



Original Article

Role of Ultrasound in the Evaluation of Urinary Bladder Neoplasm with Histopathological Correlation

A H M Tohurul Islam¹, Syeda Nazlee Mostafa², Mizanur Rahman³, Ziban Nahar⁴

Abstract

A descriptive study was carried out on 41 consecutive patients of clinically suspected bladder tumor presented with haematuria, which were studied by ultrasonography and was confirmed histopathologically. Per abdominal sonographic scan of KUB region, especially lower abdomen was done in full bladder state in supine position. Bladder lumens as well as peri-vesical structures were also studied. The sensitivity and specificity of ultrasonography were 96.87% and 60% respectively. The accuracy of ultrasonography was 91.89%. Positive predictive value 93.39% and negative predictive value was 75%. Histopathological types of bladder tumor where 90.63% were transitional cell carcinoma, 6.25% were adenocarcinoma and 3.13% were squamous cell carcinoma. The highest incidence was noted in the posterior wall of the bladder (53.13%) followed by lateral walls (35.50%), roof (03.13%) & the bladder neck (06.25%). The peak age incidence was in 5th to 7th decade, having mean age 57.4 ±2.3 years. Male to female ratio was 9.67:1 and most of them having the habit of smoking (81.25%). Highest incidence of bladder tumor was found in subjects belonging to blood group 'O' (53.13%), followed by 'A' (25%), 'B' (18.75%) 'AB' (3.13%). All the cases belong to Rhesus positive group. Bladder tumor was higher among the low socio-economic group (43.75%), followed by below average (34.38%), average (15.63%) and good (6.25%). Ultrasound is a very useful modality in diagnosis of urinary bladder neoplasm, which is cheap, easily available, noninvasive and negligible discomfort. So, sonographic scan can be recommended as a useful diagnostic modality in respect of urinary bladder neoplasm.

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Introduction

Bladder cancer is the commonest neoplasm of urinary tract and represents roughly 4% of all malignancies. About 95% bladder cancer originates from urothelium and 4% are of non-epithelial origin and remaining 1% are carcinoid and metastasis.

A definitive diagnosis of urinary bladder tumor cannot, of course, be made without cystoscopy and biopsy but ultrasonography along with its different modification assists the physician to predict the presence of bladder tumor and plan the treatment that may be necessary at cystoscopy.

¹ Assistant Professor, Department of Radiology & Imaging, Rajshahi Medical College, Rajshahi.

² Assistant Professor, Department of Radiology & Imaging, BSMMU, Shahbag, Dhaka.

³ Professor, Department of Radiology & Imaging, BSMMU, Shahbag, Dhaka.

⁴ Resident Surgeon, Department of Obstetrics & Gynaecology OPD, Rajshahi Medical College Hospital, Rajshahi.

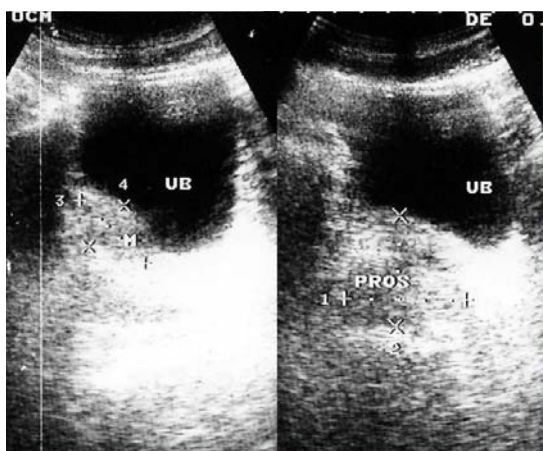
Methods

This prospective study was carried out in 41 patients, consecutively and cross-sectionally aged 29-88 years which were appeared as suspicious case of bladder tumor in the outpatient department and indoor of the Dept. of Nephrology & Urology of Bangabandhu Sheikh Mujib Medical University (BSMMU) and Dhaka Medical College Hospital (DMCH), Dhaka, during the period of one year from July 2003 to June 2004.

Per abdominal US scan of KUB



Photograph 1- Small TCC in posterior wall



Photograph 2- Adenocarcinoma in lateral wall

The post operative resected tissue was examined histopathologically in the Dept. of Pathology and reports were correlated with US findings.

Results

Highest incidence of tumors was found in 6th decade of life occurring in 13 (40.63%) cases. Next common age Incidence of bladder tumor was higher among the illiterate or just literate peoples (68.76%).

