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CHANGING IMAGE MODALITIES IN ACUTE URETERIC COLIC

Ureteric colic is an important and frequent emergency, that urologist and other clinician faces in their day to day practice throughout the world. It is most commonly caused by the obstruction of the urinary tract by calculi. Between 5-12% of the population will have urinary tract stone during their life time and recurrence rate approach 50 %¹. Incidence of ureteric colic in Bangladesh appears to be rising particularly among the working people returned from Middle East. It is important to reach an early diagnosis for better management. But the diagnosis of ureteric colic is sometime confronted. It is traditional to check urine for RBC and a plain X-ray KUB immediately. Loaded bowel sometimes obscures the pathology and decreases the sensitivity of plain KUB. Plain abdominal radiography may be sufficient to diagnose ureteric stone in patients with known calculus disease with a previous KUB X-ray. The sensitivity of KUB in other patients is poor with reported sensitivities of 58%-62%^{2,3}. KUB should not be used alone in the selection of patients for undergoing non-contrast CT evaluation. It may be a valuable component of the IVU or US assessment of acute flank pain.

Use of ultrasound scan increases the sensitivity of diagnosis of ureteric colic. Ultrasound is a safe and non-invasive imaging modality that is useful in the evaluation of the urinary tract. Ultrasonography allows direct demonstration of PUJ and VUJ stone. But stones located in-between is extremely difficult to locate sonographically⁴. Sometimes hydronephrotic change in the kidney gives an indirect evidence of the presence of distal stone or obstruction when stone is not visible. But hydronephrosis may not appear in early stage and it may not be possible to exclude obstruction in presence of previously dilated non obstructive system. The assessment of the ureteric jet is the other US parameter that is helpful in the evaluation of urinary obstruction. Ultrasound has significantly lower sensitivity than IVU and misses more than 30% of stones⁵. Intrarenal Doppler US improves the detection of early obstruction by determining the elevated resistive index (RI) in kidneys with stones and nondilated collecting systems⁶. A

combination of US and KUB has been recommended to improve the sensitivity of detecting ureteric calculi⁷. The lack of ionizing radiation makes US the initial screening method of choice for evaluating the pregnant patient with hydronephrosis.

The use of IVU has been used for ureteral stone detection for long time and has a sensitivity of 59.1–87.0 %.⁸ Loin pain, fever along with a non excreting kidney warrant urgent intervention. IVU is indicated if the findings of US/KUB are inconclusive or interventional treatment is anticipated. It provides information regarding the location and size of the renal calculi, the degree of obstruction and the effect on renal function. The technique permits the complete evaluation of the urinary system. Its main disadvantages are the use of ionizing radiation and intravenous administration of iodinated contrast media with risk of contrast reaction. It is important to see that the patients have normal or near normal renal function before doing an IVU. Contrast allergy however decreased with the use of low molecular agent. Badly prepared bowel in emergency situation also obscure the pathology and decreases the sensitivity of IVU. If the collecting system cannot be opacified in cases of severe stone obstruction, then the interpretation of IVU would be the same as that of KUB. Pregnancy and dehydration are relative contraindications of doing IVU. IVU has been the standard imaging modality for the investigation of ureterolithiasis until the advent of CT. Compared with NCT, the technique is more time consuming and is unable to offer alternative diagnosis.

Over the past decades noncontrast CT (NCT) scan has been establish as an image modality in the emergency department for diagnosing ureteric stone in the developed world. Helical CT is widely used nowadays, and is more familiar to physicians who might produce a more accurate diagnosis. Non-contrast CT has high sensitivity (97%) and specificity (96%) for ureterolithiasis^{9,10}. Nearly all stones are opaque on CT, and stone size can be accurately measured with this technique. CT can provide additional information such as periureteral stranding or urinoma to disclose the degree of stone

obstruction. It is less time consuming, does not require any contrast, therefore no contrast allergy and no adverse effect of contrast agent on renal function. Non-contrast CT is equal to IVU in diagnosis of obstruction and is more reliable in detecting the presence of ureterolithiasis. NCT also provide alternate or coexisting pathologies like acute appendicitis, diverticulitis, twisted ovary or presence of ureteric TCC. It is more rapid than IVU and does not depend on the technical expertise that is required by US. Further more, with the increased use of NCT; there was no significant decrease in the positive rate of renal colic detection¹¹. Main concern against standard NCT is the greater radiation exposure of 10mSv than estimated exposure of 2.5 mSv in IVU. Recent development Low dose NCT has got the calculated mean effective radiation dose was 1.40 mSv for males and 1.97 mSv for females and can detect stone size of < 2 mm which comparable to standard NCT¹². Multi-detector CT (MDCT) is the most recent advance in CT technology. CT urography (CTU) employing MDCT technique has the potential to replace IVU in the complete evaluation of the kidney and urinary collecting system¹³.

Magnetic resonance imaging (MRI) can be used to detect ureteral stones. MRU utilizing heavily T2-weighted (T2W) pulse sequences can easily depict a dilated ureter and demonstrate the level of obstruction without the use of ionizing radiation and contrast material¹³. The accuracy of MRU for ureteric stones may be lower than that of IVU as its spatial resolution is not high enough for the detection of small stones. However using breath-hold heavily T2-weighted sequences in acute flank pain found sensitivity of 54-58% and specificity of 100%. Sensitivity and specificity increased to 96.2-100% and 100%, respectively, using gadolinium-enhanced 3-D FLASH MR urography. Ureteric stones are seen as filling defects in the ureter on MRU. Perirenal and periureteral T2W high signal intensity can also be observed in patients with acute obstruction. MRU in combination with US may be used instead of IVU or CT in the evaluation of pregnant women with renal colic who have nondiagnostic findings from a sonogram.

So it is now appeared that non-contrast CT is the most accurate and efficient technique in the imaging evaluation of acute renal colic. The question may be raised whether it is practically feasible or economically viable in our country to do NCT in every patient with ureteric colic presenting to emergency department, probably not. In patients with known renal calculi, plain radiography only may be used for the imaging follow up.

In other cases, a plain x-ray KUB and a renal USG still appears to the first line imaging and will remain so for few more years, as these are readily available in this country. When intervention warranted or diagnosis remains unclear, intravenous urography, being the method familiar to most clinicians, can be used if CT scan is not available or affordable. Urologist can make an special arrangement with the radiologist to reduce the cost of NCT. On the other hand the waiting for 2 days in hospital for bowel preparation also increases the cost of IVU. In pregnant patients, ultrasound is the best initial imaging modality. When US findings are inconclusive, MRU has the potential to evaluate acute urinary tract obstruction without the use of ionizing radiation.

Dr. Md. Jahangir Kabir

Chief Consultant of Urology
Labaid Specialized Hospital
Dhaka, Bangladesh

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SONO-URETHROGRAPHY IN THE EVALUATION OF MALE ANTERIOR URETHRAL STRICTURES

AKM K ALAM¹, MS HOSSAIN² MS FARUQUE³, FH SIDDIQUE⁴, MM HOSSAIN⁵, ATM AMANULLAH⁵, IA SHAMEEM¹, GM CHOWDHURY¹, MAI JOARDER³, SM RAHMAN⁶ SAMG KIBRIA⁷

Abstract:

Objective: To evaluate the accurate length, site, number of male anterior urethral stricture and to determine the extent of spongiofibrosis by sonourethrography and comparing it with retrograde urethrogram and operative findings.

Methods: This cross sectional study was conducted to evaluate 60 patients with anterior urethral stricture. All patients underwent retrograde urethrography (RGU) followed by sonourethrography (SUG) to evaluate abnormalities of male anterior urethra. All sonographic studies were performed with a standard ultrasound scanner (Just Vision 400, Toshiba) using a 7.5 MHz linear array transducer. With the patients in supine position anterior urethra was filled with saline and multiple longitudinal and transverse scans were taken. All cases underwent operative treatment. During operation all patients observed for length of stricture and degree of spongiofibrosis of stricture and correlated it with RGU & SUG findings.

Results: The Mean (\pm SD) age of the patients of this study was 30.75 \pm 8.70 years and the age range of the subjects was 50 to 18 years. Sensitivity of SUG to diagnose urethral stricture length at cut off level 10 mm was 94.1%, specificity 97.7%, positive predictive value 94.1%, negative predictive value 97.7% and accuracy 96.7% (Kappa value = 0.918; p value <0.001). Sensitivity of RGU to diagnose urethral stricture length at cut off level 10 mm was 88.2%, specificity 86.0%, positive predictive value 71.4%, negative predictive value 94.9% and accuracy 86.7% (Kappa value = 0.693; p value <0.001). Diagnostic accuracy was determined as receiver operating characteristic (ROC) curve, suggesting that the area under the curve (AUC) of SUG and RUG was 0.959 and 0.871, respectively in the diagnosis of length of stricture (Fig.-1).

Conclusion: Retrograde urethrography and sonourethrography are equally efficacious in detection of anterior urethral strictures.

Key words: Anterior urethral stricture, retrograde urethrography, sonourethrography, spongiofibrosis.

Introduction:

Standard radiographic retrograde urethrography remains an important study for the planning of urethral reconstruction¹. However because conventional retrograde urethrography produces static images, variation in the penile stretch, urethral distension and patient positioning may produce variable results^{1,2}. Voiding cystourethrography offers a valuable complement to retrograde urethrography, but again variation in positioning may produce an incorrect axis of assessment and thus imprecise results. Extravasation of contrast, sepsis and hypersensitivity may also occurs^{1,3,5}. To overcome these problems in 1988 MC Aninch et al reported a new technique for imaging the male anterior urethra with high resolution ultrasound (Sonourethrography)¹.

As a dynamic 3 dimensional study which can be repeated without radiation exposure, sonourethrography offers important technical advantages by estimating length of strictures, degree of spongiofibrosis which would be more informative in making decisions about the management^{3,20}. This study was undertaken to explore the uses of high-resolution ultrasound in evaluating abnormalities of male anterior urethra and comparing with Retrograde Urethrography. Recently sonourethrography and MR imaging have been proposed, distending the lumen with simple saline solution instead of iodinated contrast media^{5,7}. They are being used to study the urethral mucosa and the periurethral spongy tissue which can be involved in the urethral pathologies such as strictures, diverticula, trauma, and tumors^{1,7,9}. A significant reduction in the incidence of recurrent stricture may be obtained by selecting patients for treatment on the basis of the findings of sonourethrography^{16,18}.

The present study is designed to determine the length, site, number of male anterior urethral stricture, extend of spongiofibrosis by sonourethrography and comparing it with retrograde urethrogram and operative findings.

Materials & Methods:

This hospital based cross sectional study was conducted from January 2007 to October 2008 in the department of Urology, Radiology and Imaging, Bangabandu Sheikh Mujib Medical University, Dhaka to evaluate male anterior urethra by sonourethrography. A total of 60 patients out of 100 by defined criteria were evaluated in this study. Male patients with the complaints of poor stream of urine were selected from the out patients Urology Dept. of Bangabandhu Sheikh Mujib Medical University. A detailed history was elicited which included a past history of reaction to contrast media, penile or urethral trauma, infections, urethral surgery, prolonged urethral catheterization or urethral dilatation. Clinical examination was performed for specific relevant findings of meatal stenosis, epispadias, hypospadias, fistulae, diverticula or purulent urethral discharge. All patients under went RGU followed by sonourethrography. The patients who were diagnosed as primary anterior urethral strictures were invited to participate in the study. After anaesthetic evaluations all cases underwent operative treatment. During operation all patients observed for length and degree of spongiofibrosis and correlated with RGU & SUG findings.

All sonographic studies were performed with a standard ultrasound scanner (Just Vision 400, Toshiba) using a 7.5 MHz linear array transducer. With the patients in supine, glans was cleansed with antiseptic solution, a 12 Fr Foley’s catheter introduced such that the bulb of the catheter laid in the fossa navicularis. The bulb was distended gently using 2 ml normal saline. The penis was then cranially extended over the lower abdomen and ultrasonic gel was applied liberally to the ventral surface of the penis. Twenty ml to 100 ml of sterile normal saline was infused after taking care of to exclude air bubbles. The penile urethra was visualized to the penoscrotal junction with multiple longitudinal and transverse scan by placing the transducer on the ventral penile surface. Subsequently, the transducer was repositioned to visualize the proximal penile and distal bulbar urethra transscrotally. Transperineal scans were performed to visualize the proximal bulbar urethra and external sphincter (Figure-2).

During sonourethrography, the urethra became distended by saline infusion and appeared as a homogenous echo free band, 8-10 mm in diameter. Below the urethra an echogenic band was visualized, which was produced by dorsal acoustic enhancement and reflection from tunica albuginea. Strictures were

located as segments of reduced dispensability on infusion of saline. The stricture length and diameter were determined using electronic scale measurements. Strictures were graded as mild encroachment on less than one third of normal lumen, moderate encroachment on less than one third of normal lumen. Periurethral fibrosis was identified as regions of greater echogenicity in corpus spongiosum thickness, moderate involvement of one third to a half, and severe involvement of over one half (Fig.-3). The duration of the procedure varied from 10 – 20 min.

Results:

A total of 60 patients with symptoms of lower urinary tract obstruction underwent retrograde urethrography (RGU) followed by sonourethrography. The outcome variables studied were compared with peroperative findings of stricture urethra and sensitivity, specificity and overall accuracy for the procedures were calculated. The findings of the study obtained from data analyses are given in different tables.

Evaluation of stricture by RGU shows that 51 (85.0%) had single stricture and only 9 (15.0%) patients had multiple strictures. In thirty three (55.0%) patients, the strictures were located at bulbous part and 27 (45.0%) at penile part of the urethra. Over 96.7% of the subjects had strictures of <10 mm length (Table-1).

Table-I
Distribution of the respondents by the evaluation of stricture by SUG and RGU.

