenous spread elsewhere. The question arose whether a new exploration was indicated. On the lympho-adenogram (Fig. 3) one normal lymph node remained in the inguinal region, the iliac lymph nodes could not be evaluated properly. Tomography showed them to be normal. Subsequently, excision of the left inguinal and iliac lymph nodes followed by histological examination confirmed the X-ray diagnosis.

In the patient discussed above, just as in four other patients in this group, lymphography demonstrated incomplete lymph node excision, despite great care during the operation.

Group IV

10 patients with malignant melanoma of the extremities had been treated surgically whereafter metastases developed in the lymphatic drainage area. The youngest patient in this group was a girl aged 9.

Positive and negative findings on the lympho-adenograms and supplementary tomograms as well as the histological diagnosis are cited in Table I. On the supplementary tomograms pathological lymph nodes were discovered in all the patients of this group. The site of the metastases in the lymphatic system are presented in Table II.

Table I demonstrates that one wrong interpretation occured on the lympho-adenograms, corrected by tomography.

The usefulness of tomography in evaluation is illustrated by the case cited below.

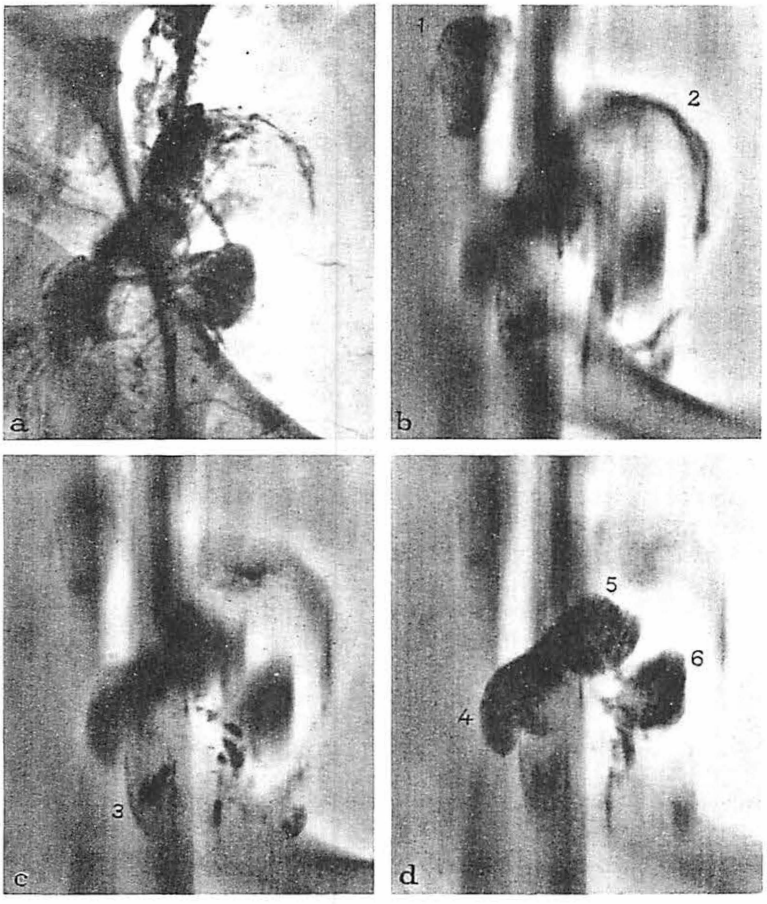


Fig. 4a, b, c, d Patient 6: melanosarcoma right lower leg, before re-exploration. Lymphadenogram (a); in the subinguinal and inguinal regions one lymph node is still seen to be present. Low in the iliac region another poorly defined, pathological lymph node is visible. Tomograms (b), (c) and (d): the iliac lymph node (1) is roentgenologically normal. The iliac lymph nodes (2) and (3) are pathological, with an interrupted marginal sinus, hardly recognizable internal structure, and much enlarged. The inguinal lymph node (4) and the iliac lymph nodes (5) and (6) are roentgenologically normal. Histology confirmed the X-ray diagnosis after re-exploration.

Patient 3: man aged 25 with malignant melanoma of the right lower leg excised with dissection of the lymph nodes in the groin. Metastases were found in some nodes but the most proximal were tumour free. Two months later, a rapidly groing mass was felt in the right groin. Aspiration biopsy showed deposits of malignant melanoma. There was no evidence of haematogenous dissemination. To determine the lymphogenous spread a lymphographic examination was then carried out. Except for one superior inguinal lymph node there were no lymph nodes in the right subinguinal and inguinal regions, but in the same region and the low iliac region, retrogradely filled lymphatics were seen. There was one poorly defined pathological lymph node, the size of a hen's egg, in the low iliac region (Fig. 4a). Tomograms provided more information about the structure of the lymph nodes in this region. On the 13.5 cm section (Fig. 4b) the iliac node no. 1 is normal but the node no. 2 is gross by enlargement, showing interruption of the margin sinus and loss of definition of the

internal structure. Another pathological lymph node no. 3 is early visible on the 15 cm section (Fig. 4c); this node is enlarged with an interrupted marginal sinus and loss of most of the internal structure. Further anteriorly, on the 16 cm section (Fig. 4d) three normal lymph nodes are visible. An extensive lymph node dissection was performed, from about 4 cm above the aortic bifurcation down to the right groin. On pathological examination the X-ray diagnosis was confirmed. Post-operative X-ray examination showed one remaining lymph node which was normal.

In three patients of this group, apart from the pathological lymph nodes on the lymphoadenograms and tomograms, micro-metastases or very small metastases were histologically demonstrated in apparently roentgenological-normal iliac lymph nodes. In this group 7 patients are present in whom the surgical removal of lymph nodes has been inadequate.

Discussion

In the years 1963-1972, 55 patients with malignant melanoma of the extremities and vulva were examined by means of lymphography. The operative curability of malignant melanoma depends upon whether or not metastases have occured. The extent of metastatic spread determines the feasibility and extent of surgical treatment. While the regional lymph nodes can be easily excised, metastases into iliac, paralumbar, aortic and sub or supraclavicular lymph nodes make dissection much more complicated. Because in this type of patient surgery will usually follow lymphography within a very short time, a definitive roentgenological impression of normal versus metastases must be made immediately. In order to achieve optimal roentgen diagnosis it is of paramount importance to visualize all the regional lymph nodes. In the lower extremities this is achieved by simultaneously injecting the anterior and posterior superficial lymph systems. Tomography, in addition to the lymphadenogram, provides more accurate and detailed information about the position, shape and structure of the lymph nodes. In this series the correct roentgen diagnosis was made on the basis of the lymphadenogram in 38 patients. However, by adding tomography, the number of correct diagnosis was raised to 47 patients.

Lymphography also serves as a control to see if all lymph nodes have been removed during surgery. In twelve of sixteen patients undergoing careful dissection, residual lymph nodes were demonstrated during lymphography. These patients were operated on prior to a lymphogram. Had the surgeon had the advantage of seeing a lymphogram, a more complete excision might have been possible and no further operations would have been necessary. It is felt that this alone is a very important reason for preoperative lymphography. In addition, the preoperative lymphangiogram might show such extensive metastatic involvement that any radical surgery would be rendered unjustifiable.

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