Contrast Filled Urinary Bladder Versus Early Phase Contrast Enhanced CT for Urinary Bladder

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Urinary bladder tumors are neoplasms which present as hematuria and sometimes if the lesion is small, then it becomes difficult to detect. We conducted this study to evaluate to different types of techniques for CT of urinary bladder. One with contrast filled urinary bladder and other with Contrast enhanced urinary bladder with the contrast not in the umen of urinary bladder.25 patients were evaluated, 18 of the cases were positive as far as the contrast filled bladder was concerned while 23 patients showed the abnormally enhancing bladder wall.3 were negative in both techniques and were proven carcinoma on cystoscopy.
Key words: Hematuria, CT, Urinary Bladder

For long Intravenous urography and cystogram had been used radiologically to detect urinary bladder growth . With new investigations like CT and MRI emerging the role of conventional radiography has been diminishing. While using CT scan two thoughts regarding the technique have emerged. One is to let the urinary bladder get filled after Intravenous contrast and then scan , the growth will appear as a filling defect projecting into the bladder , other is to scan immediately after Intravenous contrast and study the enhancing walls of the bladder . Both have their advocates. Precisely for these reasons we conducted this limited study to see the effects of both techniques.

Objectives of the study

To study the technique of CT urinary bladder. Contrast filled delayed CT of bladder versus Early phase contrast enhanced CT

Patients and methods

All the patients had cystoscopy done on them and were diagnosed as Urinary bladder cancer.25 patients referred from the Department of Radiotherapy, Mayo Hospital were scanned during January 2002 to April 2002.

Results

As all the patients had urinary bladder growth proven on cystoscopic biopsy the purpose of the study was to see which technique is the better Contrast filled or the early contrast enhanced. Out of 25 patients 18 showed the bladder growth of Delayed CT and 23 showed bladder growth in the early phase contrast enhanced CT.

Technique	Showing growth	Showing no growth	%age
Delayed Contrast filled	18	7	72
Early contrast enhanced	23	2	92

Discussion

On unenhanced computed tomography, the urine within the bladder is of water density. The bladder wall on CT appears as a rim of soft tissue, the inner margins of which are best seen if the bladder is distended with urine, air, oil or carbon dioxide. The outer margin of the bladder wall is smooth and generally well delineated by perivesical fat. Following the intravenous injection of contrast medium, urine within the bladder will be opacified and, since contrast-laden urine is heavier than nonopacified urine, urine–contrast demarcation is often seen on transverse images. While contrast enhancement is helpful for the evaluation of intraluminal filling defects, demonstration of the bladder wall is indistinct[1,2,3,4].

The diagnosis of bladder cancer is clinical and requires cystoscopy with biopsy.. In the case of a pedunculated tumour, there is a well-demarcated filling defect, usually round with a lobulated margin . Increased thickness of the bladder wall in the region of the tumour should indicate infiltration. Ultrasound has proved valuable in identifying bladder tumours. Using the transabdominal approach, a detection rate exceeding 95% has been reported, but difficulties related to tumour size (<5 mm) or location (near the vesical neck) often limit its value[6,9,10,11].

On computed tomography, bladder neoplasms appear as sessile or pedunculated soft-tissue masses projecting into the bladder lumen. These tumours have a density similar to that of the bladder wall on enhanced scans, and occasionally the intraluminal surface is encrusted with calcium .Often the only abnormality on CT is localized bladder wall thickening. Double-contrast techniques, such as air or carbon dioxide and 30% meglumine diatrizoate, can be used to assess small mucosal lesions but the CT appearance of bladder tumours is not specific. Masses that can simulate bladder cancer include invasive carcinoma of the prostate or rectum, metastases, phaeochromocytoma, leiomyoma, lymphoma, and malakoplakia. The major role of CT in carcinoma of the bladder is to stage rather than to detect the primary neoplasm . CT, however, is not accurate for the early stages, and its reliability increases with more advanced disease. CT cannot differentiate between the various layers of the bladder wall and cannot, therefore, distinguish lesions limited to the lamina propria (T1) from