Evaluation of stricture	Frequency		SUG-RGU	
	SUG-RGU	Percent		
Number of stricture				
• Single	52	51	86.7	85.0
• Multiple	8	9	13.3	15.0
Location of stricture				
• Bulbar	36	33	60.0	55.0
• Penile	24	27	40.0	45.0
Anterior urethral stricture length (mm)				
• <10	18	58	30.0	96.7
• >10	42	2	70.0	3.3
Periurethral fibrosis				
• Mild	5		8.3	
• Moderate	51		85.0	
• Severe	4		6.7	

Evaluation of stricture by sonourethrography shows that 52 (86.7%) had single stricture and only 8 (13.3%) patients had multiple strictures. In thirty six (60.0%) patients, the strictures were located at bulbous part and 24 (40.0%) at penile part of the urethra. About 70.0% (42) of the subjects had strictures of >10 mm length and 30.0% (18) had stricture of d<10 mm length. Most of the patients, 85.0% (51) had moderate, 8.3% (5) had mild, and only 6.7% (4) had severe periurethral fibrosis (Table-I).

Evaluation of stricture preoperative shows that 83.3% had single stricture and only 16.7% patients had multiple strictures. In thirty six (60.0%) patients, the strictures were located at bulbous part and 40.0% at penile part of the urethra. About 70.0% of the subjects had strictures of >10 mm length and 30.0% had stricture of <10 mm length. Most of the patients, 80.0% had moderate, 15% had mild, and only 5% had severe periurethral fibrosis (Table-II).

Table-II

Distribution of the respondents by per operative evaluation of stricture

Per operative evaluation of stricture	Frequency	Percent
Number of stricture		
• Single	52	83.3
• Multiple	08	16.7
Location of stricture		
• Bulbar	36	55.0
• Penile	24	45.0
Anterior urethral stricture length (mm)		
• <10	18	30.0
• >10	42	70.0
Periurethral fibrosis		
• Mild	9	15.0
• Moderate	48	80.0
• Severe	3	5.0
Colour of urethral mucosa		
• Pink	11	18.3
• Gray	46	76.7
• White	3	5.0
Resistance to incision		
• Mild	8	13.3
• Moderate	48	80.0
• Severe	4	6.7

SUG evaluation of fibrosis was correlated well with per operative findings ($r=0.569$; $p < 0.001$). Kappa value= 0.671; p value < 0.001 . 67.1% agreement was also observed between SUG and per operative findings in the evaluation of fibrosis.

Out of all patients 16 cases were diagnosed as having urethral stricture length $d < 10$ mm by SUG and confirmed by peroperative evaluation. They were true positive. One case was diagnosed as having urethral stricture length $d \sim 10$ mm by SUG and not confirmed by peroperative findings. So, it was false positive case. Of 43 patient having urethral stricture > 10 mm, which were confirmed by SUG, one was confirmed as having urethral stricture $d < 10$ mm and 42 were > 10 mm length by peroperative evaluation. They were false negative and true negative respectively. Kappa value 0.918 revealed that statistically highly significant agreement (total agreement) between these two tests in the diagnosis length of urethral stricture at 10 mm cut off point.

On the other hand considering correlation between RGU and operative findings 15 cases were true positive, 6 were false positive 37 cases were false negative and two were true negative at a cut off level of 10 mm.

Sensitivity of SUG to diagnose urethral stricture length at cut off level 10 mm was 94.1%, specificity 97.7%, positive predictive value 94.1%, negative predictive value 97.7% and accuracy 96.7%. Sensitivity of RGU to diagnose urethral stricture length at cut off level 10 mm was 88.2%, specificity 86.0%, positive predictive value 71.4%, negative predictive value 94.9% and accuracy 86.7% (Table-III).

Table-III

Sensitivity, specificity, accuracy, positive and negative predictive values of the SUG and RGU in the diagnosis of urethral stricture length at cut off level 10 mm

	SUG	RGU
Sensitivity	94.1	88.2
Specificity	97.7	86.0
PPV	94.1	71.4
NPV	97.7	94.9
Accuracy	96.7	86.7

Diagnostic accuracy was determined as receiver operating characteristic (ROC) curve, suggesting that the area under the curve (AUC) of SUG and RUG was 0.959 and 0.871, respectively (Figure 1).

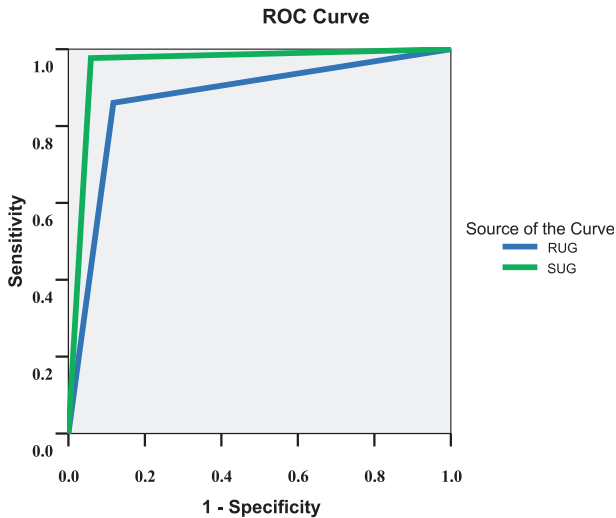


Fig.-1: Receiver operating characteristic curve (ROC curve) analysis

Test Result Variable(s)	Area under the Curve
RUG	0.871
SUG	0.959

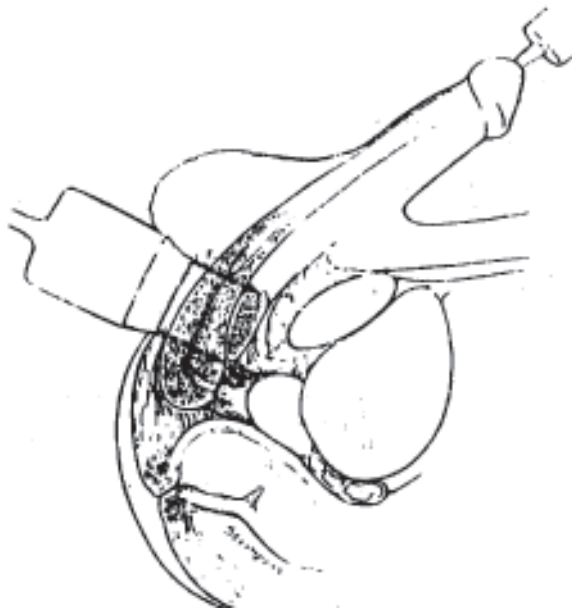


Fig.-2: Sonourethrography



Fig.-3: Sonourethrography showing location and length of urethral stricture

Discussion:

Urethral stricture is one of the most important causes of bladder outflow obstruction and become one of the most important workload of the urological centres in developing countries³. Although radiographic retrograde urethrography (RGU) has long been the gold standard for imaging the anterior urethra, inherent limitation persist⁷. Limitations of RGU include variation in the appearance of strictures with positions of the patients and the degree of stretch of the penis during the study, limited information about periurethral fibrosis and it has hazards of radiation exposure to testes^{3, 11}. Contrast material may extravasate into other areas of the penis. In addition venous and lymphatic intravasation may occur^{2, 3}. McAninch et al began using ultrasonography to image the male urethra in the mid 1980s at San Francisco General Hospital to evaluate complex urethral strictures more precisely (McAninch et al 1988). Since then it has been routinely used urethral ultrasound to evaluate anterior urethral strictures.

Among the 60 subjects 21 (35.0%) were 25 or below 25 years of age, 25 (41.7%) between 25-35 years and the rest 14 (21.3%) were above 35 years of age. The Mean \pm SD was 30.75 \pm 8.70 years and the age range of the subjects was 50 to 18 years.

The sites of stricture in this series were penile and bulbar. Evaluation of stricture shows that 45.0% of the stricture was located at bulbous part followed by 55% at penile part. Site of stricture detected by sonourethrography was similar as detected by RGU, 60.0% at bulbous part and 40.0% at penile part. Walther et al. (1980) studied 52 patients with anterior urethral stricture and

found that 55% of strictures were bulbar, 35% at penile and 10% at penobulbar part which was similar to this study. Lipsky et al. (1977) found similar results. Among the 60 subjects of our series, all had complaints of poor stream and straining during micturition. About Ninety seven percent subjects had the burning sensation during micturition. In the study of Khan (2007), Singh et al (2004) and Peter A. Nash et al (1995) similar number of patients complaints as this study.

Sensitivity of SUG to diagnose urethral stricture length at cut off level 10 mm was 94.1%, specificity 97.7%, positive predictive value 94.1%, negative predictive value 97.7% and accuracy 96.7%. Sensitivity of RGU to diagnose urethral stricture length at cut off level 10 mm was 88.2%, specificity 86.0%, positive predictive value 71.4%, negative predictive value 94.9% and accuracy 86.7%. In Khan (2007) series the overall accuracy was a bit lower in case RGU (97.3%) than that in sonourethrography (100%).

In the present study when strictures were grouped according to anatomical sites both techniques were equally sensitive in length estimation in the penile urethra. But sonourethrography showed a greater sensitivity in estimating strictures length over all and correlated better with operative findings than RGU. Diagnostic accuracy was determined as receiver operating characteristic (ROC) curve, suggesting that the area under the curve (AUC) of SUG and RUG was 0.959 and 0.871, respectively, which also reflect SUG is the better diagnostic modality than RUG in comparison with peroperative finding.

Gupta et al. (2006) in a study including 30 patients reported poor correlation between the two techniques in estimating of stricture length, RGU underestimating the length in most cases. The accurate estimation of strictures length is important because it is one of the factors that determine the suitable operative procedure.

Periurethral fibrosis (spongiofibrosis) is a critical determinant of appropriate therapy and ultimate prognosis. Excessive fibrosis is said to be responsible for high recurrence rates. Peroperative evaluation of strictures shows 18.3% were pink coloured, 76.7% gray coloured and 5.0% white coloured. In 13.3% of the cases mild resistance was felt during incision, in 80.0% cases moderate and in 6.7% cases severe resistance was felt. In our series SUG evaluation of fibrosis was correlated well with per operative findings of fibrosis ($r=0.569$; $p < 0.001$). 67.1% agreement was also

observed between SUG and per operative findings in the evaluation of fibrosis. The findings of present study are also similar with Nash et al. (1995).

Conclusion:

Retrograde urethrography and sonourethrography are equally efficacious in detection of anterior urethral strictures. Further evaluation of strictures in terms of length and periurethral pathologies, like spongiofibrosis, is better evaluated by using sonourethrography as compared with retrograde urethrography.

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Authors:

1. Associate Professor, Department of Urology, BSMMU, Dhaka
2. Student, MS Urology (Thesis Part), BSMMU, Dhaka
3. Assistant Professor, Department of Surgery, BSMMU, Dhaka
4. Urologist, National Cancer Institute, Dhaka
5. Assistant Professor, Department of Urology, BSMMU, Dhaka
6. Professor, Department of Radiology & Imaging, BSMMU, Dhaka
7. Professor of Urology, BSMMU, Dhaka

ROLE OF TRANSABDOMINAL ULTRASOUND IN EVALUATING PATIENTS WITH ACUTE URINARY RETENTION (AUR) DUE TO BENIGN PROSTATIC HYPERPLASIA (BPH)

SD GUPTA¹, TMS HOSSAIN², MM RAHMAN³, MN HOODA⁴, MA KASHEM⁵, I JAHAN⁶, AKMZI BHUIYAN⁷

Abstract :

Acute retention of urine (ARU) is one of the most serious complication of benign prostatic hyperplasia (BPH). However there is no consensus on the management of ARU due to BPH. In this study we prospectively evaluated 58 patients with acute urinary retention in different hospitals in Dhaka city due to BPH by a simple noninvasive method based on intravesical prostatic protrusion (IPP) using transabdominal ultrasound. Catheterization with an indwelling catheter was done at hospital admission. History taking and physical examinations were done in all cases. Transabdominal ultrasound was done to assess the prostatic volume and intravesical prostatic protrusion (IPP). IPP were divided into three grades. The voiding trial was judged to be unsuccessful if the patient failed to reestablish satisfactory micturition. After catheter removal in this study 34 patients failed to void well. There were more patients with higher grade IPP in the group with failure than in the group with a successful trial off catheter. These patients were followed up for one year. This study reveals that the greater the protrusion, the more severe the obstruction, Grade 3 IPP patients are more likely to have recurrent urinary retention. The degree of IPP influences the outcome.

Key words: ultrasound, urinary retention, prostatic hyperplasia, intravesical prostatic protrusion.

Introduction:

Benign prostatic hyperplasia (BPH) is the most common benign tumour in men and its incidence is age related. Fifty percent of men aged 51 to 60 and over 90% in men older than 80 present with lower urinary tract symptoms due to BPH.¹ Patients with BPH may present with acute retention of urine (ARU) which is a common urological emergency for hospital admission. These patients are usually immediately managed by urethral catheterization. But there is still debate regarding the management strategy of these patients with ARU due to BPH². Previously prostatectomy was regarded as the gold standard treatment for patients with BPH who

developed acute urinary retention. But studies show that a significant number of patients voided well at catheter removal and they did not require any surgical intervention². The management of patients with BPH has undergone rapid change in the last few years as a result of better understanding of the natural history of BPH and the easy availability of ultrasound. In our clinical practice transabdominal ultrasound of KUB and prostate is routinely done to assess the patients with lower urinary tract symptoms (LUTS) due to BPH. In this study we tried to find out the correlation of intravesical prostatic protrusion (IPP) with bladder outlet obstruction due to BPH and the role of IPP in the management strategy of patients with ARU due to BPH.

