

Reliability of Lymphography as a Diagnostic Aid in the Planning of Treatment for Bladder Carcinoma

E. Essed and J. D. Mulder

Departments of Urology and Radiology, University Hospital, Leiden, The Netherlands

Accepted: August 5, 1978

Summary. To assess the accuracy of lymphography, 90 lymphograms were compared with surgical and histological findings. Histological correlation with the initial report was found in 65 of 90 cases (72%). Comparison of the original radiologist's report with a recent re-examination showed agreement between the two radiological evaluations in only 74%. Although improvement in diagnostic accuracy can perhaps be obtained, we cannot yet recommend lymphography as an aid in the planning of treatment for bladder carcinoma.

Key words: Bladder carcinoma - Staging - Lymphography

In one patient cannulation of the pedal lymphatics was impossible and in 10 patients only one-sided visualisation succeeded (6 right, 4 left). These 10 patients are included in this study, so 136 patients are discussed.

Tumours were classified according to the TNM-system (UICC, 1974) (Table 1).

90 of the 136 patients underwent extirpation of pelvic lymphnodes in the course of some surgical procedure (exploratory laparotomy, interstitial radiotherapy or radical cystectomy), so comparison with histological findings was possible. Accurate radiological and surgico-pathological description made it possible to classify retrospectively

The objectives of a classification of malignant neoplasms as stated by the Committee on TNM-classification (UICC, 1974) (11) are:

1. to aid the clinician in the planning of treatment
2. to give some indication of prognosis
3. to assist in evaluation of treatment results
4. to facilitate the exchange of information between treatment centres
5. to contribute to the continuing investigation of human cancer.

According to this Committee the state of the regional lymphnodes (N) should be assessed by lymphography. The object of the present study is to evaluate the efficacy of lymphography as a diagnostic aid in the planning of treatment for bladder carcinoma.

METHODS

During the period 1964-1976, 394 patients were treated for carcinoma of the bladder. 137 patients were considered candidates for pedal lymphangiography.

Table 1.

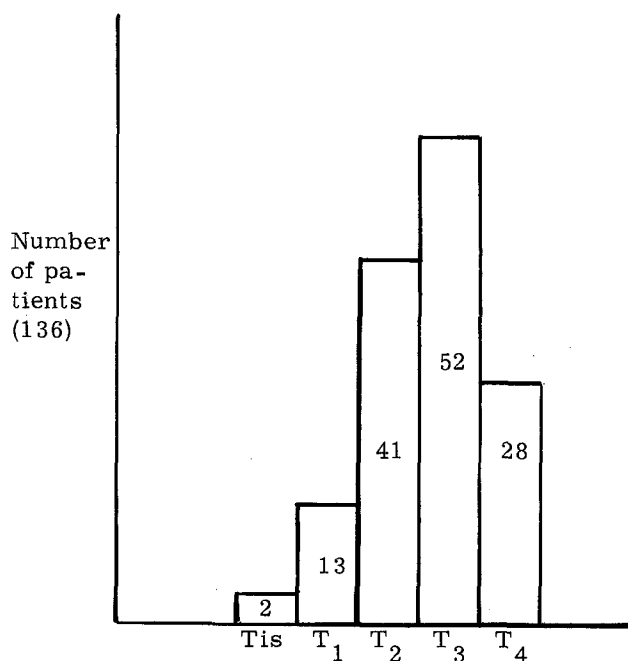


Table 2. Node classification, as proposed by the UICC (1974)

N - Regional and Juxta-regional lymph nodes.	
The regional lymph nodes are the pelvic nodes below the bifurcation of the common iliac arteries. The juxta-regional lymph nodes are the inguinal nodes, the common iliac and paraaortic nodes.	
N ₁	Involvement of a single homolateral regional node.
N ₂	Involvement of contralateral or bilateral or multiple regional lymph nodes.
N ₃	There is a fixed mass on the pelvic wall with a free space between this and the tumour.
N ₄	Involvement of juxta-regional lymph nodes.
-	TNM-classification of malignant tumours (UICC, 1974)

Table 3. 32 cases in which histological findings were not in agreement with the initial report

	Initial report	Histological findings
32	10	+
	4	±
	15	-
	3	±

the nodes according to the TNM-system (Table 2). During the time between lymphangiography and surgery (some patients received preoperative irradiation) no attempts were made to modify the initial radiological diagnosis.

