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Research Article

Ultrasonographic evaluation of urinary bladder neoplasias

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ABSTRACT

Background: Ultrasound has been shown to be a sensitive method for evaluating patients with chronic obstruction, bladder outlet obstruction, urinary tract infection, renal failure, renal and bladder neoplasm and renal transplants. It is now recommended as the method of choice for preliminary assessment and follow-up of several of these disorders. The objective of the study was to evaluate the specificity and sensitivity of ultrasonographic features of neoplastic lesions of urinary bladder.
Methods: Clinical impression about the suspected abnormality was obtained from the case papers or from referring by clinical colleagues. Data was recorded under headings like clinical history, clinical examinations, investigations like urine analysis, serum creatinine and blood urea, X-ray of chest and Kidney Urinary Bladder, pelvic and abdominal Ultrasonography, and if require CT scan and guided biopsy.
Results: out of total 35 cases 29 were Transitional Cell Carcinoma, 4 were Squamous Cell Carcinoma, One leiomyoma and one was secondary from bronchogenic carcinoma. Most of tumours were irregular in shape in both TCC and SCC patients. Most of tumour showed heterogeneous echo-texture in ultrasonography. While all SCC showed heterogeneous with calcification echo-texture. Most of the cases had residual urine volume was less than 100 cc.
Conclusions: The primary advantage of ultrasound over the conventional study was found to be its ability to detect focal or diffuse bladder wall abnormalities in patients who presented with commonest complaint of painless hematuria.

Keywords: Urinary bladder, Neoplasia, Ultrasonographic findings

INTRODUCTION

Diagnostic imaging today comprises of a broad battery of imaging modalities to be used in varying combinations depending on the level of specialization of diagnostic unit and type of diagnostic problem to be solved. Of all these modalities ultrasound together with conventional radiology are by far the most commonly used basic primary modalities.[1] Although, ultrasound has few limitation, in spite of all latest advents to assess bone changes and define anatomic details and relationship compared with CT and MRI while it has advantages of cost, portability, lack of radiations and its usage can provide answer in evaluation and managements of certain urinary bladder neoplasias as primary investigation.[2]

With improved resolution and available intra-cavitory probes of sonography equipment, it may be the only modality needed to evaluate bladder lesions. Its non-ionising, non-invasive and reproducible nature. Also give quick reliable results without use of contrast media/injections and wide availability makes it the ideal primary imaging modality in general and even for children, pregnant women and very sick.[3]

Ultrasound has been shown to be a sensitive method for evaluating patients with chronic obstruction, bladder outlet obstruction, urinary tract infection, renal failure, renal and bladder neoplasm and renal transplants. It is now recommended as the method of choice for preliminary assessment and follow-up of several of these disorders. Several other reports have assessed the value of ultrasound in evaluation of patients presenting with urinary complaints.[4-7]

So, the aims of this study was to evaluate the specificity and sensitivity of ultrasonographic features of neoplastic lesions of urinary bladder.

METHODS

A prospective study was done at the department of radiology, SSG hospital, Baroda. Human research Ethics Committee permission was taken before starting of the study.

The clinical impression about the suspected abnormality was obtained from the case papers or from referring by clinical colleagues. All patients were studied and recorded under the headings like clinical history, clinical examinations like abdominal examination including abdominal distension, tenderness, lump, and other system examinations. Investigations like urine analysis, serum creatinine and blood urea, plain X-ray of chest and X- ray for Kidney Urinary Bladder, pelvic and abdominal Ultrasonography and if require CT scan and guided biopsy.