Methods:

Between July 2008 to Dec 2009, 58 male patients presenting with an initial ARU episode suggestive of BPH were included in this study. This study was carried out in National Institute of Kidney diseases and urology Hospital (NIKDU), Sir Salimullah Medical College, Mitford Hospital, and different private hospitals of Dhaka city. Patients with prostatic cancer, recurrent or chronic urinary retention, urinary tract infections, bilateral hydronephrosis, renal impairment, or neurological diseases were excluded. History taking and physical examinations were done in all cases. DRE was done to see the consistency of prostate. Transabdominal ultrasound was done to assess the prostatic volume and intravesical prostatic protrusion (IPP). The degree of protrusion was graded by measuring from the tip of the protruding prostate perpendicular to the bladder circumference at the prostate base in the midsagittal plane². Patients were divided into three groups according to IPP grade (Table-1). Grading was done as follows, Grade 1, 1-5mm or less, Grade 2 greater than 5mm to 10mm and Grade 3 more than 10mm^{2,3}. The voiding trial was judged to be unsuccessful if the patient failed to reestablish satisfactory micturition as defined by post-void residual urine greater than 100 ml and a maximum flow rate of less than 10 ml/sec. Statistical analysis was performed between groups using the chi-square test and

a P value of <0.05 was considered statistically significant.

Table-I

Distribution of patients according to IPP grade (n=58)

Group of the patients	Grade of IPP	Number of Pts.
Group 1	Grade 1	15
Group 2	Grade 2	16
Group 3	Grade 3	27

Results:

A total of 58 patients were included in the study. Mean age of the patient was 63 years ranging from 50 to 80 years. Average prostate volume was 45 gram. After catheter removal, 24 patients voided well with a flow rate of more than 10ml/sec and residual urine less than 100ml while 34 patients failed to void well. IPP grade was a significant factor between those who had a successful and failure voiding. The failure rate of trial voiding was 40% (6 of 15 cases), 57% (9 of 16 cases), 71% (19 of 27 cases) for grades 1 to 3 prostate respectively (Table:2). This difference was significant when comparing grades 1 and 3 (p<0.05). There were also significant more patients with higher grade IPP in the group with failure than in the group with a successful trial off catheter.

Table-II

Distribution of patients according to voiding pattern after removal of catheter (n=58).

Patient Group	Number of Pts	Successful TWOC	Failed TWOC	Failure rate
Grade 1 IPP	15	9	6	40%
Grade 2 IPP	16	7	9	57%
Grade 3 IPP	27	8	19	71%

At six months follow up, 3 patients (1 in grade 2 and 2 in grade 3) and at one year follow up 2 patients (grade 3) had recurrent urinary retention after an initial successful trial without catheter. No patient in the Grade 1 group had recurrent retention. There was no significant age difference between the success and failure.

Discussion:

Acute urinary retention due to BPH is a common urological emergency⁴. However there is no consensus on the management of this urological emergency². At

some centres trial without catheter is done to assess spontaneous voiding ability while at others an episode of ARU is an indication for prostatectomy without the need of trial without catheter. In this series, 33%(19 out of 58) patients did not require surgery at 1 year follow up. Studies show that 23% to 55% of patients in ARU had successful Trial without catheter (TWOC).⁴⁻⁹ In this study IPP was a significant factor that predicted the outcome. The failure rate of TWOC based on IPP Grade was 40%, 57% and 71% for grade 1 to 3 respectively. This is similar with the study done by Tan et al² In this study it is noted that the greater the intravesical protrusion, the more severe the obstruction. Grade 3 patients are more likely to have recurrent urinary retention. On the other hand 9 patients (60%) with a grade 1 prostate achieved successful TWOC at a follow up of up to one year.

Conclusion:

IPP measurement can easily be obtained with transabdominal ultrasound scan in the outpatient department to evaluate patient with ARU due to BPH. Considering the findings of the present study and the study which correlates with the study it can be concluded that IPP is a useful clinical predictor for evaluating the success of a voiding trial following ARU. The degree of IPP influences the outcome. IPP can be used to direct the appropriate patients to more aggressive treatment strategies such as surgery¹¹.

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Authors:

1. Assistant Registrar, Department of Urology, National Institute of Kidney Diseases and Urology (NIKDU), Sher-E-Bangla Nagar, Dhaka.
2. Assistant Professor, Department of Urology, NIKDU, Dhaka
3. Assistant Professor, Department of Urology, DMCH, Dhaka
4. Assistant Professor, Department of Urology, NICH&R, Dhaka
5. Assistant Professor, Department of Urology, SSMCMH, Dhaka
6. OSD, DG Health, Dhaka, FCPS (Surgery) (Part II Student).
7. Professor of Urology, NIDKU, Dhaka

POSTERIOR URETHRAL VALVES: FULGURATION AND RESULTS

MN UDDIN¹, AKM ZI BHUIYAN², KR ABEDIN³, KZ RAZZAQUE⁴

Abstract

Obstructive uropathy that takes to the renal failure with more frequency in paediatric age is secondary to posterior urethral valve. Recent advance in endoscopy has altered the management and outcome of the patients.

Materials and methods: *This retrospective study was conducted at National Institute of Kidney Diseases and Urology, Dhaka from July 2005 to December 2009. Total 48 patients were selected for this study among them most were less than 1 year of age and 13 patients (27.08%) had associated vesicoureteric reflux. Most of the patients were presented with dribbling of urine and some were with repeated urinary tract infection and renal failure. Diagnosis was confirmed by Micturating cystourethrogram and Urethrocystoscopy.*

Results: *All the patients were managed by endoscopic fulguration. In most of cases fulguration was primary but in some cases after supportive treatment. Outcome was satisfactory in all cases except one patient (2.08%) developed stricture urethra and 4 patients (8.4%) developed end stage renal diseases. After fulguration 13 patients (27.08%) showed to have associated bladder dysfunction and 4 patients (8.4%) required antireflux surgery. Followup period was 36 months varying between 3 to 48 months.*

Conclusion: *Early and adequate valve fulguration provides the better outcome of posterior urethral valve.*

Key word: *Posterior urethral valve, Endoscopic fulguration, Bladder dysfunction*

Introduction:

Posterior urethral valve is one of the major common devastating, congenital obstructive urethral lesions in male infants and newborns. These valves are mucosal fold and usually result in lifelong disabilities with urinary incontinence and decreased renal function despite optimal medical management. They may cause varying degree of obstruction when the patients attempts to void. Patients with severe degree of obstruction can present with distended bladder, hydronephrosis and even renal

failure. This can also be diagnosed in utero during antenatal checkup by Sonologist.

Posterior urethral valve occur in 1 in 8,000 to 25,000 live births and make up 10% of urinary obstruction diagnosed in utero¹. The diagnosis has been made on average 1 in 1250 fetal ultrasound screenings². Posterior urethral valves sometimes associated with other congenital anomalies like pulmonary hypoplasia, vesicoureteric reflux, and cryptorchidism. Hoover and Duckett showed 13% of valve patients associated with vesicoureteric reflux, among them 92% on left side³. Most of them resolved spontaneously, 35% of them that failed to cease required antireflux surgery⁴. Children presented with mild, moderate or severe symptoms of obstruction depending on age of presentation and types of valves. They ranged from life threatening renal conditions in newborns to minor voiding dysfunction in older children like poor, intermittent dribbling of urinary stream. Sometimes recurrent urinary tract infection and failure to thrive may be the only feature.

Materials and Methods:

Total 48 patients were enrolled for this study at NIKDU from July 2005 to December 2009. Patients were evaluated with Urine RME and culture to exclude infection, S. creatinine to see renal functional status, CBC to detect anemia, creatinine clearance to see the extent of renal failure. USG were done to see post void residue, hydronephrosis, hydroureter and also helpful for prenatal diagnosis. IVU showed hydronephrosis and hydroureter in long standing cases. Diagnosis was established by Micturating Cysto Urethrogram (MCU) which showed elongated and dilated posterior urethra with large PVR and vesicoureteric reflux. Urethrocystoscopy confirmed the diagnosis by visual identification and supravescical compressions shows that the valves cause obstruction. Urodynamic study was required to exclude any neuropathic component. Nuclear renal scan sometimes required to evaluate persistent hydroureteronephrosis.

Initially all patients were managed with urethral catheterization for drainage of urinary bladder. Healthy,

uninfected patients managed with endoscopic fulguration that was done by Bugbee's electrode or a pediatric resectoscope with hook in retrograde fashion. If the patients were so small for safe instrumentation or very ill then cutaneous vesicostomy performed as a temporary measure, later on these patients managed with fulguration when patients became older and healthy. Patients with urosepsis, hydronephrosis and renal failure were managed with antibiotics, and correction of fluid and electrolyte imbalance. Fulguration done when patients were stable. Patients with severe hydronephrosis initially managed by cutaneous pyelostomy or loop ureterostomy followed by valve destruction later on when patients condition permit. After fulguration of valve in most of the cases associated vesicoureteric reflux improved spontaneously. Antireflux surgery required later on where it was persisted. Patients followed regularly at three months interval in 1st year, half yearly in 2nd year, then yearly to predict result of fulguration, complication and monitor renal function.

Results:

This retrospective study was conducted at National Institute of Kidney Diseases and Urology, Dhaka from July 2005 to December 2009. Total 48 patients were enrolled for this study where the patients were diagnosed at different age. Among them 13(27.08%) patients were less than 1 month, 21(43.75%) patients less than 1 year and 14(29.16%) patients more than 1 years with mean age 1.5years (Table-I). 13 (27.08%) patients were associated with vesicoureteric reflux, among them bilateral involvement were in 8 cases and unilateral left

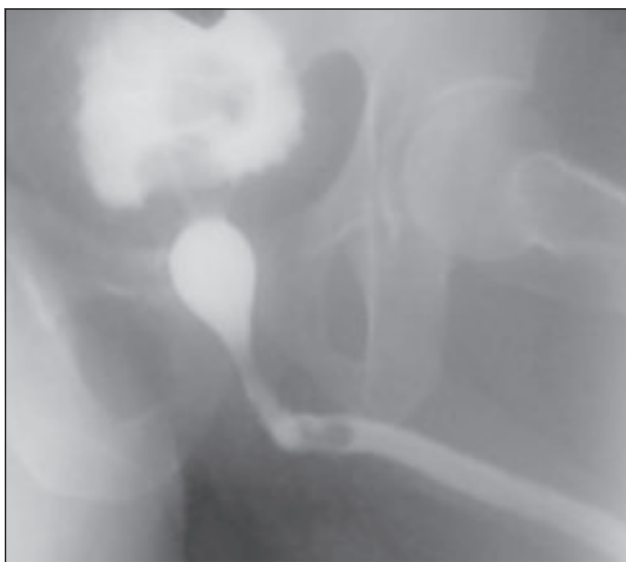


Fig.-1: MCU showed PUV

side involvement in 5 cases. 3 (6.25%) patients were associated with right side undescended testis and inguinal hernia.

Table-I
Age of Diagnosis

<1 month	13(27.08%)
<1 year	21(43.75%)
> 1 year	14(29.16%)

Most of the patients were presented with symptoms but 11 with repeated urinary tract infection and 6 patients with renal failure.

Twenty one (43.7%) patients initially treated with fulguration. Thirteen (27.08%) patients were so small to negotiate endoscopic instruments that they were treated initially with cutaneous vesicostomy followed by endoscopic fulguration when child become larger one. Six (12.5%) patients with urosepsis initially treated with indwelling urethral catheterization and infection was controlled by sensitive antibiotics followed by fulguration. Eight (16.66%) patients with hydroureteronephrosis and renal failure initially treated with urethral catheterization with correction of fluid and electrolyte imbalance. Among them 1 patient underwent loop ureterostomy, 2 patients underwent cutaneous pyelostomy where renal failure were not improved with urethral indwelling catheterization. Then all 6 patients underwent fulguration. (Table-II).

Table-II
Treatment

Initial fulguration	21 (43.7%)
Vesicostomy then fulguration	13 (27.08%)
Urosepsis control then fulguration	6(12.5%)
Renal failure treatment then fulguration	5(10.41%)
Loop ureterostomy then fulguration	1(2.01%)
Cutaneous pyelostomy then fulguration	2(4.16%)

After operation 1 patient (2.08%) developed stricture urethra, and 4 patients (8.4%) developed end stage renal disease (Table-III). Thirteen patients (27.03%) showed bladder dysfunction and 4 patients (8.4%) required antireflux surgery.

Table-III
Complication of disease and fulguration

Bladder dysfunction	13(27.08%)
Stricture urethra	1(2.08%)
ESRD	4 (8.33%)

Discussion:

Obstructive uropathy that takes to the renal failure with more frequency in pediatric age is secondary to posterior urethral valves. The management has changed in important form in last few years that leads to better outcome of the patients with good quality of life. Prenatal diagnosis has improved the opportune detection of these patients. Appropriate treatment of patients with PUV, resides in a series of requirements that include: 1. opportune diagnosis, of being possible prenatal 2. Use of fine endourologic equipment 3. Patient's categorization for group's presage that allows to values the functional renal evolutions and therapeutic result. 4. Study of dynamics vesical function ⁵.

We retrospectively reviewed 48 patients that underwent endoscopic posterior urethral valve fulguration. Thirteen one (64.58%) patients were presented with dribbling of urine and failure of thrive. Seventeen (35.41%) patients presented with repeated urinary infection and renal failure. In our series 34(70.83%) patients were presented less than 1 year. Diagnosis was confirmed with Micturating Cystourethrogram and Urethrocystoscopy. Twenty one (43.7%) patients was treated primarily with valve fulguration except some too small patients and severe hydroureteronephrosis with renal failure were treated initially with high diversion followed by fulguration when the patients become larger and stable. All the patients were followed regularly with history, physical examination and necessary investigations. Average length of followup was 36 months varying between 3 months to 48 months. 3 patients were lost from followup, 2 from 6 months and 1 from 1 year of followup.

