

RELIABILITY OF DIAGNOSTIC IMAGING AFTER ORCHIECTOMY ALONE IN FOLLOW-UP OF CLINICAL STAGE I TESTICULAR CARCINOMA: EXCESSIVE COST WITH POTENTIAL RISK

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ABSTRACT

From 1981 to 1984, 86 consecutive patients with previously untreated nonseminomatous testicular carcinoma were classified as clinical radiological stage I and treated with orchiectomy alone. The follow-up program included chest x-ray and lymphangiography (LAG) every month and abdominal computed tomography (CT) bimonthly. All patients were followed for 15 to 63 months after orchiectomy (median 32 mo.). Metastases developed in 23 patients (26.7%) and in 13/23 there was retroperitoneal lymphadenopathy. Time of relapse after orchiectomy ranged from 2 to 36 months (median 7 mo.) with a shorter interval for chest (4 mo.) compared with retroperitoneal metastases (7 mo.). Lung metastases were readily identified at an early stage (<2cm) whereas more than one-third of retroperitoneal nodal metastases were >5cm at time of diagnosis. LAG detected metastases in 8/11 patients (72.7%), abdominal CT in 8/10 (80%), and both together (LAG and CT) 7/8 (87.5%).

In clinical stage I nonseminomatous testicular carcinoma, the high incidence of concomitant but often asymptomatic regional and distant metastases and the relatively high cost and inconvenience of follow-up using abdominal CT imaging, LAG and chest x-ray suggest that orchiectomy is best combined with

retroperitoneal node dissection at time of initial presentation to insure more accurate and safe staging of tumor dissemination.

An accurate, nonoperative appraisal of tumor dissemination in retroperitoneal lymph nodes in early-stage testicular nonseminomatous germ cell tumors is a major goal of urologic oncologists to avoid surgical nodal dissection and associated morbidity. On the assumption that 60-80% of clinical stage I patients with these neoplasms are curable with orchiectomy alone, and relying on effective chemotherapy to eradicate residual metastatic disease discovered later, several surveillance programs incorporating close follow-up diagnostic imaging have been suggested (1-4). Because such a program is potentially risky, its soundness depends on the high sensitivity and accuracy of the diagnostic follow-up tests to avoid inordinate delay in treatment of inaccurately understaged and therefore undertreated patients. Since 1981, a number of investigators have reported the results of lymphangiography (LAG) and abdominal computed tomography (CT) in staging testicular carcinoma (Table 1), with both imaging methods (LAG and CT) showing greater overall accuracy and sensitivity

Table 1
Comparison of Results of LAG and/or CT in Diagnosis
of Retroperitoneal Dissemination from Testicular Carcinoma

Reference	LAG			CT			LAG + CT		
	N°Pts.	Acc.%*	Sens.%**	N°Pts.	Acc.%*	Sens.%**	N°Pts.	Acc.%*	Sens.%**
Dunnick (1981)	56	82	77	50	74	66	43	87	82
Ehrlichman (1981)	16	69	58	17	59	60	13	69	73
Thomas (1981)	27	70	71	27	89	90	27	89	95
Marincek (1983)	30	80	56	30	70	44	30	87	67
Tesoro-Tess (1985)	167	76	74	35	74	74	35	77	89

*Accuracy: Patients whose imaging studies were interpreted correctly.

**Sensitivity: Patients with histologically positive nodes whose imaging studies were interpreted correctly as positive.

than either technique alone. From earlier experience in our institution with LAG and with careful histologic verification of the diagnosis, we started a surveillance program in August, 1981, when the additional availability of abdominal CT and use of serum tumor markers such as α fetoprotein and human chorionic gonadotropin (HCG) greatly improved the accuracy of clinical staging (10,11).

