Original Article

Role of flexible cystoscopy and ultrasound in the detection of recurrent Bladder Tumour

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Abstract:

Background: Rigid cystoscopy under anaesthesia for the surveillance of recurrent bladder tumour creates a large urological workload. Recently, flexible cystoscopy became a popular alternative and an easy, safe and effective means of check cystoscopy in following-up patients of superficial transitional cell carcinoma (TCC) of the urinary bladder. Because of the frequency of tumor recurrences and the necessity of finding, whether a less invasive, easily repeatable investigation is capable of providing precise information about the bladder cavity, and, could decrease the frequency of repeated rigid cystoscopy under anaesthesia and inpatient admission; we have decided to perform this study. Methods: This is a prospective comparative study that involved 85 patients (70 male and 15 female) with a mean age of 61 years (41-80 years), who had undergone one or more transurethral resections for TCC of bladder (stage pTa and pT1; grade I and II.) in the department of Urology, BSMMU between July 2005 -Feb 2007. Ultrasonography(USG) of the bladder was performed one week before check cystoscopy. We have calculated sensitivity and accuracy of USG and flexible in comparison to rigid cystoscopy.Results: Eighty five (85) sessions of follow-up investigations- Ultrasound and flexible cystoscopy showed 31 recurrences confirmed by rigid cystoscopy and biopsy. In over 85 rigid cystoscopies, 54 were negative and 31 were positive for tumour. Sensitivity, the most important parameter, was 97% for the two examinations together. Each method separately had the following sensitivity: ultrasound 77%; flexible cystoscopy 90%.Conclusion: Considering that there was only one false-negative result of combined abdominal ultrasound and flexible cystoscopy; with this follow-up scheme we could have saved our patient from rigid cystoscopies, reducing the cost of in-patient admission and anaesthesia.

Key words: *Recurrent TCC bladder, Check cystoscopy, Transabdominal ultrasound.*

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Introduction:

The classic recommendation for cystoscopic surveillance in superficial bladder tumour has been every 3 months for the first year, every 6 months for the second year, and yearly thereafter[1]. To date rigid cystoscopy has been the main method of followup but flexible cystoscopy is becoming increasingly popular because it can be carried out under local anaesthesia on an out-patient basis[2, 3, 4]. The flexible cystoscope can provide accurate information about bladder tumor with a specificity of 100 (94-100) % and sensitivity of 96 (80-100) % [5].

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Constant improvement in the optics and design of endoscopes have made it possible for the urologist to tackle most urological problems endoscopically, while rigid endoscopes have become extremely popular and are in widespread use all across our country , flexible cystoscopy is still only in its infancy. Flexible cystoscopy allowed much better visualization of the anterior bladder wall and bladder neck than standard rigid cystoscopy [6].

Sonographic detection of bladder tumours is excellent and is greater than or equal to 95% [7]. The appearance is that of a focal nonmobile mass or of urothelial thickening. The appearances, however, are nonspecific and the differential diagnosis is extensive and includes cystitis; wall thickening due to bladder outlet obstruction; postradiation change; postoperative change; adherent blood clot; invasive prostate carcinoma; lymphoma; metastases; endometriosis; and neurofibromatosis. So, cystoscopy and biopsy are necessary to confirm the diagnosis. Both transvaginal and transrectal ultrasound may be used to assess a bladder wall mass if suprapubic visualization is poor.

The aim of the present study is to compare the detection rate of recurrent superficial bladder tumours by ultrasound and by flexible cystoscopy.

Methods

This prospective comparative study was conducted in the department of Urology, BSMMU, between July 2005 -Feb 2007. 85 patients who had TCC of urinary bladde (stage pTa and pT1; grade I and II.) were included in this study. Transabdominal ultrasonography of the bladder was performed with a Siemens ultrasound machine with a 3.5 MHz abdominal probe by a consultant radiologist in the radiology department 1 week before cystoscopy. Patients with carcinoma in situ, high grade tumor or and advanced lesion of stage PT2 or more were excluded from the study. Flexible cystoscopy (FC) was performed with a 15.5Fr Karl Storz GMBH & Co. KG flexible cystoscope by the same consultant urologist for all. Finally conventional rigid cystoscopy with or without biopsy was performed at the same setting to confirm the findings.