In our series most of the patients showed satisfactory micturition and good quality of life after fulguration. Thirteen patients (27.035%) after fulguration showed frequency of micturition and occassional incontinence. They were evaluated with urodynamic study and showed bladder dysfunction ranging from instability to myogenic failure and managed accordingly. Bladder dysfunction commonly founded when diagnosis was late and or

delayed treatment, may be due to long term outflow obstruction. This result was nearer to study conducted by Warren J, Pike JG et al ⁶. The patients those who underwent high diversion before ablation showed less bladder compliance then other patients. After operation 1 patients showed stricture urethra at 6th months of followup and managed with optical internal urethrotomy. Among 8 patients (16.6%) of renal failure, after fulguration 4 patients (8.4%) improved renal function and rest 4 patients (8.4%) developed end stage renal diseases and required dialysis. This result was similar to study conducted by Warren J, Pike JG et al ⁶. One patient died at 1 year of followup from complication of renal failure. Among 21 patients with vesicoureteric reflux, most of them resolved spontaneously but 4 patients (19.04%) required antireflux surgery, in 3 cases on bilateral and in 1 cases unilateral site. This result was similar to study conducted by Hoover and Duckett ³. Early age of diagnosis with early adequate treatment provide good result and patient with renal failure, VUR and bladder dysfunction provide poor prognosis. Primary valve ablation remains the gold standard treatment of PUV, with vesicostomy reserved for selected cases. Long term bladder and renal dysfunction is common in this group and 30% still develop renal insufficiency even after fulguration ⁷. So this disease mandates long term urological and nephrological followup⁸.

Conclusion:

PUV patients will be individualized and alleviating obstruction promptly to prevent renal failures that have some of these patients.

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Authros

1. Ex-Registrar, Department of Urology, NIKDU, Dhaka
2. Prof. & Head, Department of Urology, NIKDU, Dhaka
3. Asstt. Professor, Department of Urology, NIKDU, Dhaka
4. Medical Officer, Department of Urology, NIKDU, Dhaka

EFFECTIVENESS OF ENDOSCOPIC INJECTION OF 2% LIGNOCAINE INTO THE BLADDER WALL TO CONTROL OBTURATOR JERK DURING TRANSURETHRAL RESECTION OF BLADDER TUMOR

S RAHMAN, J ABEDIN, MS ISLAM, S ISLAM, M HOSSAIN, AKMK ALAM , MA SALAM

Abstract:

Purpose- To observe the efficacy of endoscopic injection of 2% lignocaine into the bladder wall at the base of tumor to control obturator jerk.

Materials and Methods- This prospective study was performed in Department of Urology, Bangabandhu Sheikh Mujib Medical University (BSMMU), National Institute of Kidney Diseases and Urology, Comfort Nursing Home (Pvt. Ltd.) and Lab Aid Specialized Hospital (Pvt. Ltd.) , Dhaka, during the period from January 2009 to December 2009. Total 90 patients were grouped into two on alternate basis. 45 patient in group-A, conducted with endoscopic injection of 2% lignocaine and another 45 patients were in group-B, conducted with nothing to control obturator jerk. Peroperative findings of both groups during transurethral resection are evaluated.

Results- In group-A, 45 patients were conducted with endoscopic injection of 2% lignocaine to control obturator jerk, 42 patients (93.3%) developed complete elimination and 3 patients (6.7%) developed partial elimination of obturator jerk. In our series overall response in complete resection of bladder tumor was 100%. In group-B patients were not conducted with 2% lignocaine injection. Statistical analysis was done and result is significant ($P < 0.05$). In group-A, complete resection possible in 42 patients (93.3%) without any obturator jerk and in 3 patients (6.7%) complete resection possible with mild form of obturator jerk after endoscopic injection of 2% lignocaine. In group-B complete resection were not possible. Statistical analysis shows significant difference ($P < 0.05$). In our series 37 patients (82.7%) did not need re-injection to control obturator jerk and 8 patients (17.7%) needed re-injection to control obturator jerk in group-A. Statistical analysis with group-B shows significant difference ($P < 0.05$).

Conclusions- It is concluded that endoscopic injection of 2% lignocaine into the bladder wall is more effective in the management of the patient with bladder tumor who develops obturator jerk during transurethral resection of bladder tumor.

Introduction:

Bladder cancer is the second most common cancer of the genito-urinary tract, it accounts for 7% of new cancer cases in men & 2% of new cancer cases in women ¹.

Standard treatment of superficial bladder tumor is transurethral resection with intra vesical therapy. Bladder tumor whether, it is superficial or muscle invasive; Urethrocystoscopy and transurethral resection of bladder tumor would be diagnostic as well as therapeutic ². But transurethral resection of bladder tumor is not difficulties free per-operatively. One of the most important difficulties is obturator jerk that may bring disaster during the procedure. Obturator jerk is the sudden involuntary reflex contraction of adductor group of muscles due to electrical stimulation of the obturator nerve. To avoid the obturator jerk reflex, urologist often can not fully resect the tumor on the infero lateral bladder wall ³.

Obturator nerve (somatic) originates from anterior division of L2-L4 segments. From the angle between external and internal iliac vessels it runs straight to the obturator foramen, where it runs close to prostatic urethra, bladder neck and infero-lateral bladder wall ⁴.

When the bladder is distended with irrigation fluid, the obturator nerve is very close to the inferolateral bladder wall. Thus, when performing transurethral surgery, in full bladder electric current can easily stimulate the obturator nerve and activating the obturator jerk, which can suddenly push the bladder wall towards the electro-cautery blade and leads to perforation, and may even cause injury to the iliac vessels ^{5, 6}.

Although stimulation of the obturator nerve is not uncommon problem, very little have been represented in the literature about its management. Various measures available for its prevention are- (1) Spinal anesthesia, (2) Spinal plus general anesthesia, (3) Reversal of polarity, (4) Changes in the site of the inactive electrode or in current frequency, (5) Nerve cooling. But unfortunately all of the above techniques have been proven ineffective².

Naris and Hobika (1961) proposed the use of d-tubocurarine and succinyl choline to block the neuromuscular transmission during general anesthesia. However disadvantage of this was, it necessitated endotracheal intubations which was invasive and thus did not get popularity⁷. Prentis (1965) first used regional anesthesia to block the obturator nerve, and thus to block the obturator jerk during transurethral resection of bladder tumor⁸. Direct or percutaneous transvesical injection with lignocaine to the obturator canal to block the obturator jerk was used by some urologist⁹.

Junne Yih Kuo (2008) used 1% lignocaine to block obturator nerve by injecting through perineal route, but it is not easy. Here chance of obturator vascular injury is more as well as technically not always smooth. Endoscopic injections of local anesthetic (2% lignocaine) to the bladder wall is very easy and permissible procedure under direct vision for regional conduction block to prevent obturator jerk³.

Motor nerve fiber of obturator nerve contains A α fiber which is thicker in diameter. For effective obturator block, the local anesthetic conc. must exceed that for pain and temperature sensation, which are carried by thin A α and c-fiber, by two fold. Thus the concentration of lignocaine must be greater than 1% for effective motor blockade. So 2% lignocaine is the best concentration for effective nerve block. Onset of action of local anesthetic (lignocaine) is approximately 4 minutes & lasts up to 40 minutes. In adult 10-15 ml (up to 300mg) of 2% lignocaine can easily injected¹⁰.

Nerve can be easily excited by electrical or mechanical or chemical or thermal stimulus. When nerve is stimulated, it produces action potential and the depolarization wave that travels in all direction along the entire length of nerve fiber due to increase Na⁺ permeability. This conduction can easily be blocked by injection of local anesthetic (2% lignocaine) into the bladder wall that block Na⁺ Permeability¹¹.

The most important difficulties faced during transurethral resection of bladder tumor are the obturator jerk which is due to stimulation of obturator nerve by electric current. Once obturator jerk develops, it suddenly pushes the bladder and may lead to perforation⁵.

It is a common feature meets with bladder neoplasm in the lateral wall of the bladder. If we use local anesthetic (2% lignocaine) with appropriate concentration, we can easily block the nerve conduction. Endoscopic localization of bladder tumor with cystoscope is very

easy, and endoscopic injection of 2% lignocaine into the bladder wall at the base of tumor with a specialized needle is also very easy, quick and permissible procedure under direct vision for regional conduction block thus prevent the obturator jerk².

In Bangladesh no such study has been performed with injection of 2% lignocaine into the bladder wall at the base of the tumor through endoscopic route to control obturator jerk.

So this prospective study has been performed to assess the role of (endoscopic injection of 2% lignocaine into the bladder wall) this procedure to control the obturator jerk during transurethral resection of bladder tumor. Any superiority of outcome of this study will broaden the indication of this procedure to control obturator jerk reflex during transurethral resection of bladder tumor and it provides a predominant role, which can be easily provided in operation theatre with minimum or no cost for endoscopic resection of bladder tumor without disastrous hazard. This study may be the basis of further study in this field.

Materials and Methods:

This was a multicenter based prospective interventional study conducted in the Department of Urology, Bangabandhu Sheikh Mujib Medical University (BSMMU), National Institute of Kidney Diseases and Urology, Comfort Nursing Home (Pvt. Ltd.) and Lab Aid Specialized Hospital (Pvt. Ltd.), Dhaka, during the period from January 2009 to December 2009. Bladder tumor patients (Male & female) seeking treatment and peri-operatively those who developed obturator were study population. Purposive sampling technique will be applied to collect sample. Total ninety (90) patients having urinary bladder tumor were be selected according to selection criteria and divided two groups. The selection criteria were patients with bladder tumor (primary/recurrent) located on lateral bladder wall; posterior-lateral bladder wall and involving neck of bladder wall. The exclusion criteria were patients who do not give consent; patients having heart block, arrhythmia; patients with hepatic or renal function impairment; tumor located anterior or posterior or domes of the bladder; patient is known sensitive to lignocaine.

The included patient's per-operative findings (under spinal anesthesia) and all other variables were collected. Informed consent was taken. Patients were grouped into A and B. After preparation, group A was scheduled for endoscopic injection of 2% lignocaine into the bladder

wall and B-group was scheduled for nothing for control of obturator jerk. Total 90 patients were grouped into two in alternate basis. They were selected first by purposive sampling and after selection they were grouped into A and B with randomization. 45 patients were in group-A, conducted with endoscopic injection of 2% lignocaine into the bladder wall at the base of tumor and group-B was conducted with nothing. Peroperative findings of both groups during transurethral resection were evaluated. The aim of the present study is to evaluate the outcome, the per operative findings, injection site, volume of injection (2% lignocaine), necessity of re injection, response of injection, complication associated injection

Observation and Results

Total 90 patients were selected purposively accordingly to selection criteria and per operative findings are evaluated among them 45 patients were placed in group-A (where the endoscopic injection of 2% lignocaine given to control obturator jerk), and another 45 patients were given nothing to control the obturator jerk during TURBT.

Mean age for group-A was 57.28 ± 3.32 years with M: F 7:3 and for group-B was 54.51 ± 14.63 years with M:F 7.5:2.5. Age of the patients were compared and found no significant difference.

The size of base of the tumor in group-A, 22 patients (48.8%) has tumor base size <3 cm and 23 patients (51.2%) have tumor base size 3 cm or more than 3cm. In group-B, 24 patients (53.3%) have tumor base size <3 cm 21 patients (46.7%) have tumor base size 3 cm or more than 3cm. Statistical analysis done. Result shows that there is no significant difference between two groups regarding tumor base size. Calculated ± 2 value (0.177) is smaller than tabulated value (3.84) at 5% level of significance ($P > 0.05$).

Location of the tumor in group-A 37 patients (82.2%) have tumor in lateral wall of urinary bladder. Only 8 patients (17.8%) have tumor in postero lateral wall or extending up to neck of urinary bladder. On the other hand in group-B 35 patients (77.7%) have tumor in lateral wall and 10 patients (22.3%) have tumor in infero lateral wall or extending up to neck of urinary bladder. Statistical analysis done between two groups. Result shows non significant Calculated ± 2 value (0.277) is smaller than tabulated value ($P > 0.05$).

The number of tumor in group-A, 17 patients (37.7%) have single tumor and 28 patients (62.3%) have multiple tumor. In group-B, 19 patients (42.2%) have single tumor and 26 patients (57.8%) have multiple tumor. The macroscopic appearance of tumor in group A 32 patients (71.2%) have papillary tumor and 13 patients (28.8%)

have sessile tumor. In group-B, 30 patients (66.6%) have papillary tumor and 15 patients (33.3%) have sessile tumor. In group-A, 9.37% patients need re-injection in papillary group and 38.46% patients need re-injection in sessile group. After statistical analysis result shows non significant ($P > 0.05$, Table-I).

In group-A 8 patients (17.3%) need re-injection of 2% lignocaine during transurethral resection of bladder tumor and 87.7% patients need no re-injection during resection. In group-B, nothing was done and result significance. Calculated Z value (1.98) is greater than tabulated value (1.96) at 5% level of significance ($P < 0.05$).

The efficacy of 2% lignocaine in group-A, to complete elimination of obturator jerk was observed in 42 cases (93.3%) after endoscopic injection of 2% lignocaine into the bladder wall at the base of the tumor. In group-B, nothing was done and no complete elimination of obturator jerk was observed. There was a significant difference present between two groups ($P < 0.05$) and calculated Z value was 30.06 at 5% level of significance.

In group-A, partial elimination of obturator jerk was observed in 3 cases (6.7%) after endoscopic injection of 2% lignocaine into the bladder wall at the base of the tumor. In group-B, nothing was done and no partial elimination of obturator jerk was observed. There was a significant difference present between two groups ($P < 0.05$).

The Efficacy of 2% lignocaine in complete resection of tumor without jerk in group-A, macroscopically complete resection was possible in 42 patients (93.3%) without obturator jerk after endoscopic injection of 2% lignocaine into the bladder wall at the base of the tumor. In group-B, nothing was done and no complete resection was possible due to obturator jerk. There was a significant difference present between two groups ($P < 0.05$, Table-II).

The efficacy of 2% lignocaine complete resection of tumor with mild jerk in group-A, macroscopically complete resection was possible in 3 patients (6.7%) with mild form of obturator jerk after endoscopic injection of 2% lignocaine into the bladder wall at the base of the tumor. In group-B, nothing was done and no complete resection was possible due to obturator jerk. Statistical analysis was done and result was significant. ($P < 0.05$, Table-II).

The side effect of 2% lignocaine in group-A, the systemic side effects of 2% lignocaine was observed after endoscopic injection of 2% lignocaine into the bladder wall at the base of the tumor. 3 patients (6.6%) were observed mild anxiety, 2 patients (4.4%) were observed tremor and 1 patient (2.2%) was observed agitation. In group-B nothing was observed. There was no statistical significant difference between two groups ($P > 0.05$, Table III).