The most common & constant presentation was haematuria, found in 32 (100%) cases; anemia was present in 24 (75%) cases. region, especially lower abdomen was done in full bladder state in supine position by 3.5 MHz transducer and if needed to see the tumors in the roof, 7.5 MHz was used. Bladder lumens as well as peri-vesical structures were also studied.

Demographic and clinical variables were:

- ◆ Age of the patients
- ◆ Sex
- ◆ Occupation
- ◆ Smoking habit
- ◆ Blood group
- ◆ Socioeconomic condition
- ◆ Educational status
- ◆ Clinical presentation

The sonographic variables were:

- ◆ Location of the tumor
- ◆ Size of the tumor
- ◆ Number of the tumor
- ◆ Echogenicity
- ◆ Peri-vesical extension
- ◆ Lymphadenopathy
- ◆ Obstructive uropathy

Age incidence have been noted in 7th decade of life occurring in 07 (21.87%) of cases. In this study the lowest age noted was 29 years and the highest 88 years, having mean age is 57.4 ± 2.3 years.

The sex incidence of bladder tumor of histopathologically diagnosed cases was 29 (90.63%) male and 3 (09.37%) female. The male female ratio was 9.67:1.

The incidence of bladder tumor is different in different occupations. Highest incidence was noted in day labors with low socio-economic conditions. 50% of the patients were day labour in this study, all were from rural or slum areas of the country.

One patient was found having prolonged contact with different dyes who was a worker in printing press.

Maximum patients of bladder tumor (81.25%) were smokers taking over 15 sticks per day.

Higher incidence of bladder tumor was found in subjects belonging to blood group 'O' (53.13%), followed by 'A' (25%), 'B' (18.75%) 'AB' (3.13%). All the cases belong to Rhesus positive group.

The incidence of bladder tumor was higher among low socio-economic group (43.75%), followed by below average (34.38%), average (15.63%) and good (6.25%).

Histopathological types of bladder tumor where 29 (90.63%) were transitional cell carcinoma, 2(6.25%) were adenocarcinoma and 1(3.13%) squamous cell carcinoma.

Table-I: Age group of patients (n=32)

Age in years	No. of cases	Percentage
21-30	01	03.13
31-40	03	09.39
41-50	05	15.63
51-60	13	40.63
61-70	07	21.87
71-80	02	06.26
81-90	01	03.13

Table –II: Sex incidence of urinary bladder tumor (n=32).

Sex	No. of patients	Percentage
Male	29	90.63
Female	03	09.37

Table- III: Socio-economic condition (n=32)

Socio-economic condition	No. of patients	Percentage
Low	14	43.75
Below average	11	34.38
Average	05	15.63
Good	02	06.25

Table -IV: Smoker & non Smoker (n=32)

Smoking Habit	No. of cases	Percentage
Smoker	26	81.25
Non Smoker	06	18.75

Table –V: Blood grouping of the cases (n=32)

Blood group	No. of cases	Percentage
'O' Rh +ve	17	53.13
'A' Rh +ve	08	25.00
'B' Rh +ve	06	18.75
'AB' Rh +ve	01	03.13

Table –VI: Clinical presentations (n=32)

Presentation	No. of cases	Percentage
Hematuria	32	100.00
Anemia	24	75.00
Dysuria	07	21.88
Pain	06	18.75
Obstructive uropathy	10	31.25

Table- VII: Number of the tumors in the patients

Number of tumors	Number of cases	Percentage
Single	24	75
Multiple	08	25

Table- VIII: Distribution of tumors in the bladder (n=32)

Site of tumor	No. of cases	Percentage
Posterior wall	17	53.13
Lateral wall	12	35.50
Roof (Dome)	01	03.13
Neck	02	06.25

Table- IX: Histopathological types of tumors (n=32)

Type of tumor	No. of cases	Percentage
Transitional cell carcinoma	29	90.63
Adenocarcinoma	02	06.25
Squamous cell carcinoma	01	03.13

Discussion

The aim of this study was to establish diagnostic usefulness of ultrasonography in the evaluation of urinary bladder tumor.

During this study 41 patients presented with manifestations of bladder tumor, particularly with haematuria. All of were evaluated by ultrasound investigation, but in later on four cases were excluded from the study.

The reason of exclusion was unavailability of histopathological report.

All the 41 patients underwent ultrasound examination. Among them final diagnosis was made on the basis of the cystoscopic biopsy report.

Bladder tumor can occur at any age, it is generally a disease of the middle age & elderly. However with median ages at diagnosis for tumor being 69 for men and 71 for women¹.

In the present series, 13 cases are found in 6th decades, 07 cases found in 7th decades then 5, 3,

2, 1, 1 cases found in 5th, 4th, 8th, 9th & 3rd decade respectively. So our finding is very close to it. Males suffer four times more than female².