those invading the superficial (T2) and deep (T3a) muscle. CT is clinically useful for detecting invasion into the perivesical fat (T3b), adjacent viscera and pelvic lymph nodes (category N), and distant metastases (category M). Extravesical extension is characterized by poor definition of the outer aspect of the bladder wall with an increase in density of the perivesical fat .. Large doses of contrast medium should be avoided because dense opacification of the lumen may obscure small tumours or produce scan artefacts which degrade the image. Tumour involvement of the pelvic side wall is characterized by a soft-tissue mass extending into the obturator internus muscle or by strands of soft tissue extending from the main tumour mass to the pelvic wall . Tumour invasion of the seminal vesicles should be suspected if a soft-tissue mass obliterates the seminal vesicle fat angle. This sign should be interpreted with caution because the normal seminal vesicle angle may be lost if the rectum is over-distended or if the patient is scanned in the prone position. When no distinct fat planes are present between the bladder and the rectum, uterus, prostate, or vagina, early tumour invasion into these neighbouring structures may be difficult to exclude[10,12].

CT is useful in detecting lymph node metastases, involvement being judged by node size. Nodes greater than 10 mm are suspect and nodes greater than 15 mm are considered malignant. The obturator and middle external iliac lymph nodes are involved first, followed by the internal and common iliac lymph nodes. Reported CT staging accuracies vary from 40% to 92%, with an accuracy range of 65–85% for the detection of perivesical extension. The reported accuracy of CT for lymph node detection varies from 65% to 85%. The anatomical and dosimetric data provided by CT have improved radiation port planning, facilitating the use of computerized dosimetry.

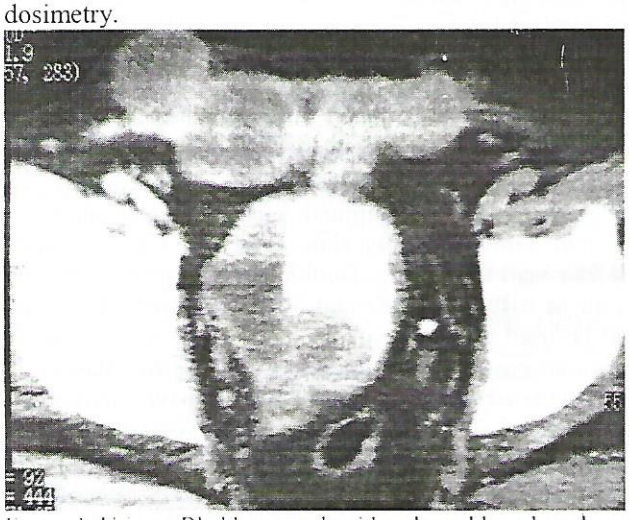

Figure 1. Urinary Bladder growth with enlarged lymph nodes.

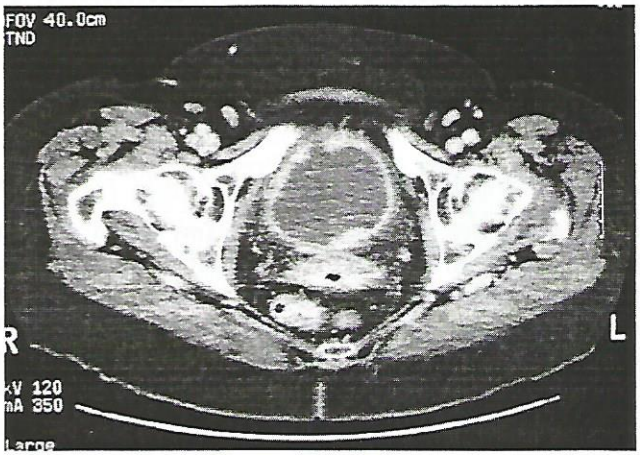

Figure 2. Growth seen as abnormally enhancing wall .

Conclusion

Early contrast enhanced technique is better in detecting even a small sized growth along the wall of urinary bladder.

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