Table-I
Macroscopic appearance of Tumor in study groups:

Group	Total number	Papillary tumor	Patients need re-injection in papillary group	Sessile tumor	Patients need re-injection in sessile group	χ^2	P value
A	45	32 (71.2%)	3 (9.37%)	13 (28.8%)	5 (38.46%)	1.45	P>0.05
B	45	30(66.6%)	0	15 (33.3%)	0		

χ^2 - test, NS= Not significant, $\chi^2_{0.05,1} = 3.84$

Table- II
Efficacy of 2% Lignocaine in study groups

Group	No of Patients	Complete resection with out jerk				Complete resection with mild jerk			
		No.	%	Z value	P Value	No.	%	Z value	P Value
A	45	42	93.3	30.06	<0.05	3	6.7	2.90	<0.05
B	45	0	0			0	0		

Z-test, N= Significant, $Z_{0.05} = 1.96$

Table III
Side effect of 2% lignocaine.

Adverse effect	Group-A	Group-B	Calculated χ^2 value	P value
Anxiety	3 (6.6%)	0	2.90	P>0.05
Tremor	2 (4.4%)	0	1.96	P>0.05
Agitation	1 (2.2%)	0	0.989	P>0.05

χ^2 - test, NS= Not significant, $\chi^2_{0.05,1} = 3.84$

Discussion:

The present study has been designed to prove the efficacy of endoscopic injection of 2% lignocaine into the bladder wall at the base of the tumor to control the obturator jerk. Obturator jerk is one of the most common disastrous difficulties during transurethral resection. Here, sudden involuntary reflex contraction of adductor group of muscle develops due to electric stimulation of obturator nerve. Obturator nerve passes through the obturator canal, within the pelvic cavity, it runs close to prostatic urethra, bladder neck and infero lateral bladder wall. Also abnormal course or abnormal branch of obturator nerve invites the jerk during transurethral resection⁴.

About 10% patients have abnormal course of obturator nerve¹². When bladder wall distended with irrigation fluid, the obturator nerve lies very close to the lateral bladder wall. Thus when performing transurethral surgery,

electric current can easily stimulate the obturator nerve and activates the adductor muscle jerk, which can suddenly push the bladder wall towards the electro cautery blade and leads to perforation⁵.

Since 1961 different authors tried to establish different methods to control obturator jerk during transurethral resection of bladder tumor. But none of the procedure becomes ideal as these are mostly operator dependent as well as invasive, and brings another complication.

In this study no statistical significant difference was observed between the two groups in relation to age and sex. In group-A age ranges from 42-82 years with mean age SD 57.28±3.32 years with M:F 7:3 and in group-B age ranges from 40-76 years mean with SD 54.51±14.63 years with M:F 7.5:2.5. No significant difference was observed between the two groups in relation to age (P>0.05)¹.

In this study the size of base of the tumor in each group was evaluated and found that 48.8% cases had tumor base size < 3cm and 51.2% cases had tumor base size 3cm or more than 3cm in group-A and in group-B, tumor base size <3cm and 3cm or more than 3cm were in 51.3% and 46.7% cases.

Regarding location of tumor, 82.3% patients had tumor on Rt. or Lt. lateral wall and 17.8% patients had tumor on posterior lateral wall involving the neck in group-A. In group-B, tumor location on Rt. or Lt. Lateral wall and on posterior lateral wall involving the neck was 77.7% and 22.3%. After statistical analysis it was found that there is no significant difference between two groups ($P>0.05$). Observation also showed that almost all tumor producing obturator jerks were located on lateral or infero lateral wall.

Salam M.A 2002 described that 70% bladder tumor involves the lateral wall and 20% bladder tumor involves the neck (Salam. 2002). In our series this results were 82.3% and 17.8% in group-A, and in group-B were 77.7% and 22.3%¹³.

Junne YK in 2008 found that most of the tumor producing obturator jerk are located on lateral or infero lateral wall and to avoid obturator jerk urologists often do incomplete resection. Result of our study is almost similar to that study conducted by Junne YK³.

For this most of the tumor producing obturator jerk is on lateral or infero lateral wall.

In this study the number of tumor in both groups are assessed. In group-A, single number tumor were 17cases (37.7%) and multiple tumor were 28 cases (62.3%). In group-B, the single number tumor cases were 19 (42.2%) and multiple tumor were 26 cases (57.8%). Statistical analysis shows no significant difference between two groups ($P>0.05$).

Single number tumor are usually low grade bears good prognosis and less chance of stage progression and about 43% patients are cateragorized in this group¹.

In this study single number tumor in group-A was 37.7% and in group-B was 42.2%. This result was almost near to 43%. Variation of result may be due to exclusion criteria (only jerk producing tumor are included here). In our series result showed that 71.2% patients had papillary tumor and 28.8% patients had sessile tumor in group-A. In group-B, these percentages were 66.6% and 33.3%. Statistical analysis shows no significant difference present about macroscopic appearance of

tumor between two groups ($P>0.05$). According to Badrinath et al advanced tumor are 25% and superficial tumor are 50-70% in first presentation¹.

Macroscopic sessile appearance of bladder tumor is clinically advanced tumor and Papillary, single macroscopic appearance are almost clinically superficial. Here the sessile tumor in group-A and B were 28.8% and 33.3% and papillary tumor in group-A and B were 71.2% and 66.6%. Also it was observed that sessile tumor needs higher percentage of re-injection rate (38.46%) than papillary tumor (9.37%). Our findings regarding macroscopic appearance of bladder tumor were similar to Badrinath et al¹.

In this study the efficacy of 2% lignocaine are evaluated. In group-A, 45 patients were conducted with endoscopic 2% lignocaine intravesical injection at the tumor base to control obturator jerk, 42 patients (93.3%) developed complete elimination of obturator jerk and 3 patients (6.7%) partial elimination of obturator jerk. In our series overall response to complete resection of bladder tumor during transurethral procedure was 100%.

In group-B patients were not conducted with 2% lignocaine injection. Here no jerk was eliminated during procedure. Statistical analysis was done between two groups. Result shows that, there is significant difference present between two groups regarding obturator jerk elimination ($P<0.05$).

Here in group-A, complete resection possible in 42 patients (93.3%) without any obturator jerk reflex and in 3 patients (6.7%) complete resection possible with mild form of obturator jerk after endoscopic injection of 2% lignocaine. In group-B complete resection were not possible. Statistical analysis shows significant difference ($P<0.05$).

Junne et al shows that used of 2% lignocaine and electric stimulation to locate obturator nerve to inhibit the obturator jerk are better than blind anatomic approach, although its success rate is still not 100%³.

According to Augsurqer et al, with the blind anatomic approach, the effectiveness of inhibiting the obturator jerk was about 83.8%-85.7%, while with nerve stimulation, the results were superior, and according to Gasperich et al, and Kobayashi et al, the effectiveness reached 89.4%-100%⁷.

Gasperich et al, on the other hand, used the nerve stimulation approach with 0.5 mA, and 3-4 ml of 1% lignocaine was injected only once with a success rate

of 100%, while Kobayashi et al, also used nerve stimulation with 0.5 ml and injected 7-40 ml of 0.25% bupivacaine once, with success rate of 89.4%¹⁴.

In another study by Crecvy, peri prostatic and sub Vesical infiltration with 0.5 percent lignocaine done through a modified O'Conor sheath and spinal puncture needle guided by finger through per rectal route, produces effective obturator jerk control with success rate about 100%¹⁵.

In this series mild form of obturator jerk can not be eliminated after endoscopic injection of 2% lignocaine in 3 cases (6.7%). But here complete resection was possible. This may be due to abnormal branch or presence of accessory obturator nerve. In our series 37 patients (82.7%) did not need re-injection to control obturator jerk reflex and 8 patients (17.7%) needed re-injection to control obturator jerk reflex. This may be due to failure to block the conduction field by first injection. In this study no serious side effects were detected in group-A patients due to injection of 2% lignocaine. Only small group of patients developed minute adverse affect. In our series 3 patients (6.6%) developed anxiety, 2 patients (4.4%) developed mild tremor and 1 patient (2.2%) developed agitation. Statistical analysis shows no significant difference between two groups ($P>0.05$). But in our study no such complication noted. Less and mild form of side effects are due to injection of 2% lignocaine in tissue space under direct vision. This approach of injection was another important feature of this study.

This study showed a potentially important role of endoscopic injection of 2% lignocaine into the bladder wall at the base of tumor to control obturator jerk. The limitation of this study was small sample size and very large tumor are not included here with no follow up of the patient for further evaluation.

Considering the findings of the present study, it is concluded that endoscopic injection of 2% lignocaine into the bladder wall is more effective than other procedure in the management of the patient with bladder tumor who develops obturator jerk during transurethral resection of bladder tumor.

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Author

Department of Urology, BSMMU, Shahabag, Dhaka

SINGLE-INCISION LAPAROSCOPIC SURGERY

MA SALAM

Laparoscopy has been demonstrated a valid approach in many gynecologic procedures with better results in terms of minimal perioperative morbidity and shorter hospital stay, with consequent improved quality of life compared to laparotomic approach^{1,2}. Despite this well-known advantages, laparoscopy still requires 0.5 to 1.5 cm long incisions and three to five ports to be performed, each working port implying with an inherent risk of bleeding, infection, concordant organ damage, hernia formation, and decreased cosmetic outcome³. Recently, some efforts have been made to decrease incisional morbidity related to parietal trauma and improve cosmetic results while maintaining the same standards of surgical care^{4,5}.

Single port access (SPA) surgery, also known as laparo endoscopic single-site surgery (LESS), Single Incision Laparoscopic Surgery (SILS) or one port umbilical surgery (OPUS) or single port incisionless conventional equipment-utilizing surgery (SPICES) or natural orifice transumbilical surgery (NOTUS), or Embryonic Natural Orifice transumbilical surgery (E-NOTES) is an advanced minimally invasive surgical procedure in which the surgeon operates almost exclusively through a single entry point, typically the patient's navel. SPA surgical procedures are like many laparoscopic surgeries in that the patient is under general anesthesia; insufflated and laparoscopic visualization is utilized.

In this context, mini laparoscopic approaches and natural orifice transluminal endoscopic surgery (NOTES) have been developed, utilizing the mouth, anus, vagina, or urethra to access through the peritoneum. Laparo endoscopic single-site surgery (LESS) has encompassed recent terminology including single-port incision laparoscopic surgery (SILS) or single port access laparoscopic surgery (SPA). NOTES and LESS techniques have emerged as viable, feasible, and widely applicable minimally invasive procedures⁶⁻⁸. Until now LESS has been mainly used in urologic surgery but recent sporadic reports in the literature have hypothesized some applications in gynaecology⁹⁻¹⁰.

In laparo endoscopic single-site surgery (LESS), rather than the traditional four to five small incisions, a single

small incision can be used at the entry point. All surgical instruments are placed through this small incision and also the incision site is located in the left abdomen or umbilicus.

Providing the benefits of fewer scars, the opportunity of less pain, and shorter recovery periods, SILS is one of the newest laparoscopic techniques and it is regarded as non-invasive. In general, SILS techniques take about the same amount of time to do as traditional laparoscopic surgeries. However, SILS is recognized as to be a more complicated procedure because it involves manipulating three articulating instruments through one access port^{11,12}.

Along with many benefits, SILS often offers financial advantages to hospitals, patient's health care insurance options, and employers, too. Typically, the patient's hospital stay is shorter as well as less medical assistance than traditional laparoscopic surgeries. Although SILS offers exciting benefits for any wide variety of patients facing weight-loss challenges, not everyone is an applicant for the procedure. Obesity, severe adhesions, or scarring from previous surgeries are a few of the factors that would prohibit patients from getting the surgery.

Although originally designed to concentrate on weight-loss issues, SILS is really a rapidly evolving technique that's also being put on other areas of healthcare. Some surgeons are successfully using this procedure for urological, gynecological, and colon surgeries.

How SILS differs from traditional laparoscopic surgery?

Over the last decade conventional laparoscopic surgery has replaced open surgery in the treatment of several surgical diseases. In traditional laparoscopic surgery, the abdomen is filled with carbon dioxide gas to create a space for the surgeon to work inside with telescope and different other ports for instrument. Metal cannula called ports are then inserted through three to four small cuts, each measuring around $\frac{1}{2}$ – 1 cm. A telescope attached to a camera inserted through one of the ports allows the surgeon and gynecologists to observe a

magnified picture of the internal organs on a television screen. The surgeon, gynecologists urologists or pediatric surgeon carries out the surgery with the help of instruments introduced through the ports.

In Single incision laparoscopic surgery, the surgeon makes only one incision of around 1.5 cm – 2 cm just below the umbilicus to allow placement of three thin 5mm port side by side parallel to each other. A specially designed SILS port is also available which is inserted into the abdomen; this port carries the telescope as well as the laparoscopic instruments. The surgeon then carries out an operation identical to a traditional laparoscopic one.

As the technique of single incision laparoscopic surgery gets refined and better instrumentation becomes available, the surgeons will be able to carry out many more operations today carried out by traditional laparoscopic surgery using the SILS approach. As there is only one incision the patient experiences much less pain as compared to traditional laparoscopic surgery and recovers faster. The healed incision leaves practically no scar, thus making SILS cosmetically a superior option. All patients enjoy these benefits, but SILS is of particularly great cosmetic value to ladies (as most would prefer to have as few scars as possible) and to busy corporate executives who wish to recover rapidly from surgery so as to get back to work¹³⁻¹⁵.

The surgeon would assess an individual patient to decide whether or not he / she are a suitable candidate for SILS. SILS may not be applicable to some patients, e.g. Those who are very obese. Those who have had multiple previous abdominal operations and patients who are likely to have grossly enlarged or thickened diseased organ. In 5% to 10% patients it may not be possible to complete the operation by SILS due to technical difficulties. The surgeon places one or two additional ports and completes the procedure in the traditional laparoscopic manner. Very rarely, it may be necessary to convert to an open operation. Both these issues are always discussed with patients prior to surgery and they are made aware that conversion to traditional laparoscopy or indeed to open surgery merely represents a sound judgment on part of the surgeon in the interest of patient safety. As SILS involves the use of specialized equipment, it is marginally more expensive as compared to traditional laparoscopic surgery. However, this small extra cost is more than offset by the benefits that the patient reaps.