In the course of these 12 years the radiological reports were given by several different investigators of varying experience and the diagnostic criteria were not precisely defined. Therefore 89 of the 136 lymphangiograms were re-examined. Comparison with histological findings was possible for 62 of these 89 lymphangiograms.

In the re-examination the following criteria were used for the presence of lymph node involvement (metastases):

1. Obstruction of lymphatics, either demonstrable during the filling phase or shown as incomplete emptying of lymph vessels after 24 h.

Table 4. False positive and negative reports

	Initial report	Histological findings	
10	2N ₁	+	-
	5N ₂		
	3N ₄		
15		-	13N ₁
			+ 1N ₂
			1N ₄

Under initial report is shown the N-classification according to lymphography. Under histological findings the pathological classification of nodes is shown

2. Filling of collateral pathways.
3. Marginal or central filling defects in nodes, at least 5 mm in diameter, preferably in enlarged nodes.
4. Filling of fewer nodes than considered normal for the area.

RESULTS

Initial Radiological Diagnosis

Of the total number of 136 lymphangiograms correlation with histological findings was possible in 90 cases. In 32 cases the histological findings were not in agreement with the original radiologist's report (Table 3). If one excludes equivocal reports and only considers the definite false positive and negative results, there was agreement between radiological and histological diagnoses in 72% (65/90). False positive (10) and false negative (15) reports are shown in Table 4.

Re-examination

89 lymphangiograms were re-examined without knowledge of the original diagnosis and both original and review reports were compared. In 54 cases both reports were identical (60%). In 35 cases there was some difference in the evaluation of films on the two occasions. In 23 the radiological diagnosis was changed and 12 reports were equivocal. Finally both reports were compared with the histological findings (Tables 5 and 6).

DISCUSSION

There is clinical evidence that radical cystectomy with extirpation of pelvic lymph nodes can cure some patients with metastases confined to a few regional nodes (2, 6, 9, 14). Although most authors did not classify lymph nodes according to the TNM-system, it appears from their anatomical description, that for the greater part, they were referring to N₁ metastases.

The majority of patients with positive regional lymph nodes have occult or demonstrable organ metastases and in spite of complete radiotherapeutic or surgical control of tumour growth in the pelvis, these patients will die of systemic disease (8). Preoperative knowledge of the state of the lymph nodes would be of help in assessing the potential curability of the disease.

Patients with N₂, N₃ or N₄ involvement could be spared major surgery, as their disease is already considered to be systemic. However, patients with N₁ node metastases should not be denied potentially curative therapy. This implies, that if lymphography could distinguish between N₁ and N₂, it could be used in the selection of treatment.

Recently some authors have reported the accuracy of lymphangiography in detecting nodal metastases (1, 5, 10, 12). Others, however, found little correlation of the lymphangiogram with histological examination of regional and juxtaregional lymph nodes (3, 4). It has been generally accepted that obturator and internal iliac nodes are not visualised by pedal lymphography. Recently, however, Merrin et al. (7) found that the nodes surrounding the obturator nerve showed evidence of lymphographic contrast material in every case in which they were examined. We were nevertheless not surprised by our 15 false negative reports (13 N₁, mostly micrometastases) and consider them not to be of too serious consequence.

The problem really lies with the false positive reports (2 N₁, 5 N₂, 3 N₄). Turner et al. (13), in comparing lymphography with the histological findings in lymph nodes removed at operation, found an overall concordance in 58/65 cases (90%). They modified, however, the initial radiological diagnosis in the course of follow-up films. Their treatment policy leaves a period between diagnosis and cystectomy of at least two months. In addition they excluded 5 of their 6 false positive reports, reasoning that pre-operative radiotherapy might have "sterilised" the nodes.

