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COMPUTED TOMOGRAPHY AND LYMPHOGRAPHY OF THE RETROPERITONEAL SPACE IN TESTICULAR TUMORS

A comparison

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Computed tomography is still available only in a relatively small number of hospitals. The scanners are then usually exploited almost beyond their capacity, resulting in a long waiting list and a long delay before the examination is carried out. Therefore, it is important, in order to utilize the scanner time as effectively as possible, to select carefully for examination those cases in which the information provided by CT is more likely to be of significance for the treatment and for the outcome for the patient.

CT has been compared with lymphography for the demonstration of retroperitoneal metastases from testicular tumors and the results are now reported.

The use of CT for examination of the retroperitoneum in testicular tumors has been suggested by KREEL (1976) and LEE et coll. (1978). Testicular lymphatic vessels following the spermatic arteries drain into the lymph nodes of the renal hilum. These nodes are usually not demonstrated by bipedal lymphography, and some metastatic deposits may therefore be missed at lymphography alone.

Materials and Methods

From January 1978 to December 1979, 31 patients (50 examinations) referred to the departments of radiation therapy at the University Institute and at the S. Maria Nuova Hospital in Florence were examined with CT. Of the 31 patients, 21 had seminoma and 10 other malignant tumors. In all patients, chest radiography including tomography, pyelography, bipedal lymphography, barium meal and liver scintigraphy were carried out.

The first CT scan was obtained in 26 patients (20 with seminoma and 6 with non-seminomatous tumors) as a part of their initial staging: in 3 after a retroperitoneal lymphadenectomy performed before referral and in one at the appearance of a retroperitoneal mass 2 years after an orchidectomy performed elsewhere. In 13 patients repeated CT was performed during the follow-up.

CGR Total Body FS 200 or the EMI CT 5005 was used. Sections were taken through the entire abdomen from the diaphragm to the pubis, at 2 cm intervals, the thickness of the sections was 1.3 cm. The preparation of the patient included oral administration of Gastrografin 45 and 5 min before starting the CT. Occasionally contrast medium was infused intravenously to demonstrate the ureters and bladder.

A correlation between lymphography and CT was not possible in 9 patients. Lymphography was not performed in 3 patients (because of allergy in 2 and of age and respiratory conditions in one), a lymphadenectomy was carried out between lymphography and CT in 3 patients, and the available lymphographic films were unsatisfactory in 3 patients examined before referral.

In the 22 evaluable patients, CT and lymphography were compared concerning detection of

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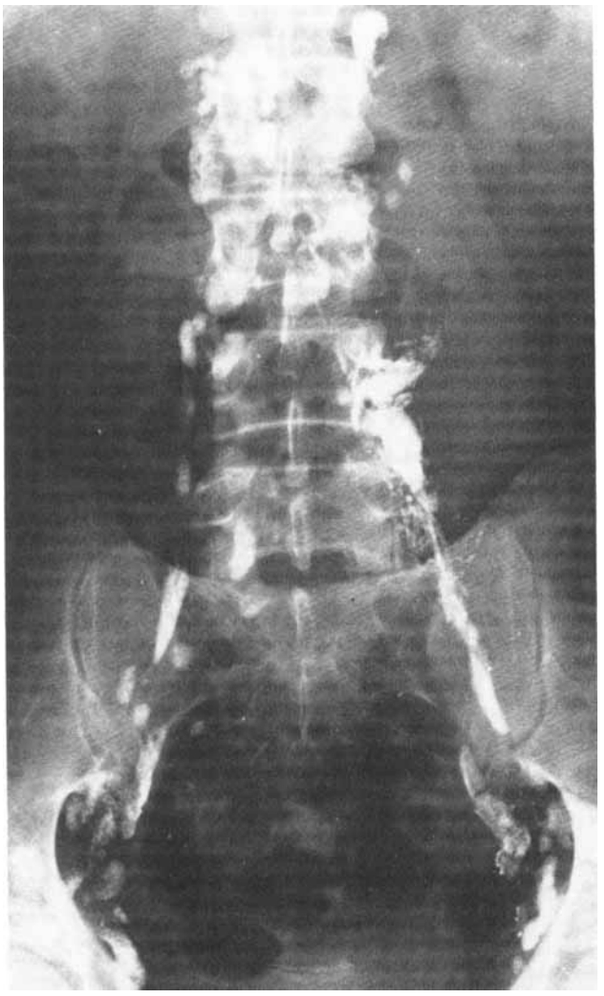


a

b

Fig. 1. 34-year-old. Teratocarcinoma of the left testis. a) Lymphography. Metastatic deposits in the left lumboaortic chain clearly suggested but only the lower pole of the mass is evident. b) CT. The full extent of the metastatic mass demonstrated, the left lumboaortic nodes being massively involved, which completely excludes the lymphatic flow. Thus, CT is definitely of value for the delimitation of irradiation volume.

retroperitoneal metastases, and the definition of 'full extent' of the tumor. The staging and treatment policy in seminoma and in non-seminomatous tumors depend on information in both these respects (CIONINI et coll. 1978).