Instrument used in Single Incision Laparoscopic Surgery

Single incision laparoscopic surgery (SILS) is a new technique that has now been utilized in many hospital all over world for various laparoscopic procedures. The major difficulty with this new technique is the sacrifice that has to be made in terms of comfort and ergonomics. As all instruments and camera are inserted through the same incision, the ability to triangulate instruments around the target is lost. Although this can be partially rectified nowadays by the use of rotator instruments, the surgeon ends up working with his hands very close together, and finds himself often being impeded by the laparoscope and the assistant. The surgeon's right hand will control the left-sided instrument on the screen and the left hand controls the right-sided instrument on screen. These technical difficulties do make SILS a more demanding procedure on the operating surgeon than normal laparoscopic techniques. This led to an initial significant increase in the operation time and need ambidexterity. However, with increasing exposure to the technique, operating times have been reduced significantly, and are now very similar to the average time taken for laparoscopic procedures. Future improvements in instrumentation may help to reduce operating times further.

Method of Entry

Once the incision is made and the fascia is cleared, the entry into the abdomen can be performed in two ways: Veress needle or direct cut down entry. With the Veress technique, the fascia is lifted and also the needle is inserted. Once pneumoperitoneum is achieved, a 5-mm trocar is inserted first, followed by the other trocars. Utilization of a port which allows visualization of tissue layers during entry may be desirable. If the cut down technique is used (for multiple individual trocars, TriPort, or GelPort), a little incision is made in the fascia, and also the peritoneal cavity could be palpated just before keeping the first trocar to prevent possible bowel injury. A little defect is frequently present in the lower umbilicus and can be gently dilated to permit placement of a trocar. Insufficient visualization of subsequent trocars is one of the disadvantages of entry and trocar placement in SILS. Because all the ports are placed alongside each other, their placement is blind. Use of a transparent port for initial entry may allow better visualization. A flexible scope that articulates at least 180 degrees can allow

direct visualization of secondary trocars. If the patient has already established a previous surgery and it is at risk for adhesions, extra care must be taken since the trocars are placed¹⁶.

Incision and Subcutaneous Flap

When SILS cholecystectomy was first performed, a small 2 to 3cm vertical or horizontal incision is made within the umbilicus and some dissected subcutaneous flaps to more easily place multiple ports. For gastric banding, the position of the adjustment port requires a subcutaneous flap. It's the potential to result in formation of a seroma and infection from the port. But with careful, minimal dissection, this may be avoided. In many single incision laparoscopic surgery procedures, minimal development of the flap is required to place multiple trocars, but surgeons should be cognizant of this possible complication.

Trocars

There are many technical challenges to performing single-incision laparoscopic surgery. Unlike standard laparoscopy, all trocars, usually 3 to 4, are crowded into one skin incision. To allow for greater freedom of movement and reduced clashing, a few modified trocar options are now available and more have been in production. Many prefer the trocars used in standard laparoscopy or slightly modified ports. Some of these trocars have smaller heads, lower profiles, and absence of insufflation ports, such as Apple trocars (Apple Medical Corporation, Marlborough, Massachusetts) and Ternamian EndoTIP™ (Karl Storz Endoscopy, Tuttlingen, Germany). This allows freedom from the hands while maximizing technique incision. Others have placed instruments directly through the fascia with no trocar. Purpose-designed ports include multilumen, single-trocar systems, such as the R-Port (Advanced Surgical Concepts, Wicklow, Ireland), Uni-X single laparoscopic port system, and GelPort (Alexis®). Recently, Covidien received FDA clearance to promote its single incision laparoscopic surgery™ multiple instrument access port.

The GelPort used in SILS is similar to those used in hand-assisted laparoscopic procedures. The GelPort supplies a "flexible fulcrum" for insertion and manipulation of a laparoscope and up to 3 or four 5mm trocars through a single fascial incision. This system also allows the insertion of an instrument directly through the GelPort without using a trocar. Given that we do not know the long-term rate of complications of placing multiple trocars so closely together, this

technique could also prevent hernias. Lastly, the GelPort technique readily maintains the pneumoperitoneum and avoids the leak commonly encountered with multiple individual trocars. However, a single, larger incision may increase pain, the bigger incision size may limit cosmetic benefit, along with a specialized port clearly adds cost¹⁷⁻¹⁹.

There are now other commercially accessible, single-incision platforms with built-in trocars specifically made for single incision laparoscopic surgery procedures. These devices require a single fascial incision such as the GelPort, but have 3 to 4 ports for instruments, in addition to a separate site for insufflation. They've many of the same advantages and problems as the GelPort, but have less flexibility in port size and site.

Flexible Instruments

In addition to standard laparoscopic instruments, bent or flexible instruments and laparoscopes may be used to minimize the clashing from the instruments. You will find instruments that have varying degrees of flexibility and freedom. Novare Surgical Systems, Inc. makes a products called RealHand® which includes a flexible grasper, needle holder, scissors, and hook that mimic the movements from the surgeon's wrist. Ethicon (Cincinnati, OH, USA) helps make the REALIZE™ Endoscopic Dissector, that has 90-degree flexibility and it is used for retrogastric dissection. Other flexible instruments available include tools from Covidien (Norwalk, Connecticut), Pnavel Systems, Inc. (Morganville, New Jersey), and Cambridge Endo-maker of the Autonomy™ Lapro-Angle™ Instruments (Framingham, Massachusetts). Typically, using one flexible instrument and something rigid instrument is adequate to give enough working space to control and dissect tissue bimanually. Also, combined utilization of long and short instruments keeps the handles and surgeons' hands from interfering with each other. In our experience, using one flexible instrument is satisfactory, and trying to use two may be more mentally challenging and cumbersome. One problem with multiple planes of articulation is wrist fatigue, especially since all articulating instruments often deflect when force is applied¹⁸⁻²².

Telescopes used in SILS

For basic laparoscopic procedures for example, a standard 10-mm, 30-degree telescope provides sufficient visualization of the surgical field. However, for other procedures, the length and visibility supplied by the

standard laparoscope may pose some limitations. Because there is only one incision, typically in the umbilicus, the distance in the umbilicus to the surgical field might be longer than with the conventional laparoscopic technique. EndoEye laparoscope of Olympus Surgical & Industrial America Inc, allows panoramic view from the surgical field with minimal movements through the operator. By manipulating just the tip of the laparoscope with the shaft off line, the viewing angle needed can be obtained while allowing the working ports a higher level of freedom.

Use of fiber optic endoscope in SILS

Instead of using the traditional telescope, some purchased the flexible endoscope, as with some NOTES procedures, to do SILS. Instead of puncturing with the stomach or even the vagina, the endoscope is placed transabdominally for visualization. Some have inserted a double-channel endoscope directly with the fascia, while others have used a 15-mm trocar for insertion of the endoscope. Another trocar is positioned for insufflation, smoke evacuation, and retraction. Unlike single incision laparoscopic surgery, where the surgeon is applying a using a laparoscope, the main working instrument is the double-channel endoscope. Once the endoscope is positioned, the procedure is performed much like NOTES with slightly less technical difficulty because of distance. Current limitations of the technique, similar to those encountered using NOTES, are that most surgeons don't have the required skills and the available endoscopic instruments are not created for surgical dissection.

Retraction

One of the initial cases of single-incision laparoscopic cholecystectomy described using two transumbilical trocars with two transabdominal stay sutures for retraction of the gallbladder. Sutures can allow retraction, lowering the quantity of ports needed. A suture that enters and exits the abdomen in separate areas and passes with an organ having a locked stitch or clips can allow for "puppeteering" or retraction in different directions. Since that time, the use of intrabdominal suture to the anterior abdominal wall with or without endoloop and use of the penrose like a sling are also described. Using percutaneous sutures for retraction begs the question of more punctures and incisions. At what point is it no longer a single-incision procedure? Another technique for retraction involving a magnetic system might be adaptable from the use within NOTES procedures.

Benefits of Single Incision Laparoscopic Surgery.

Typically, this surgery requires only one small incision. Health and cosmetic benefits – Since there are fewer incisions, there is less possibility of infection, less scarring and better cosmetic results. The surgery is recognized as minimally invasive to cause shorter recovery times. Laparoscopic surgery has generally replaced the need for traditional open surgeries in the abdominal or pelvic cavities.

For many years, large incisions were necessary to perform abdominal surgical procedures. Although effective, multiple morbidities were related to this method, including postoperative pain, wound infection, incisional hernia, and prolonged hospitalization. The present rate of wound infection is 2 to 25 percent, and occurrence of incisional hernia is 4 to 18 percent in US patients. Some surgeons and gynecologist perceptions that complications and morbidities were associated with the size and extent of the incision led these phones minimize their incision length. By making smaller incisions that were protected by a port, there was an excellent decrease in incision-related complications. There is faster postoperative recovery, pain reduction, less requirement for narcotics, respiratory function improvement, reduction in infection and hernias, and overall cosmesis. However, with the introduction of the new technique came a price¹⁶⁻¹⁹.

Prior to the safety from the technique might be verified and standardized, the procedure was introduced with haste, causing higher rates of common bile duct injury along with other complications. Over time, the complication rates decreased and advantages of minimal, small incisions were recognized and accepted as the defacto standard. Surgeons continued to create modifications to reduce the number of incisions. For instance, laparoscopic cholecystectomy, which typically requires four incisions, was modified to 2 or three trocar incisions. Others reduced how big incisions and instrumentation to 2 to 3mm.

Although endoscopic technology continues to be accessible, it was initially limited to the luminal walls. However, when accidental puncture of the stomach during polypectomy showed another way to access the peritoneal cavity, the potential of scarless, incisionless surgery was introduced. Natural orifice transluminal endoscopic surgery (NOTES) was envisioned as probably the ultimate form of non-invasive surgery-with many potential benefits, including complete removal of wound infection, adhesions, and hernias, decrease in

pain and recovery period, minimal anesthesia and analgesia, and no external scar.

Basically, NOTES involves placing flexible endoscope through among the body's natural orifices, like the mouth, anus, vagina, or urethra, to achieve access to an appearance space to do surgery. Since Kalloo's transgastric peritoneoscopy in 2004, multiple centers have successfully performed many variations of NOTES in humans, including transgastric appendectomy to complete transvaginal cholecystectomy. However, using the creation of every novel technique, you will find limitations and shortcomings. Insufficient specific instrumentation, safe viscerotomy closure technique, and difficulty with patient recruitment in America has limited its implementation. Preliminary experience has proven feasible and suggested that several of the potential benefits, such as cosmesis, pain reduction, and shorter recovery, may in fact be realized. Knowing the importance and also the potential advantages of NOTES yet realizing current limitations from the technique, surgeons are developing single-incision laparoscopic surgery in parallel, perhaps like a bridge between standard laparoscopy and NOTES.

The tenet of single-incision laparoscopic surgery is to lessen the quantity of incisions to one, typically at the umbilicus, for multiple trocar placements. Since single incision laparoscopic surgery procedures are relatively new and in evolution, many techniques happen to be described but no widely accepted standard exists. SILS was first adapted to cholecystectomy and once the strategy was proved to be effective and safe for basic laparoscopic procedures, it was put on a few of the technically simpler bariatric procedures. Laparoscopic gastric banding was one of the obvious transitional procedures since the significant incision necessary for the adjustment port offers the needed space to place multiple trocars. However, laparoscopic banding was more technically difficult due to the camera angles required for dissection of the retrogastric tunnel, the requirement for retraction of an often-fatty liver from a longer distance, and the requirement for suturing. As surgeons gained more experience, the technique became more sophisticated, and cosmesis was improved by placing the incision within the umbilicus. With this particular change, the distance from incision to the surgical field increased and also the angle of dissection became more technically challenging. Some have modified this technique by adding a small, second incision for retraction or using specialized ports. With

tries to overcome these obstacles, multiple techniques and instruments have been developed. Since the primary benefit of single incision laparoscopic surgery seems to be cosmetic, most agree that the umbilicus may be the preferred incision site; however, it's at this time how the techniques diverge²²⁻²⁵.

Future upcoming technologies

Magnetically anchored and guidance systems (MAGS) are designed to maneuver intra-abdominal instruments by use of an external handheld magnet. The fundus from the gallbladder, for instance, could be retracted above the costal margin by coupling the interior aspect of an external magnet. The graspers are situated on the gallbladder with the help of endoscopic biopsy forceps. Magnets may become valuable, but challenges have an exponential reduction in force with thicker abdominal walls and clumping of ferrous objects within the operating room.

Robotic or remotely controlled devices are other technologies that could aid single-incision laparoscopy. The ability to insert instruments and also have the surgeon control them remotely makes it possible for examples of freedom and triangulation not otherwise possible with a single point of origin. Avoiding the requirement for handles and resulting clashing or interference of instrument motion are significant potential advantages of these systems.

Single-incision laparoscopic surgery is gaining interest and associated courses are being taught at many centers. This can be for any number of reasons. Many see a natural progression to reduce the number of incisions from multiple small incisions necessary for laparoscopy to a single incision. Although neither truly scar-less nor as pain-free as NOTES, it may still offer several benefits. SILS has got the potential to improve cosmesis, yet be practiced with already existing instruments and what many view as modified laparoscopic techniques.

As with any new surgical technique, there's a learning curve. We now have learned in the problems encountered with NOTES that lacking the appropriate instrumentation and adjusting to a different setup can be hugely challenging. Although the idea of single incision laparoscopic surgery seems similar to standard laparoscopy, theoretically you will find major differences in technique. Actually, some "rules" of laparoscopy have to be "broken" in order to perform SILS. It involves crowding of all the working instruments within one

incision, and the basic principle of triangulation is therefore lost to some extent. When related to inadequate training and experience, these challenges may increase risk of intraoperative injury. Visualization may be obscured because of crowding of instruments, and longer distance from insertion to operative site presents additional challenges. To some degree, we still lack optimal instrumentation to overcome these issues. Given these challenges, is single incision laparoscopic surgery worth performing for improved cosmesis? May be the hope of slightly faster recovery and decreased pain likely?

