

Evaluation of Tumour Extension by Whole Body Scanner

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Summary. Fifteen patients with urinary bladder carcinoma were examined by computerised tomography parallel with conventional urography before, during and after radiation therapy. Computer tomography gave better diagnostic information in the cases in which the tumour had encroached upon, or was growing outside the bladder wall, and was equally as valuable as urography when it was located wholly within the bladder. The scans were of great value as a guide in the planning of computer-aided radiation therapy.

Key words: Urinary bladder cancer - Planning of radiation therapy - Computer tomography.

The Department of Diagnostic Radiology at Karolinska Sjukhuset has had at its disposal the first whole body scanner to be used in Scandinavia. During the evaluation period, patients with different diseases have undergone computerized tomography as a parallel examination to other current methods and the results were then compared. This report presents the value of computer tomography in the diagnosis of urinary bladder tumours and in the planning of radiation therapy.

PATIENTS AND METHODS

Fifteen patients with bladder carcinoma diagnosed in the usual way were examined by computerised tomography as an addition to the conventional urographic examination. The whole body scanner used was a Delta-Scanner with an examination time of 2.5 min per pair of pictures. The standard polaroid camera was exchanged for a miniature camera loaded with 35 mm film for slides, in order to increase the resolving power on the film.

The slides were used not only for obtaining diagnostic information but also in the subsequent planning of radiation treatment in the computer system at Radiumhemmet. Instead of making contour sketches, the scans were fed to the tracing table of the programmer via a slide projector and a mirror system and

by this means a correct relation was obtained between the relevant anatomical details.

The patients were examined before, during and after the radiation treatment, for the purpose of diagnosis, planning, and assessment of the effects of the irradiation that was in progress.

RESULTS

Of the 15 patients with urinary bladder carcinoma examined by computer tomography, 10 had tumours growing wholly within the bladder, while in the remaining 5 the growth encroached upon the bladder wall or was located outside the bladder. In these 5 cases, computer tomography was definitely superior to conventional urography. With the latter examination, it was hard to determine the extent of the tumour even when special rotation techniques for the bladder were applied. In one case, the tumour lay like a thin covering along the mucous membrane of the bladder and could not be detected by computer tomography.

During the radiation therapy, the patients were examined after approx. 3000 rads and after termination of the treatment, which consisted of 6400 rads, or, with superfractionation, 8400 rads. In the 14 cases in which the tumour could be seen in the scans its regression could be followed without difficulty

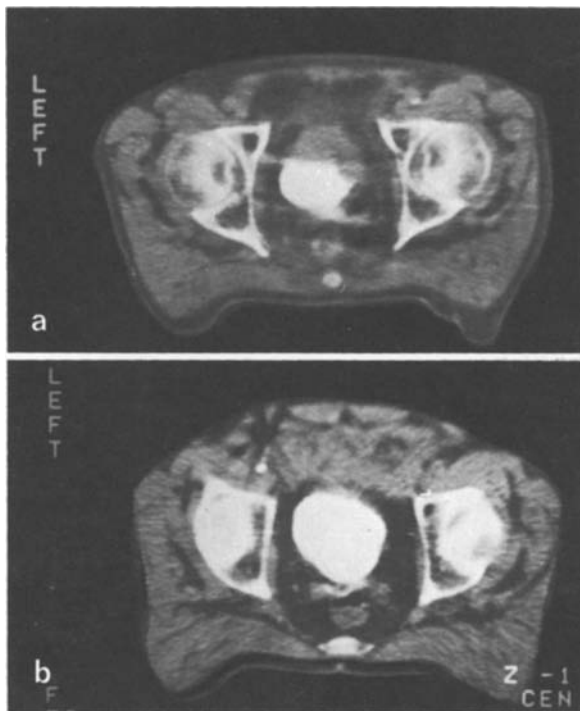


Fig. 1. Scans from a 76 year old man with a urinary bladder carcinoma. a) demonstrates a tumour mass in the ventral-right part of the bladder with oedema of the bladder wall. b) After 6400 rads radiation therapy the tumour is not seen

during the treatment. Oedema which developed with the irradiation could also be followed. In one of the patients with a tumour outside the bladder this oedema caused difficulty in estimating the size of the growth.

DISCUSSION

Although this material of 15 patients is small, it is nevertheless possible to discern a trend regarding the value of computerised tomography in the investigation of urinary bladder carcinoma. With the conventional radiographic methods, it is hard to demonstrate tumours growing outside the bladder, whereas in the 5 patients in this material with such tumours, the extent of the tumour could be readily assessed with the aid of computer tomography. The scans were especially valuable in the subsequent planning for computer-aided radiation therapy. It was a distinct advantage to be able to feed the scan pictures directly into the programmer and thus avoid having to work out a programme by making a contour sketch of the patient and plotting in relevant anatomical details from radiographs. A corresponding series of patients with undifferentiated prostatic carcinoma suitable for radiation therapy, has shown that computer tomography may also be valuable for assessing the spread of tumour cranially along the posterior wall of the urinary bladder.

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