MATERIALS AND METHODS

From 1981 through 1984, 86 consecutive patients with non-seminomatous testicular carcinomas were entered into the study. Each patient had no clinical evidence of tumor spread beyond the testicle and none had chemotherapy or radiotherapy after orchiectomy. The standard staging included chest x-ray, intravenous pyelography, bipedal lymphangiography (LAG), and abdominal computed tomography (CT), and each imaging technique had to be unequivocally negative for neoplasia. Moreover, serum levels of tumor markers (α fetoprotein and HCG) had to be normal or returned to normal following orchiectomy. The follow-up program included, during the first year, chest and plain abdominal x-rays (i.e., follow-up LAG), serum "tumor" markers monthly, and abdominal CT bimonthly. In subsequent years longer intervals between imaging studies were planned. Because of resorption of lymphographic contrast medium, the vast majority of patients required a second LAG 6 to 12 months after

orchiectomy. Only those patients who were willing to comply to this intense and rigid protocol were included and all others were staged and managed by retroperitoneal lymphadenectomy. These 86 patients were followed for 15 to 63 months after orchiectomy (median 32, mean 34 months).

RESULTS

Metastases developed in 23 patients (26.7%) (Table 2). In 9, relapse was limited to the chest and in one patient the only sign of recurrence was an elevated serum HCG level. In 13 patients (15.0%) retroperitoneal lymphadenopathy developed combined in two with supraclavicular or pulmonary metastases respectively. Time of tumor relapse postorchiectomy was from 2 to 36 months (median 7 months) with a shorter interval for chest recurrence (4 months) compared with retroperitoneal extension (7 months) (Table 3). In patients with recurrent tumor, pulmonary metastases detected were <2cm, whereas involved retroperitoneal lymph nodes were >5cm in 5 of 13 patients (38.5%). When retroperitoneal dissemination occurred, only 8/13 patients (61.5%) had undergone both LAG and CT because of the unavailability of prompt abdominal CT, or because of premature resorption of lymphographic contrast medium and thus insufficient ongoing opacification of retroperitoneal lymph nodes. LAG detected metastases in 8/11 patients (72.7%), abdominal CT in 8/10 (80%), and to-

Table 2
Determination of metastases in 23/86 patients

Site	# Patients	%
Retroperitoneal lymph nodes >5cm	5	5.8
Retroperitoneal lymph nodes <5cm	6	7.0
Retroperitoneal lymph nodes + distant	2	2.2
Lung	9	10.6
Elevated serum HCG*	1	1.1
Total	23	26.7

*Human chorionic gonadotropin

gether (LAG and CT) in 7/8 (87.5%). One patient underwent lymphadenectomy for suspected paraaortic metastases, but at operation, only slightly enlarged lymph nodes were found in the pelvic region.

DISCUSSION

Diagnostic imaging in patients with nonseminomatous testicular carcinoma varies and generally depends upon the "radiologic" equipment available and the choice of definitive therapy. Orchiectomy alone as treatment for clinical stage I disease has gained favor in recent years (1, 3, 12). On the other hand, this approach is potentially dangerous and requires a tremendous investment in time of patient and doctor and the prompt availability of sophisticated imaging modalities to ensure the lack or presence of tumor spread particularly in the retroperitoneum. Nonetheless, despite an extensive and intense diagnostic approach, overall misstaging for testicular carcinoma is still in the range of 10-20% and this value tends to be higher in early stage disease where small metastatic foci more easily go undetected.

For pulmonary metastases, the use of high kilovoltage x-ray technique combined in selected patients with complete lung tomography and thoracic CT provides excellent imaging and follow-up in these individuals.