Results

Out of 85 rigid cystoscopies, 31 were positive for tumor (Table-1). Ultrasonography was positive in 77.42%, flexible cystoscopy in 90.32% of these positive controls. Rigid cystoscopy was negative for tumor in 54 cases and this was corroborated in by ultrasounds in 90.74%, flexible cystoscopy in 94.44% of the cases. Sensitivity and specificity of USG in detecting recurrent bladder tumour were 77.42 and 90.74 respectively; and for flexible cystoscopy were 90.32 and 94.44.

Table-I: Results of follow-up examinations (85 cystoscopies)

Rigid cystoscopy	Findings of USG& Flexible cystoscopy	USG	Flexible cystoscopy
Positive Rigid cystoscopy N=31	*True positive	24	28
	False negative	07	03
Negative Rigid cystos copy N=54	False positive	05	03
	**True negative	49	51

* True positive=Positive in rigid cystoscopy, **True negative= Negative in rigid cystoscopy

Table-II: Correlation among the results of rigid cystoscopy, flexible cystoscopy and Ultrasonography studies (*Pos.=Positive; **Neg.=Negative)

No of pt (85)	Rigid cystoscopy(RC)	Flexible cystoscopy	USG
21	**Pos.***	**Pos.**	**Pos.**
47	Neg.**	Neg.	Neg.
06	**Pos.**	**Pos.**	Neg.
05	Neg.	Neg.	**Pos.**
04	**Pos**	2 Neg. 2 **Pos.**	1 Neg. 3 **Pos.**
02	Neg.	**Pos.**	Neg.

There was a close correlation between the results of rigid cystoscopy and those of flexible cystoscopy in 79 of the 85 cases (92.94%).Correlation between the results of rigid cystoscopy and ultrasonography was in 73 of the 85 cases (85.88%).

There was discordance between the results of two modalities of cystoscopy in 6 cases (3 false positive and 3 false negative).Discordance between the results of rigid cystoscopy and ultrasonography was 12 (5 false positive and 7 false negative).

Table-III: Efficacy and sensitivity of flexible cystoscopy and ultrasonography together in the follow up of superficial bladder tumour.

The global result of our study are the following: 30 true-positive (at least one procedure suggesting tumor and confirmed by rigid cystoscopy); 54 true-negative (both USG and flexible cystoscopy were negative for tumour and confirmed by rigid cystoscopy); none was false positive (at least one procedure suggesting tumor but rigid cystoscopy did not confirm it); one false-negative (both USG and flexible cystoscopy were overlooked the tumor but rigid cystoscopy showed it).

a)

Rigid cystoscopy	Findings of Ultrasonography and Flexible cystoscopy in combination	
Positive Rigid cystoscopy N=31	Positive examination (True positive)	30
	Negative examination (False negative)	1
Negative Rigid cystoscopy N=54	Positive examination (False positive)	0
	Negative examination (True negative)	54

b)

	USG	FC	USG+FC
Accuracy	85.88	92.94	98.73
Sensitivity	77.42	90.32	96.77
Specificity	90.74	94.44	100

Sensitivity is the most important value, which increases with combination of USG and flexible cystoscopy (96.77).

Table- IV: Effect of size of the tumour on diagnostic accuracy of transabdominal ultrasound

Rigid cystoscopy	USG				X^2	p value	Comment
	<5 mm (n= 12)		>5 mm (n=19)				
	Negative	Positive	Negative	Positive			
Tumour	07	05 (41.66%)	0	19 (100%)	40.70	<0.001	Highly significant
No tumor	49	0	0	5			

Ultrasonography detected all the tumours of >5mm size but detection rate of<5mm tumours were only 41.66% (5 of 12). So, ultrasonography significantly missed smaller tumours(<5mm).