It seems reasonable to require at least a good radiation response of the primary bladder tumour ("downstaging") before claiming radiotherapeutic effect on pelvic lymph nodes, and this is not mentioned for the 5 patients excluded. Four of our 10 false positive patients received preoperative irradiation. Only one showed any sign of tumour regression in the surgical specimen (surgery is

Table 5. Of the 136 lymphangiograms 89 were reviewed. In 54 cases reports were identical

	First report	Second report	Histological findings
20	-	-	-
7	+	+	+
54			
6	-	-	*
10	+	+	
8	-	-	+
3	+	+	-

* No lymph node extirpation

Table 6. Of the 136 lymphangiograms 89 were reviewed. 35 times reports diverged

	First report	Second report
20	-	+
1	-	±
35		
3	+	-
2	+	±
8	±	+
1	±	-

Histological findings 12 times confirmed the first report. Histological findings 6 times confirmed the second report. (The 12 equivocal reports are omitted).

undertaken as soon as possible after diagnosis and irradiation with 2000 R). The other 6 patients were treated by interstitial radiotherapy (5) or cystectomy without previous irradiation. Re-examination of the 89 lymphograms showed the possibility, that improvement of results could be obtained by re-defining our diagnostic criteria and by making use of follow-up films (13). This policy has been adopted recently.

In our experience lymphography cannot distinguish between N₁ and N₂ cases. Some patients may therefore be denied curative treatment. We

cannot yet recommend lymphangiography as an aid in the planning of treatment. The question arises whether surgical staging of lymph nodes is preferable or should be added for the positive cases.

REFERENCES

1. Camey, M., le Duc, A., Khoury, S.: Intérêt de la lymphographie dans l'exploration du cancer de la vessie. *Journal d'Urologie et de Nephrologie* 79, 370 (1973)
2. Dretler, S. P., Ragsdale, B. D., Leadbetter, W. F.: The value of pelvic lymphadenectomy in the surgical treatment of bladder cancer. *Journal of Urology* 109, 414 (1973)
3. Farah, R. N., Cerny, J. C.: Lymphangiography in staging patients with carcinoma of the bladder. *Journal of Urology* 119, 40 (1978)
4. Grasset, D., Navratil, H.: Limites de la lymphographie dans le diagnostic de l'extension ganglionnaire des cancers vésicaux. *Journal d'Urologie et de Nephrologie* 79, 369 (1973)
5. Johnson, D. E., Kaesler, K. E., Kaminsky, S., Jing, B. S., Wallace, S.: Lymphangiography as an aid in staging bladder carcinoma. *Southern Medical Journal* 69, 28 (1976)
6. Laplante, M., Brice, M.: The upper limits of hopeful application of radical cystectomy for vesical carcinoma: Does nodal metastases always indicate incurability? *Journal of Urology* 109, 261 (1973)
7. Merrin, C., Wajsman, Z., Baumgartner, G., Jennings, E.: Clinical value of lymphangiography: are nodes surrounding obturator nerve visualised? *Journal of Urology* 117, 762 (1977)
8. Prout, G. R.: The surgical management of bladder carcinoma. *Urologic Clinics of North America* 3, 149 (1976)
9. Reid, E. C., Oliver, J. A., Fishman, I. J.: Preoperative irradiation and cystectomy in 135 cases of bladder cancer. *Urology* 8, 247 (1976)
10. Turner, A. G., Hendry, W. F., MacDonald, J. S., Wallace, D. M.: The value of lymphography in the management of bladder cancer. *British Journal of Urology* 48, 579 (1976)
11. Union Internationale contre le Cancer. TNM, Classification of malignant tumours. 2e ed. Geneva, UICC 1974
12. Wajsman, Z., Baumgartner, G., Murphy, G. P., Merrin, C.: Evaluation of lymphangiography for clinical staging of bladder tumors. *Journal of Urology* 114, 712 (1975)
13. Wallace, D. M., Bloom, H. J. G.: The management of deeply infiltrating (T3) bladder carcinoma: controlled trial of radical radiotherapy versus pre-operative radiotherapy and radical cystectomy. (First report). *British Journal of Urology* 48, 587 (1976)
14. Whitmore, W. F.: Total cystectomy. In: *The biology and clinical management of bladder cancer*. Cooper, E. H., Williams, R. E. (eds.). Oxford: Blackwell Scientific Publications 1975

Dr. E. Essed
Departments of Urology and Radiology
University Hospital Leiden
Rijnsburgerweg 10
Leiden, The Netherlands