Indeed, pulmonary metastatic foci at an early stage (i.e., <2cm) are readily detected and the number of patients with intrathoracic relapse after orchiectomy alone (10/86 or 11.6%) compares favorably to those initially staged with orchiectomy and retroperitoneal lymphadenectomy (11.1%) (13). On the other hand, management and evaluation of retroperitoneal lymph nodes is more complex. It is not only time-consuming and stressful for patients, but is also logistically difficult to carry out, particularly since for accuracy both LAG and abdominal CT are preferred. Thus, in our experience with pathological stage I-II patients with testicular carcinoma who underwent retroperitoneal lymphadenectomy, this combined diagnostic imaging technique reduced the false negative rate of each modality alone from 27% to 10-11% (9). Similar results have been obtained by others (5-8). Furthermore, because these testicular tumors are known to have a high rate of dissemination, a close follow-up program (1-2 months) is necessary to detect small metastases when they are still potentially resectable and the patient potentially still curable. Based on the assumption that the retroperitoneal tumor relapse rate was not to exceed 10-15%, and that metastases would develop within just a few months after orchiectomy, the findings were somewhat disappointing. Although only 15.0% retroperitoneal nodal relapses were

REFERENCES

1. Peckham, MJ, A Barrett, JE Husband, WF Hendry: Orchidectomy alone in testicular stage I non-seminomatous germ-cell tumors. *Lancet* (1982), 678-680.
2. Peckham, MJ: Orchidectomy for clinical stage I testicular cancer. A progress report of the Royal Marsden Hospital study. First International Symposium on Testicular Tumors, Paris, October 8-10, 1984.
3. Johnson, DE, RK Lo, AC von Eschenbach, et al: Surveillance alone for patients with clinical stage I nonseminomatous germ cell tumors of the testis: Preliminary results. *J. Urol.* 131 (1984), 491-493.
4. Jewett, MAS, JG Herman, JFG Sturgeon, et al: Expectant therapy for clinical stage A non-seminomatous germ cell testicular cancer? *Maybe. World J. Urol.* 2 (1984), 57-58.
5. Dunnick, NR, N Javadpour: Value of CT and lymphangiography: Distinguishing retroperitoneal metastasis from nonseminomatous testicular tumors. *A. J.R.* 136 (1981), 1093-1099.
6. Erlichman, RJ, SL Kaufman, SS Siegelman, et al: Computerized tomography and lymphangiography in staging testis tumors. *J. Urol.* 126 (1981), 179-181.
7. Thomas, JL, ME Bernadino, RB Bracken: Staging of testicular carcinoma: Comparison of CT and lymphangiography. *A. J.R.* 137 (1981), 991-996.
8. Marincek, B, P Bruschin, J Triller, et al: Lymphography and computed tomography in staging nonseminomatous testicular cancer. Limited detection of early stage metastatic disease. *Urol. Rad.* 5 (1983), 243-246.
9. Tesoro-Tess, JD, G Pizzocaro, F Zanoni, et al: Lymphangiography and computed tomography in testicular carcinoma: How accurate in early-stage disease? *J. Urol.* 133 (1985), 967-970.
10. Tesoro-Tess, JD, L Balzarini, R Mesumeci: Radiological follow-up in clinical stage I testicular carcinoma treated with orchidectomy alone. In *Progress in Lymphology*, Casely-Smith, JR, NB Piller (Eds.), University of Adelaide Press (1985), 262-264.
11. Pizzocaro, G, F Zanoni, A Milani, et al: Orchidectomy alone in clinical stage I nonseminomatous testis cancer: A critical appraisal. *J. Clin. Oncol.* 4 (1986), 35-40.
12. Sogani, PC, WF Withmore, Jr., HW Herr, et al: Orchidectomy alone in the treatment of clinical stage I nonseminomatous germ cell tumors of the testis. *J. Clin. Oncol.* 2 (1984), 267-270.
13. Pizzocaro, G: Retroperitoneal lymphadenectomy in clinical stage I non-seminomatous germinal testis cancer. *Eur. J. Surg. Oncol.* 12 (1986) 25-28.
14. Pizzocaro, G, R Salvioni, F Zanoni: Unilateral lymphadenectomy in intraoperative stage I nonseminomatous germinal testis cancer. *J. Urol.* 134 (1985), 485-489.

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