Ultrasonography examinations of all patients were done by using Schimadzu/Philips Ultrasound machine with 3.5 MHz Convex and 5-10 MHz linier transducers. Scans were performed in longitudinal and transverse sections. Oblique scans were done as per the need. Post-void scan of bladder performed for residual volume assessment. Protocol for Ultrasound evaluation protocol was as follow:

1. Kidney: size, cortical thickness, C-M differentiation, calculus, hydronephrosis, mass (location, cystic/solid, echotexture).
2. Ureter: seen or not, if seen – dilatation, level and cause of obstruction.
3. Urinary bladder: shape, wall configuration and thickness, volume, mass – numbers of tumor, shape, size, location, association of diverticuli, contents, vesico-uretiric junction.
4. Post-voiding scan: residual volume.
5. perivesical structures: In male- prostate and seminal vesicle, in female – uterine dimensions, ovaries and adenexa.

RESULTS

Out of total 35 cases 29 were of transitional cell carcinoma, 4 squamous cell carcinoma, 1 secondaries from bronchogenic carcinoma and 1 leiomyoma of bladder. As seen in table 1 most common age of bladder carcinoma is 41 to 50 years. Incidence of transitional cell carcinoma was very much high in male (26) than female (3). While in squamous cell carcinoma it was similar in both male (2) and female (2). Figure 1 & 2 shows symptoms at the time of presentation among patients with TCC and SCC. Most common symptom at the time of presentation of patient with TCC and SCC is hematuria. Most of tumor were irregular in shape in both TCC (10) and SCC (3) patients. Most of tumor (26) showed heterogeneous echo-texture in ultrasonography (Figure 3). While all SCC showed heterogeneous with calcification echo-texture (Figure 4). Association of diverticula with mass seen in 2 cases of TCC. Vasicoureteric involvement seen in 3 cases of TCC while 1 cases of SCC. Most of the cases had residual urine volume was less than 100 cc. almost all cases of TCC cases had infected urine. Hydronephrosis was associated with 9 cases of TCC and 3 cases of SCC. Hepatic secondaries were found in 3 cases of TCC, while no secondaries found in SCC. However ultrasonography finding of the patient of primary bronchogenic carcinoma with secondaries in bladder shows single mass with irregular but define margin and heterogeneous echotexture. It was present with bilateral hilar lymphadenopathy.

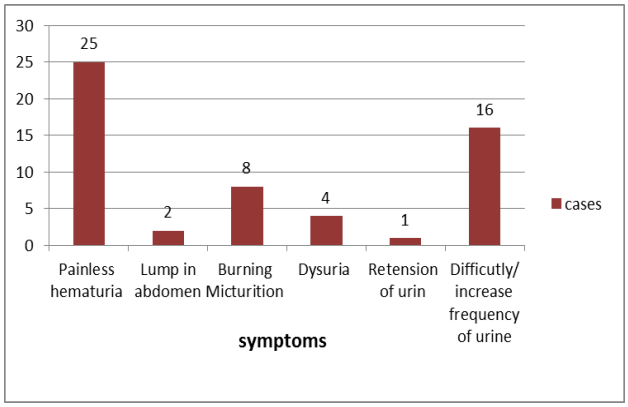

Figure 1: Presenting symptoms in TCC patients.

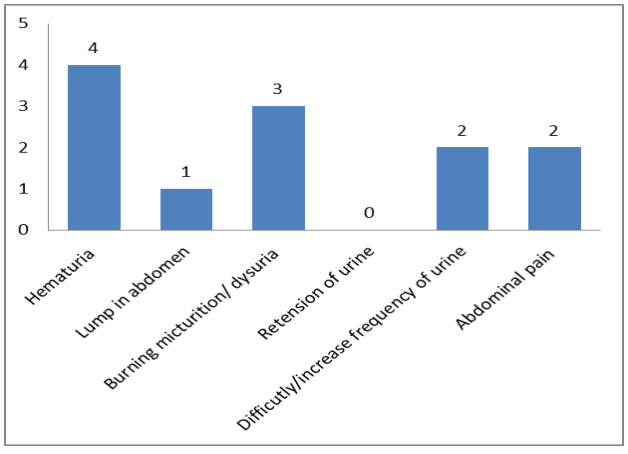

Figure 2: Presenting symptoms in SCC patients.