The influence of CT on the irradiation volume, on the assessment of tumor response and on the detection of relapses after treatment was also evaluated.

Results

The result of the comparison between CT and lymphography in the diagnosis of retroperitoneal metastases appears in the Table.

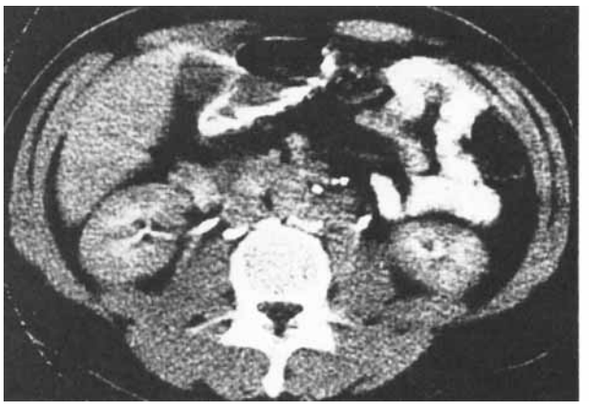
In no case with a lymphography considered normal did CT demonstrate the presence of metastases in retroperitoneal nodes.

Table

Result of correlation between CT and lymphography in detection of retroperitoneal metastases

	Seminoma	Non-seminomatous tumors
Total No. of evaluable patients	16	6
Normal at both examinations	11	1
Pathologic at both examinations	3	4
Equivocal findings at both examinations	2	1

In 3 patients with seminoma, lymphography showed small abnormalities of equivocal value, without enlargement of nodes; CT did not provide more information nor were metastases demon-



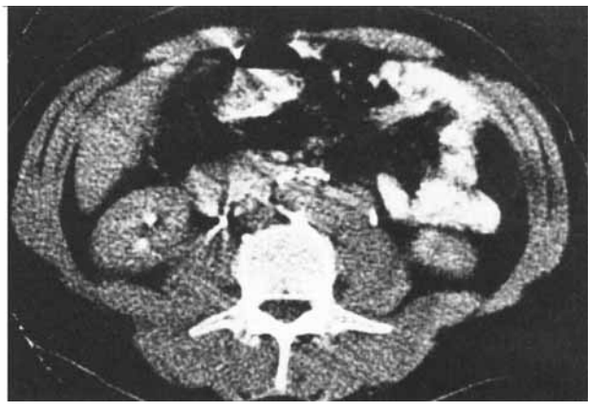


Fig. 2. 43-year-old. Teratocarcinoma of the right testis with seminomatous areas. Enlargement of the nodes of the right renal hilum, not filled at lymphography. Metastatic disease was also detected at lymphography in clearly enlarged lumboaortic nodes but they were only partially filled. Thus, the extent of the disease was better defined at CT.

strated in other sites in any of them. These 3 are alive and well after irradiation. CT scans repeated at 6 and 12 months after treatment in 2 patients had the same appearances as the initial ones.

The presence of metastses was clearly demonstrated by both examinations in 7 patients (3 seminomas and 4 non-seminomatous tumors). However, in all, the information provided by the CT was definitely superior to exactly define the 'full extension' of the abdominal tumor.

In 5 patients the CT demonstrated enlarged nodes also in areas not normally demonstrated by pedal lymphography (as the paraortic region at L1–L2 level, or the renal hilum), and in 6 the CT demonstrated the entire neoplastic masses which were only partially filled at the lymphography because of massive involvement (Figs 1, 2).

The definition of the irradiation field was influenced by the more complete demonstration of the extension of the disease in 4 patients with tumor masses exceeding the limits of the standard fields and under-evaluated at palpation and at lymphography.

In 3 patients with large metastases a repeat scan during the treatment made possible a proper adaptation of the field to the regression of the tumor volume. In one of them (Fig. 3) with a seminoma irradiated after an explorative laparotomy because of a very large abdominal mass, even the positioning of metallic clips during the operation proved less correct than CT in outlining the tumor volume and following the tumor regression due to the T shape of the mass.