Before we are able to answer these questions, there needs to be randomized, prospective studies to compare SILS to standard laparoscopy. The theoretical benefits are obvious, but it's unclear whether the benefits really exist and when they'll outweigh the potential risks. This comparison isn't unlike the development of laparoscopy. Initially, many were skeptical given higher rates of complication, higher cost of instrumentation, and increased operative time. However, it turned out to be extremely beneficial for patients and had become the defacto standard for a lot of procedures. Similar to the development of laparoscopy, it would appear that dissemination from the single incision laparoscopic surgery techniques will precede careful study. The fact that SILS appears like an incremental step (i.e., moving trocars to one location) and involves few new instruments makes it simple for surgeons to adopt. Ideally, careful comparison to existing techniques would precede wide using new technology. Market forces, patient interest, and even industry are driving the advancement of single incision laparoscopic surgery. Although many surgeons are already performing SILS procedures, disciplined, evidenced-based investigations must be performed to determine the proper place of single incision laparoscopic surgery in surgical practice²⁶⁻²⁷.

We now have learned in the introduction of laparoscopy that serious, avoidable complications can occur when embarking on new techniques without adequate training. What specific training is needed and whether credentialing specific to SILS is necessary still be determined. Currently, most surgeons performing single incision laparoscopic surgery feel that some specific didactic training and observation of single incision laparoscopic surgery technique is necessary at the very least. Some feel that hands-on training and proctoring is necessary. Using SILS lacks any significant level of regulation or monitoring. Clearly, some guidelines have

to be implemented to avoid unnecessary complications. As mentioned, this might involve training in an animate or inanimate lab, proctoring, or just didactic education with operating room or video observation²⁸.

Single incision laparoscopic surgery (SILS) has got the potential to offer patients real benefits, however the actual connection between SILS will not be positive if training is inadequate. Some believe single incision laparoscopic surgery will be a bridge to NOTES. While there may be some cross-fertilization between techniques, it is likely these techniques will develop running in parallel because SILS is technically simpler and easier for surgeons and patients to conceptualize. Yet, single incision laparoscopic surgery performed with flexible endoscopes may be a step toward NOTES. In summary, the first experience of single incision laparoscopic surgery challenges some basic laparoscopic surgical conventions. Experience and technology may allow SILS to become performed widely and improve surgery^{27,28}.

Conclusion

Single-incision laparoscopic surgery is feasible for urological, surgical, gynecological and even for suitable for pediatric population. However, in the future prospective studies with sufficient power are warranted to demonstrate any statistically significant benefits over the standard laparoscopic method. These are most likely to be in terms of postoperative pain, port site complications, cosmesis, and patient satisfaction²¹.

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Author:

Professor & Chairman, Department of Urology, BSMMU, Dhaka

CASE REPORTS

ALTERNATIVE PROCEDURE FOR URINARY BLADDER CLOT EVACUATION - A CASE REPORT

MS ISLAM, S RAHMAN, M HOSSAIN, S ISLAM, KM ISLAM, AKMK ALAM

Abstract:

Along with different methods for the treatment option of urinary bladder clot removal, mechanical procedure for clot dissolution and removal also becoming popular. In this report we present a case of large organized post prostatectomy urinary bladder clot in a 90 years old patient by using simple operating room suction apparatus connecting with a Nelaton's catheter and its effectiveness.

Introduction:

Clot retention in urinary bladder is a common urological problem in day to day practice. There are several methods to manage this problem. From simple catheter irrigation to open cystostomy required to remove the large organized clot from bladder. Conventionally when there is any anticipation to form of bladder clot, simple tri-channel Foley's catheter irrigation is maintained to prevent the clot. But irrigation may become difficult because of the formation of dense blood clots. Tissue plasminogen activator (t-PA/Alteplase) may be a useful pharmacological agent to improve the efficacy of manual irrigation of large, dense clots. There is report of uses Alteplase (tissue plasminogen activator) for treatment of urinary clot retention in an in vitro model to compare efficacy with sterile water for clot irrigation¹.

Some report shows physiologic thrombolysis is efficient, while pathologic aberrations in the fibrinolytic system may result in either thrombotic or hemorrhagic disease. This condition may cause post operative clot retention in patient with thrombotic or hemorrhagic disease. For the prevention of the post operative clot localized activation of fibrinolysis, discussed without systemic effects, and describes the molecular mechanism of plasminic degradation of fibrinogen and of cross-linked fibrin².

In patient with severe persistent hemorrhage from urinary bladder after clot evacuation and fulguration continuous irrigation with 1% alum solution was found very effective with out any side effect and after treatment serum aluminum level was found normal in patients³.

Evacuation of clot from the bladder by irrigation can be difficult when significant clot burden or organized clot

exists. There are some technique for the evacuation of clot from the bladder using irrigation containing hydrogen peroxide that facilitated clot removal. It is also practiced by some author⁴.

A simple but effective technique for removing calcific and other debris following aortic and mitral valve replacement. This technique uses an Ellik evacuator, which is readily available in most operating rooms. This procedure also used for cystoscopic clot removal of urinary blood clot.⁵

Along with the usual systemic & local procedure to prevent and remove urinary bladder clot different kind of mechanical procedures like stronger suction pressure through the cystoscope sheath in patients who had failed clot evacuation using the traditional Ellik's evacuator⁶. Bladder evacuation device "Urovac" device proved to be better for evacuation of prostatic chips than both the Ellik's evacuation and Toomey syringe⁷.

Here we report a case of retained large urinary bladder organized clot in a post prostatectomy patient and removal of the clot with simple operating room suction apparatus easily and rapidly.

Case report:

Eighty five years old male patient was underwent TURP due to hugely enlarged prostate and bladder was irrigated with normal saline and oral tranexamic acid was given 12 hourly for rapid homeostasis. On third postoperative day we noticed improper irrigation and distention of lower abdomen along with blackish red colour of irrigation fluid coming out of the bladder. After ultra-sonographic examination a large organized blood clot was detected in urinary bladder of the patient. Then after transfusion of two units of fresh blood, the patient was prepared for cystoscopic evaluation and removal of blood clot under spinal anesthesia. Per operatively we tried first with simple bladder wash with Ellik's evacuator through cystoscope but failed. Then we used resectoscopic breakdown of clot with TURP loop and wash with hydrogen peroxide mixed with normal saline solution with Ellik's evacuator. This procedure was also not that much satisfactory as because hydrogen peroxide was producing too much froth and dissolution of clot was very slow. Last of all we used 18fr Nelaton's catheter

through 24fr resectoscope and connecting the Nelaton's catheter with operating room suction machine using only 150-200 mm of Hg pressure along with continuous irrigation with normal saline. During the procedure the catheter was moved to and fro through the resectoscope by repeatedly stroking the clot in bladder. With repeated stroke and negative suction pressure the clot break down and rapidly coming through the suction tube.



Fig: *Clot evacuation in OT*

Discussion:

Retained urinary bladder clot removal is a common post operative procedure in urological procedure. The conventional catheter saline irrigation is an incomplete and slow method^{1, 2}. There are also some systemic and local medication like Alteplase, Alum irrigation, hydrogen peroxide solution irrigation used for this purpose but all these procedure are slow and not that much satisfactory^{1, 3, 4}. Mechanical suction evacuation with Ellick's evacuator, "Urovac" a patent device for suction also found effective^{5, 6, 7}.

In this case we used simple wide bore Nelaton's catheter connecting with usual suction apparatus and handled carefully through the resectoscope to remove

large organized urinary bladder clot and found very rapid and effective. In this procedure there was no per or post operative complication was observed and the procedure is simple, cost effective and safe.

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Author

Department of Urology, BSMMU, Dhaka, Bangladesh

SUCCESSFUL MANAGEMENT OF PRIAPISM SECONDARY TO LEUKEMIA - A CASE REPORT

AU MALLIK¹, GM CHOWDHURY², IA SHAMEEM²

Summary:

Background: Priapism due to sickle cell disease is common but rare due to leukemia. Here in we report a case of priapism secondary to leukemia, which was managed by aspiration followed by glanulocavernous shunt.

Materials and Methods : A 16-year-old male presented with prolonged involuntary painless erection of 24 hours duration. The physical examination and Doppler USG revealed low flow priapism. Blood parameter showed increase leukocyte Count indicating leukemia. We treated the patient successfully by cavernous

Lavage with adrenaline, an alpha-1 adrenergic agonist, followed by glanulocavernous shunt.

Results: Complete detumescence was achieved after second time puncture - Lavage of the cavernous.

Conclusion: We conclude that priapism due to leukemia can be best treated With adrenaline lavage until full detumescence achieved.

Key Words: Priapism, detumescence, glanulocavernous shunt.

Introduction:

Priapism is usually defined as an abnormal persistent erection of the penis unrelated to sexual stimulation and unrelieved by ejaculation (Fig.1). The penis is composed of 2 corpora cavernosa, the corpus spongiosum, which contains urethra. These corpora are capped distally by the glans penis. Each corpus is enclosed in a fascial sheath known as tunica albuginea and a thick fibrous envelope known as Buck's fascia surrounds all. The tunica albuginea of the corpus cavernous is a bilayered structure with multiple sub layers. The inner circular bundles support and contain the cavernous tissue.¹⁻³ From this inner layer radiate intracavernous pillars, which provides essential support to the erectile tissue. The outer layer bundles are oriented longitudinally. Emissary veins run between the inner and outer layers for a short distance, often piercing the outer bundles obliquely. Branches of the dorsal artery takes a more direct perpendicular route. The outer layer of tunica albuginea appears to play an additional role in

compression of the vein during erection. The paired internal pudendal artery is the major carrier of the blood supply to the penis. The terminal part of this artery divides into 3 branches, supplies the corpora cavernosa⁴⁻⁸.

In the normal male, penile erection may last for several minutes to 1 hour or more under erotic stimulation. An erection lasting longer than 4 - 6 hours is considered to be priapic⁹.

The urological condition priapism gets its name from Priapus. In Greek Mythology, Priapus was a minor rustic fertility God of purely phallic character, protector of livestock, fruit plants, gardens and male genitalia. Priapus was a son of Aphrodite. Aphrodite was the Greek Goddess of love and beauty, and goddess of physical love.

Priapism may be classified into 3 different types: low flow, ischemic, anoxic or veno-occlusive priapism, second, high flow, arterial or non-ischemic priapism, and third is recurrent or shuttering priapism. High flow priapism occurs due to trauma, which results in loss of penile blood flow regulation. In low-flow priapism usually presents with several hours of erection. The glans penis and corpus spongiosum are soft and uninvolved in the process. The low-flow type is more common and dangerous, as these patients are susceptible to greater complications and the long-term recovery of erectile function is dependent on prompt and urgent intervention.

The mechanism of priapism remains in debate, but most authors believe the abnormality to be physiologic obstruction of the venous drainage. This obstruction causes highly viscous, poorly oxygenated blood (low O₂, high CO₂) within the corpora cavernosa.⁹⁻¹⁰ Penile erection occurs as a result of increased blood inflow to the penis, engorgement with blood, and decreased outflow of blood from the penis. Primarily the process is mediated by nitric oxide. Many researchers investigated to know the mechanism of erection in normal condition. Sexual stimulation causes the release of nitric oxide (NO) via stimulation of nonadrenergic, non-cholinergic neurons. Nitric oxide causes vasodilatation⁷⁻⁹.

Herein, we report a case of priapism due to leukemia, which was treated successfully with adrenaline

intracavernous injection followed by glanulocavernous shunt formation.

Case report

A 16-year-old boy was referred to our hospital, for sustain erection of penis longer than 24 hours duration. He was not clinically anaemic. General examination revealed no abnormality. He had no history of trauma. The patient was initially diagnosed as a case of priapism and was treated with ice cool application around penis for 1 hour. The patient did not respond to this management, so complete blood count was requested. The white blood cell count was more than 100000/mm³ of blood. Doppler USG was done, which revealed low-flow of blood to the penis. In view of the patient's clinical condition, he was admitted to the Urology ward for further management. After general anaesthesia an 18G I/V cannula inserted through the glans penis to the corpora cavernous (Fig. 2). Milking of the shaft of the penis was done in order to empty both the corpora cavernosa for quick detumescence. Cannula was kept in-site for more 24



Fig.-1: Priapic penis



Fig.-2: Diagrammatic representation of glanulocavernous shunt

hours. At the same time treatment of leukemia was started. Recurrence of priapism was occurred after 24h. For which same procedure was done under G/A. At this time intracavernous adrenaline injection (1/100000 strength) and milking of the shaft was done simultaneously.

At the end of the procedure a true-cut biopsy needle was inserted through the cannula site to the cavernous muscles for glanulocavernous shunt. Postoperative period was uneventful.

Discussion

Priapism due to leukemia is an uncommon condition but an urologic emergency, which require rapid detumescence to prevent erectile dysfunction. It causes impotence, a devastating condition for male, if not treated urgently. In most cases of priapism, treatment invites draining of the stagnant blood with prevention of further blood flow into the penis, with a cannula inserted into the corpus cavernous through glans penis. Medication that acts on the blood vessels can also be injected to help shrinkage of blood vessels and thus decreases blood flow into the penis.

Leukemia is a neoplastic disorder of blood, which require medical attention. In Leukemia white cell count in blood increases to high level, subsequently blood viscosity increase. Leukocytes trapped inside sinusoids of corpora cavernous muscles of the penis, the sinusoid engorged as well as penis engorged and enlarged. But the venous return stop due to blockade of the emissary veins. These causes sustain erection of the penis. For treatment of priapism, leukemia should receive prompt chemotherapy. We diagnosed priapism and started chemotherapy immediately. The patient came to us in late. So, there is more chance of impotent development. Our described technique for treatment of priapism is based on knowledge of penile blood circulation during erection and detumescence condition as described by others¹¹⁻¹³.