Figure 3: Heterogeneous echo texture in ultrasonography of Transitional cell carcinoma.

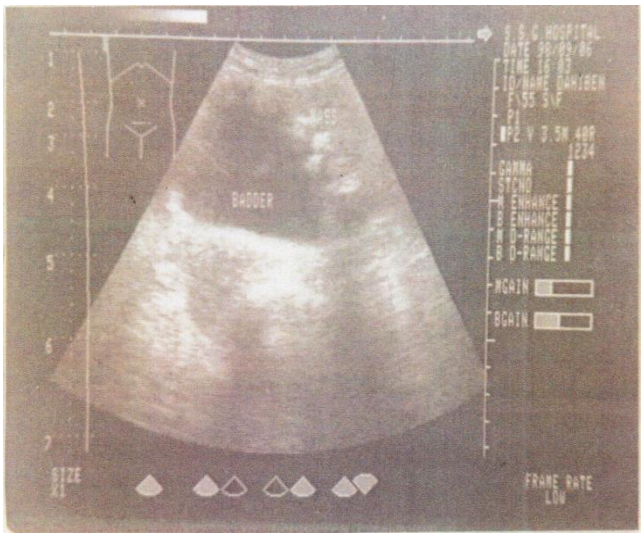

Figure 4: Heterogeneous mass with calcification in squamous cell carcinoma.

Table 1: Age wise distribution of all patients.

Age	TCC	SCC	Secondary	Leiomyoma
21-30	01	00	00	00
31-40	04	00	00	01
41-50	12	01	00	00
51-60	06	02	01	00
61-70	04	01	00	00
71-80	02	00	00	00
Total	29	04	01	01

DISCUSSION

Out of total 35 cases 29 cases were transitional cell carcinoma (TCC). Accurate staging can't be done and it was possible only by transabdominal suprapubic approach. However, when any patient present with complaint of painless hematuria, ultrasonography was prescribed. As ultrasonography shows the mass in bladder, extension into bladder musculature and perivesical structure assessed. Bree RL, et al.[8] Silver have mentioned that ultrasonography can be diagnostic, particularly if patient is asymptomatic. In present study, two cases with masses in diverticula were seen. Dondalski M, et al, has also mentioned that ultrasonography is useful tool for evaluation of vesical diverticular neoplasm.[9] The diverticuli seen as moderately echogenic, non-shadowing mass along diverticular wall.

In present study evaluation of presence or absence of bladder cancer was done by combination of Trans-abdominal Sonography (TAS), cystoscopy guided biopsy and urine cytology. And the accuracy for the definitive diagnosis was found to be 99%. Study by Yamashita T et al, in his study also mentioned that combination of TAS and urine cytology have high accuracy rate and should be the first choice for diagnosis of bladder cancer.[10] Although specific ultrasound appearance of a mass lesion was not possible in detail, as there was overlap in ultrasound appearance of adherent blood clot, with difficulty in accurate staging of mass and characterizing it as well.

Also one patient with metastasis in bladder with primary bronchogenic carcinoma presented with hematuria off and on for 2 months and increase frequency of urination and burning micturition. Incidentally, ultrasonography of this patient shown heterogeneous mass, which was confirmed by cystoscopy guided biopsy.

One patient with leiomyoma of bladder presented with small ovoid swelling in hypogastrium with dull acing pain and dysuria, which on ultrasonography shows a pear shape mass in the dome of the bladder, which was also proved by biopsy. It didn't involve bladder or urethra. Study by Cornella JL et al, shows that majority of leiomyomas involving the bladder and urethra are asymptomatic, non-obstructive or incidental. And they do not serve the indication for surgery. However, pedunculated endovesical lesions are exception to this because it has tendency to cause future symptoms. So, in that case transurethral removal is required.

CONCLUSION:

The primary advantage of ultrasound over the conventional study was found to be its ability to detect focal or diffuse bladder wall abnormalities in patients who presented with commonest complaint of painless hematuria.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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