In this series only three female cases were found to have bladder tumor.

According to Morrison and Waterhouse et al it can be postulated that there are wide variation of incidence among different parts of world which may be due to combined effect of environmental and hereditary factors^{3,4}.

It is not possible to find out the exact incidence of this disease in respect to regional variations in our country with this limited case study. As ninety percent of people of our country live in rural area, the incidence of the disease will be definitely high among rural people in respect to urban people.

Rehn found close correlation between aniline dyes used in color fibers⁵. There is also association with acrolein used in chemical dyes and in the rubber and leather industries⁶ but in our study no definite association is determined with dyes.

Cigarette smokers have up to four fold higher incidences of bladder cancer than non-smokers³.

In our study 26 cases are smoker which suggests the association of smoking as described by others.

The presence or absence of ABH(O) blood group surface antigen has previously been described as a prognostic factors in bladder cancer⁷. In this series all the cases of bladder tumors are Rhesus +Ve group and most of them are of blood group 'O'.

In most instances, recurrent episodes of painless haematuria occurred and duration of interval varies from few days to 20 yrs. Bloom & Henry reported the incidence of haematuria in 80%-95% cases of bladder neoplasm.⁸ Anemia and urinary tract infection is also common presenting symptoms. As my study selectively took the cases of haematuria was found in all cases in bladder tumor - this symptom bears much significance.

Bladder tumor occurs usually in the posterior and lateral wall especially near the ureteric orifices and are much less common on the bladder neck, dome and anterior wall⁹.

In the present series 17 patients had tumors in posterior wall, 12 patients had tumors in lateral wall, 01 in the roof and 02 in the bladder neck.

The great majority of 90% of bladder tumors are transitional cell carcinoma which includes grades I to II and carcinoma in situ; benign papillomas are only 2 to 3% of all tumors according to Cotran et al¹⁰.

In this series transitional cell carcinomas were 29, squamous cell carcinoma was 01 and adenocarcinoma are 02 cases.

According to Datta et al an investigation of over 1000 patients with haematuria was done by ultrasound. The sensitivity of ultrasound with respect to the bladder cancer was 63% and the specificity 99%¹¹.

In our study the sensitivity of ultrasound in respect of bladder tumor is 96.87%, specificity 60% and accuracy is 91.89% positive predictive value 93.39 % negative predictive value is 75 %.

Conclusion

From the results of the study, it is concluded that Ultrasound is a very useful modality in diagnosis of urinary bladder neoplasm, which is cheap, easily available, noninvasive and negligible discomfort. So sonographic scan can be recommended as a useful diagnostic modality in respect of urinary bladder neoplasm.

References:

1. Lynch CF, Cohen MB. Urinary system. *Cancer*. 1995; 75(suppl):316.
2. Boring CC, Squires TS. *Tong. Cancer Statistics 1995, Cancer.J Clin.* 1995; 45:2.
3. Morrison AS. Advanced etiology of urothelial cancer. *Urol Clin North Am.* 1984; 11: pp559.
4. Waterhouse J, Muir C, Shanmugartanam K. Cancer incidence in Five continents, *Lion International Agency for Research on Cancer.* 1982; 4:102-110.
5. Rehn L, Blasengeschwii LF. *Arbitern Arch Klin Chir.* 1895; 50:886-900.
6. Sadler WM. Molecular events in the initiation and progression of the Bladder Cancer. In: *J Oncol.* 1993; 3: 549.

7. Richey AM, Leveille R, Mellicow MM. Tumors of the Bladder. A Multifaceted problem. J Urol. 1980; 112:467-78.
8. Bloom NA, Henry ME. Tumors of the Urinary bladder: An analysis of the occupation of 1030 patients in Leeds, England. J Int. cancer Ins. 1976; 45: 879-895.
9. Miller AB, Luis OJ, Mishina T. The aetiology of bladder cancer from the aetiological point of view. Cancer Res. 1974; 37:293-6.
10. Cotran SR, Kumar V, Robbin SL. (Editors). In-Robbin's Pathologic basis of disease. 5th Edition. Prism Book (Pvt.) Ltd. Bangalore. 1994; 991-1006.
11. Datta SN, Alen GM. Urinary tract Ultrasonography in the evaluation of haematuria- a report of over 1000 cases. Ann R Coll Surg, Engl. 2002; 84(3): 203-5.

All correspondence to:
A H M Tohurul Islam
Assistant Professor
Department of Radiology & Imaging,
Rajshahi Medical College,
Rajshahi