Table-V: Comparison of Series on detection of recurrent tumours by ultrasonography

	No. of patients	***% Detected***
Itzchak *et al.* (1981)	37	62
Brun *et al.* (1984)	95	68
Malone *et al.* (1986)	126	50
Vallancian *et al.* (198 6)	100	74
Juul *et al.* (1986)	186	77
Davies et al(1990)*	40	95
This study	85	77

*Both transabdominal and transrectal ultrasound scan performed.

In this study transabdominal ultrasonography detected 77% of recurrent bladder tumours.

Discussion

Bladder cancer is one of the common diseases treated by urologists. Majority of bladder cancers are transitional cell carcinomas, which exhibit the entire spectrum of biologic aggressiveness, from benign-behaving, superficial low-grade papillary lesions to highly malignant anaplastic carcinomas. Bladder cancer often behaves as a field change disease in which the entire urothelium from the renal pelvis to the urethra is susceptible to malignant transformation, multiple occurrences and re-occurrences of urothelial tumors, which can also implant and probably migrate to other sites of the urothelium, make it difficult to determine whether a recurrent tumour represents an inadequately treated initial one, tumour implantation or migration, or the effects of multifocal carcinogenesis. So the success of treatment depends entirely upon regular follow-up. Because the number of bladder cancers is increasing day by day, work load upon the urologists is increasing many folds. Roughly, 55-60% of all newly diagnosed bladder cancers are well or moderately differentiated superficial (mucosally confined or lamina propria invading) papillary transitional cell carcinomas8. The majority of these patients develop tumour recurrences following endoscopic[9].

Flexible cystoscopy with the patient in the supine position offers the clinician an alternate yet often easier method to gain information about recurrence previously obtainable only with the rigid cystoscopy. In this study, in accordance with the findings of Clayman et al. (1984) and Powell et al. (1984), showed that flexible cystoscopy is reliable in the evaluation of bladder tumour patients, as compared with rigid cystoscopy. Three(9.6%) follow-up patients with solitary, small(<2mm), superficial bladder tumours were "missed" at flexible cystoscopy **(Table I)** and all three missed were in the first 30 cystoscopies. Three false-positive (9.6%)results were due to scarring at the site of previous resection. For the comparison of findings from rigid and flexible cystoscopy, a between-observer variation and lower quality image and perfusion in flexible cystoscopy, should be taken into account[10].

Transabdominal bladder ultrasonography constitutes a useful method to disclose tumours of more than 5mm. But its efficacy is reduced considerably when the tumour is smaller than 5mm[11].In this study, ultrasonography detected all the tumours of >5mm size but detection rate of<5mm tumours were only 41.66% **(Table IV)**. So, ultrasonography significantly missed smaller tumours(<5mm). A combination of transabdominal and transrectal ultrasound scan produced better detection rates than those reported by other workers **(Table V)**.

In this study, accuracy rate **(Table IIIb)** of ultrasound was 86% and that of flexible cystoscopy was 93% (6% of 31tumour diagnoses missed,95% confidence interval),which was comparable well with combination of ultrasound and flexible cystoscopy (accuracy rate 99%;95% confidence interval) and conventional rigid cystoscopy. So, this study showed that, when comparing rigid cystoscopy and combination of ultrasound and flexible cystoscopy, good correlation between detection rates is encouraging **(Table II,IIIb,)**.

By allowing more efficient use of bed-space and operating time, flexible cystoscopy has altered the character of our in-patient practice and, in particular, has made the large load of check cystoscopies more manageable.

Conclusion

From the findings of the present study, it can be concluded that, combination of ultrasound and flexible cystoscopy can detect recurrent supperficial bladder tumour as accurate as conventional rigid cystoscopy, and patients with this tumour can be followed-up as out-patient basis.

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