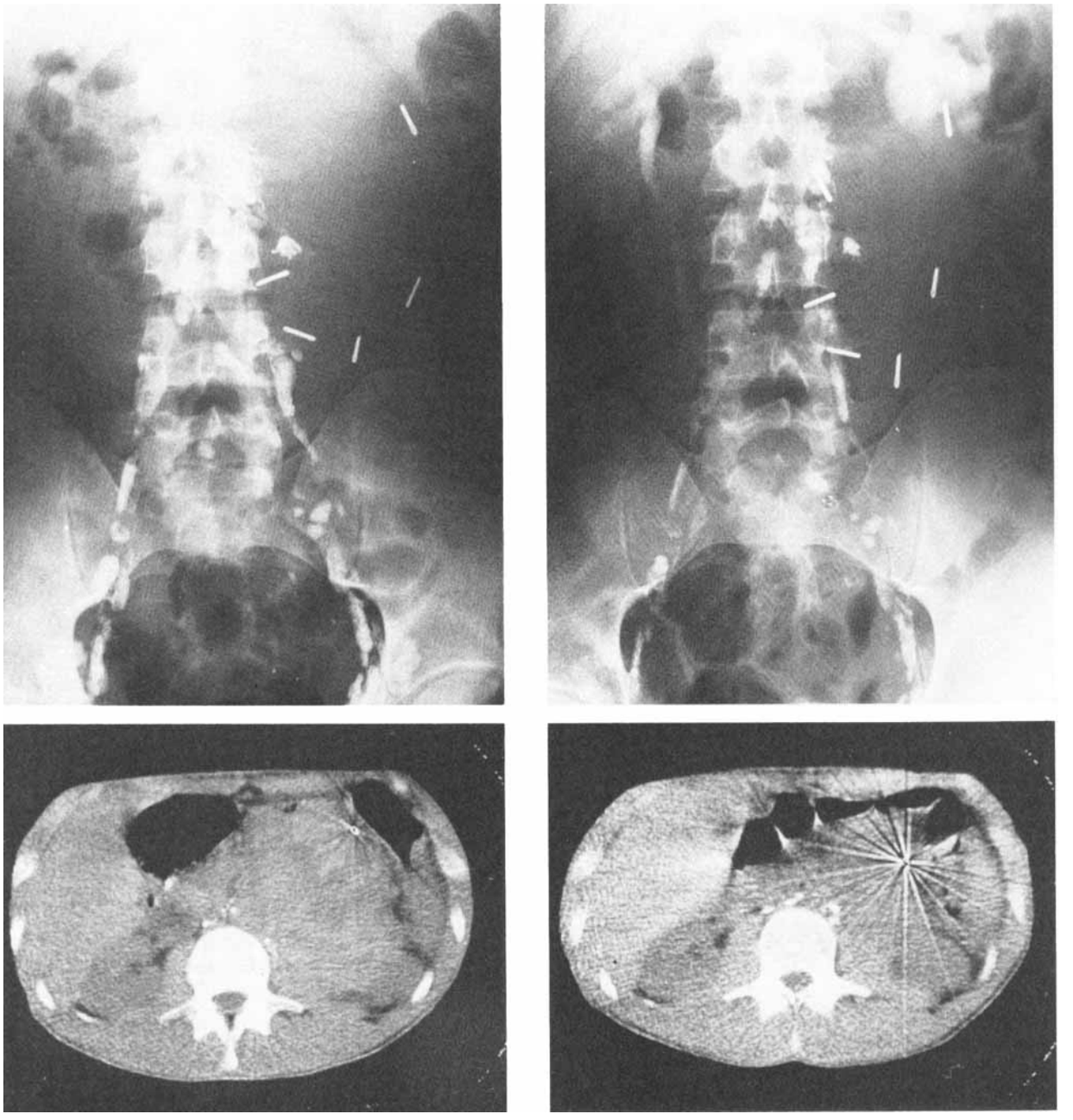
In 2 patients the CT demonstrated the presence of large necrotic areas within metastases from teratocarcinoma. In one of them (Fig. 4) with a large abdominal tumor and a high initial level of alpha-fetoprotein, a return to the normal level of the alpha-fetoprotein occurred after irradiation despite a very small regression of the palpable tumor. The CT revealed that the mass had a predominantly necrotic content and this probably caused the slow regression.

Of the patients followed with repeated scans CT demonstrated a regrowth of the metastases in 2 patients with teratocarcinoma after the lymphographic contrast medium was discharged.

In patients examined after a retroperitoneal lymphadenectomy a blurring of the outlines of the large retroperitoneal vessels was observed, resembling the presence of neoplastic infiltration. However, this explanation was in contrast with the radicality of resection claimed by the surgeon. In 2 patients repeated scans were performed for several months and the appearance remained unchanged. It was then considered to be due to abnormalities following surgery of the retroperitoneum. An example is given in Fig. 5.

Conclusions

The present small series and other previous reports (JAVADPOUR et coll. 1978, HUSBAND et coll. 1979, LEE et coll. 1979) indicate the usefulness of CT for demonstration of retroperitoneal metastases in testicular tumors. However, as the original pur-



a b

Fig. 3. 25-year-old. Anaplastic seminoma of the left testis, with a huge mass in the left lumbar region, whose contours were marked with metallic clips at laparotomy. CT and survey films of the abdomen were performed before irradiation (a) and repeated after 20 Gy (b) in an attempt to reduce the field size. CT demonstrated that the positioning of the metallic clips was incorrect because of the T-shape of the mass and radiography of the abdomen was then unable to define the radiation field properly.

pose was to select the patients in whom the information provided by the CT was more likely to significantly influence the treatment and outcome for the patient CT seems to have some limitations.

Seminoma. If the lymphography is normal, the probability of detecting nodal metastases at CT is very low (no case in the present series); small metastases without enlargement of nodes are undetect-

Fig. 4. 24-year-old. Teratocarcinoma of the left testis. CT of the abdomen after irradiation. Large metastatic mass in the left lumboaortic region containing an area of less attenuation due to necrosis of the tumor.

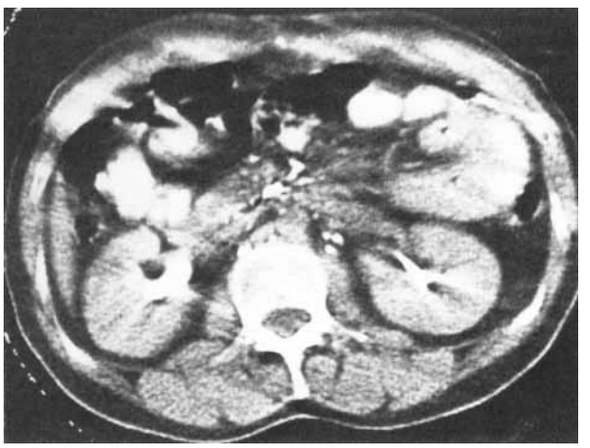


Fig. 5. 33-year-old. Teratocarcinoma of the left testis with seminomatous areas. Lymphadenectomy demonstrated small metastatic deposits in a few lumboaortic nodes; resection was considered radical by the surgeon. CT scan of the abdomen, one month after lymphadenectomy. Blurring of the retroperitoneal vessels resembling metastatic infiltration.

able. However, these nodes are probably, anyway, included in the standard treatment field and cured with the usual radiation dosage. CT of the retroperitoneum can therefore be avoided in these cases.

When the lymphography is abnormal, the probability of involvement of nodes not filled with contrast medium increases and CT of the retroperitoneum is indicated to define the exact extension of the tumor.

Non-seminomatous tumors. The probability of retroperitoneal metastses is high (60–70%) and CT is indicated as the first examination.

If the CT scan is abnormal, lymphography can be avoided. This decreases the risk of fibrosis in the retroperitoneum due to contrast medium and sometimes complicating the lymphadenectomy. When no abnormality is detected at CT, lymphography is indicated in an attempt to demonstrate small metastatic deposits not enlarging the nodes.

The systematic use of repeated scans proved useful to follow the regression of the tumor volume in patients with large metastases. It would not seem indicated in the follow-up of stage I and II A seminomas as the abdominal relapses are rare. On the other hand, it is of some value in non-seminomatous tumors as the curability of nodal metastases from these tumors is lower and the abdominal relapses more frequent.

The evaluation of CT scans after lymphadenectomy requires some caution, as this surgical procedure produces abnormality in the retroperitoneum which may resemble neoplastic infiltration.

SUMMARY

The value of CT and lymphography of the retroperitoneum was compared in 31 patients with testicular tumors. In no patient with normal or equivocal lymphography was more information gained by CT. In abnormal cases, the presence of metastatic deposits was well detected at both examinations, but CT proved more useful in defining the exact extent of the tumor and facilitated the proper arrangement of the irradiation fields. A strategy in the sequence of investigation in testicular tumors is suggested, aiming to save CT time when CT information is not likely to be of significance for treatment planning.

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