Adrenaline is an alpha-adrenoreceptor agonist that causes vasoconstriction. This agent has been extensive studied with regard to its efficacy in the control of priapism.⁹⁻¹¹ Numerous clinical trials using multiple doses format as injection inside corpora cavernous have demonstrated tremendous efficacy for detumescence of priapic penis¹¹⁻¹².

Xiao. H. et al. also documented a significantly earlier return of detumescence, preventing impotence with adrenaline intracavernous injection^{11,18}. We have shown successful effect of intracavernous adrenaline injection followed by glanulocavernous shunt formation in our patient. Result from our treatment is in agreement with

those of earlier report^{11-13,15}. The slugged blood evacuated from the corpora through a large bore needle. The addition of adrenergic injection via intracavernous irrigation has proved helpful¹³⁻¹⁷. Multiple wedges of tissue can be removed via a true-cut biopsy needle to create a shunting fistula between the glans penis and corpora cavernosa. This technique, which has been very successful, provides an internal fistula to keep the corpora decompressed. Our technique was similar to those techniques¹⁸⁻²⁰.

The recurrence after first manipulation of priapism in our case corresponds to the inaccurate technique of detumescence. Therefore, we currently recommend exclusive use of adrenaline during detumescence of priapism. We feel that recurrence in our case was due to incomplete evacuation of the stagnant blood in first time, for which we performed milking second time, until phallus of the penis became completely soft. We also recommend glanulocavernous shunt with a true-cut biopsy needle after adrenaline injection and milking. We know that the pathological cause of priapism in our case was due to Leukemia; therefore, it seems clear that despite the chance of ED, this minor surgical procedure for priapism treatment is of great value in this case.

Conclusion :

With the detumescence procedure for priapism in our case, we believe that our technique is of highly effective. Therefore, we recommend adrenaline intracavernous injection for the treatment of priapism followed by shunt formation. Longtime follow-up is necessary to see ED for those who come in delay after onset of priapism.

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Authros

1. Consultant, Dept. of Urology, Khwaja Yunus Ali Medical College and Hospital, Enayetpur Sharif, Sirajganj
2. Assoc. Prof., Dept. of Urology, BSMMU, Dhaka, Bangladesh

ABSTRACT FROM CURRENT LITERATURE

Intravesical prostatic protrusion predicts clinical progression of benign prostatic enlargement in patients receiving medical treatment

Lui Shiong Lee,¹ Hong Gee Sim,¹ Kok Bin Lim,¹ Delin Wang² and Keong Tatt Foo¹

¹Department of Urology, Singapore General Hospital, Singapore, and ²Department of Urology, The First Affiliated Hospital, Chongqing University of Medical Sciences, Chongqing, China

Objectives: To assess intravesical prostatic protrusion (IPP) as a novel predictor of clinical progression in patients with benign prostatic enlargement (BPE).

Methods: All patients attending the outpatient clinic at our institution who were being treated for lower urinary tract symptoms (LUTS) secondary to BPE between January 1997 and December 2003 were recruited into the study. International Prostate Symptom Score (IPSS) scores, uroflowmetry parameters, post-void residual urine volume (PVR), IPP and serum prostate-specific antigen (PSA) were collected. IPP was classified into Grade 1, 2 or 3. Patients were stratified to different treatment options including watchful waiting, alpha blockers or 5-alpha reductase inhibitors. Those who developed high post-void residual urine volume (>100 mL), acute urinary retention or a deterioration of at least 4 points in IPSS score were considered to have disease progression. Using the Grade 1 IPP group as a reference, the odds ratio for clinical progression of Grade 2 and Grade 3 IPP were calculated by using multivariate analysis.

Results: A total of 259 patients with a mean age of 63 years (range 50–90 years) and mean follow-up time of 32 months were available for analysis. Fifty-two patients were found to have clinical progression. Odds ratio for progression of a Grade 2 IPP was 5.1 (95% confidence interval [CI] 1.6–16.2) and that of a Grade 3 IPP was 10.4 (95% CI 3.3–33.4).

Conclusion: A higher IPP grade is associated with a higher risk of clinical progression in BPE. IPP is a useful non-invasive predictor for clinical progression in BPE.

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Lower urinary tract symptoms in women with irritable bowel syndrome

Ya-Jun Guo,¹ Chen-Hsun Ho,^{2,5} Shyh-Chyan Chen,¹ Shun-Shuang Yang,³ Han-Mo Chiu⁴ and Kuo-How Huang¹

¹Department of Psychiatrics, Heping Branch, Taipei City Hospital, Departments of ²Urology, ³Nursing and ⁴Internal Medicine, National Taiwan University Hospital, and ⁵Division of Urology, Department of Surgery, Buddhist Tzu Chi General Hospital, Taipei Branch, Taipei, Taiwan

Objectives: To investigate lower urinary tract symptoms (LUTS) in women with irritable bowel syndrome (IBS) and to evaluate risk factors associated with the psychiatric morbidity of these patients.

Methods: The study group included 52 female patients with a diagnosis of IBS. Fifty-five women without gastrointestinal symptoms were used as controls. LUTS were evaluated using the American Urological Association Symptom Index questionnaire. Psychiatric morbidity was evaluated using a 12-item version of the Chinese Health Questionnaire. Multiple logistic regression analysis was performed to identify the risk factors associated with psychiatric morbidity in IBS patients.

Results: There were no significant differences between the two groups in any of the demographic variables. The most common LUTS in patients with IBS were storage symptoms. These patients had significantly higher scores of frequency, nocturia, urge incontinence, lower maximal flow rate and lower voiding volume ($P < 0.05$). In addition, significantly higher storage and total American Urological Association Symptom Index questionnaire scores were also noted in IBS patients ($P < 0.05$). The prevalence of psychiatric morbidity in IBS patients was 28.8%, which was significantly higher than in the control group (20%). The urinary storage symptom score (odds ratio: 1.518; 95% confidence interval: 1.17–1.96; $P = 0.002$) was significantly correlated with psychiatric morbidity.

Conclusions: LUTS are common in IBS patients and have a negative impact on their psychiatric status. Healthcare providers should be aware of the psychological consequences of LUTS in these patients.

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Skeletal-related events in urological cancer patients with bone metastasis: A multicenter study in Japan

Akira Yokomizo,¹ Hirofumi Koga,² Nobuo Shinohara,³ Tsukasa Miyahara,⁴ Noriko Machida,⁵ Hiromasa Tsukino,⁶ Jiro Uozumi,⁷ Kenryu Nishiyama,⁸ Fuminori Satoh,⁹ Hideki Sakai¹⁰ and Seiji Naito¹

¹Department of Urology, Graduate School of Medical Sciences, Kyushu University, Fukuoka, ²Department of Urology, Harasanshin General Hospital, and ⁴Department of Urology, Kurume University School of Medicine, Kurume, Fukuoka, ³Department of Renal and Genitourinary Surgery, Graduate School of Medicine, Hokkaido University, Sapporo, Hokkaido, ⁵Division of Urology, Faculty of Medicine, University of the Ryukyus, Okinawa, ⁶Division of Urology, Faculty of Medicine, University of Miyazaki, Miyazaki, ⁷Department of Urology, Faculty of Medicine, Saga University, Saga, ⁸Department of Urology, Graduate School of Medical and Dental Sciences, Kagoshima University, Kagoshima, ⁹Department of Urology, Faculty of Medicine, Oita University, Oita, and ¹⁰Department of Nephro-Urology, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan

Objective: To investigate the incidence of skeletal-related events (SRE) in urological cancer patients with bone metastases in Japan.

Methods: Five hundred eleven patients with urological cancer and documented bone metastases treated from January 2003 to April 2008 in ten Japanese institutions were included in a retrospective analysis. Type and incidence of SRE (fracture, radiotherapy, spinal cord compression, surgery, hypercalcemia, and bone pain) were determined from patient medical records.

Results: The overall incidence of SRE, including 'pain', was 61%. The most common event was radiotherapy for bone metastases, with an incidence of 31%. The overall incidence of events seemed to be similar among Japanese and Western patients with prostate cancer and renal cell carcinoma when comparing data with previously published reports. Nevertheless, a much lower incidence of fracture (19.1%) was observed in Japanese renal cell carcinoma patients.

Conclusions: The overall incidence of SRE in Japanese urological cancer patients with bone metastasis was similar to that in Western patients, but the incidence of fracture was lower in Japanese renal cancer patients.

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Adrenal androgen levels as predictors of outcome in castration-resistant prostate cancer patients treated with combined androgen blockade using flutamide as a second-line anti-androgen

Kazutaka Narimoto,¹ Atsushi Mizokami,¹ Kouji Izumi,¹ Shinya Mihara,² Kiyoshi Sawada,² Toshiaki Sugata,³ Masayoshi Shimamura,⁴ Kimiomi Miyazaki,⁵ Akio Nishino⁶ and Mikio Namiki¹

¹Department of Integrative Cancer Therapy and Urology, Kanazawa University Graduate School of Medical Science, Kanazawa, Ishikawa, ²Department of Urology, Municipal Tsuruga Hospital, Tsuruga, Fukui, ³Department of Urology, Fukui Ken Saiseikai Hospital, Fukui, ⁴Department of Urology, Ishikawa Prefectural Central Hospital, Ishikawa, ⁵Department of Urology, Kanazawa Arimatsu Hospital, Kanazawa, Ishikawa, and ⁶Department of Urology, Komatsu Municipal Hospital, Komatsu, Ishikawa, Japan

Objectives: To analyze the clinical effects of flutamide as a second-line anti-androgen for combined androgen blockade in patients with castration-resistant prostate cancer (CRPC) initially treated with bicalutamide as a first-line anti-androgen.

Methods: Our study population consisted of 16 patients with CRPC who were treated with flutamide (375 mg daily) as second-line hormonal therapy. Dehydroepiandrosterone (DHEA), androstenedione, androstenediol, testosterone and dihydrotestosterone were measured to investigate the relationship between plasma androgens and outcome following treatment. Furthermore, adrenal androgen levels in a medium of adrenal cancer cell line were also measured.

Results: Second-line hormonal therapy using flutamide resulted in a reduction of the prostate-specific antigen (PSA) level in 14 (87.5%) of 16 patients. A PSA decline greater than 50% was observed in 8 (50%) of the 16 patients. The duration of median responsiveness was 6.25 months. PSA elevation of baseline androstenediol level was a predictive factor of PSA responsiveness. The lower DHEA group improved the duration of responsiveness to flutamide. *In vitro*, 3 mmol/L flutamide suppressed DHEA, androstenedione and androstenediol synthesis compared with bicalutamide in a medium of adrenal cancer cell line.

Conclusions: Our data show that flutamide suppresses the adrenal androgens in comparison with bicalutamide. The responsiveness and response duration of flutamide can be predicted in patients with a higher baseline

androstenediol level and a lower DHEA level. Metabolites from adrenal androgens contribute to the progression of prostate cancer.

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Morbidity of open retroperitoneal lymph node dissection for testicular cancer: contemporary perioperative data

Stephen B. Williams, David W. McDermott, Dock Winston, Eamonn Bahnson, Alexander M. Berry, Graeme S. Steele and Jerome P. Richie

Division of Urology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA

Objective: To review differences between primary retroperitoneal lymph node dissection (P-RPLND) and RPLND after chemotherapy (PC-RPLND) in a contemporary series of patients with testicular cancer, to validate the proposed low morbidity.

Patients and Methods: Patients who had undergone RPLND at our institution in 2001–2008 were identified and their clinical charts reviewed; in all, 190 were identified and perioperative data obtained.

Results: Of the 190 patients who had RPLND, 98 (52%) and 92 (48%) had P- and PC-RPLND, respectively. Histology of the orchidectomy specimen consisted of embryonal carcinoma in 146 (76%) patients, also including lymphovascular invasion in 83 (44%). The mean (range) operative duration was 206 (110–475) min and the mean blood loss was 294 (50–7000) mL. The median hospital stay was 4 days. Mean blood loss, operative duration and hospital stay were significantly less for the PRPLND than for PC-RPLND groups ($P<0.05$). There were 18 (9%) perioperative complications in all. There were no deaths in either group.

Conclusions: The short-term morbidity of open RPLND is acceptable, and open RPLND is safe and effective at select tertiary centres. When compared with historical data, the present contemporary series shows that the operative duration, blood loss and hospital stay have improved, with few complications. These contemporary data should be considered when comparing laparoscopic with open RPLND.

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Medical management of acute urolithiasis in one American academic emergency room

Daniel M. Kaplon, Samuel Sterrett and Stephen Y. Nakada

Department of Urology, University of Wisconsin School of Medicine and Public Health, Madison, WI, USA

Objective: To determine the implementation of medical expulsive therapy (MET) for ureterolithiasis in one tertiary-care emergency room (ER); referral patterns in the surgical and metabolic follow-up of ureterolithiasis were also assessed.

Patients and Methods: In this retrospective review we identified 556 patients with ureterolithiasis in the ER at our centre between 2005 and 2007. Of these, 131 patients met inclusion criteria, including first-time stone formers and no urological visit within the previous 5 years. ER records were reviewed and telephone interviews conducted to determine if MET was used, if the patient was referred to a urologist, if surgery was ultimately required, and if there was ultimately a metabolic evaluation.

Results: The mean (range) stone size was 4.2 (2–10) mm. Ten patients were admitted directly from the ER and 121 were discharged home. Of the 121 discharged patients, 48 (40%) were prescribed MET. In all, 46 patients received tamsulosin 0.4 mg and two received doxazosin 2 mg; no patient was prescribed steroids. The mean size of passed stones was statistically significantly lower than that of stones that did not pass ($P<0.05$). Patients prescribed MET had a 23% chance of needing surgery, vs 32% in those not prescribed MET ($P<0.05$). Seventy-one (61%) patients were followed up by a urologist, 27 (23%) by a primary-care physician, and eight (7%) had no further follow-up. Ultimately, 31 (23%) patients had a metabolic evaluation and it was abnormal in 29 (95%).

Conclusions: In this single-institution ER experience, 40% of patients with symptomatic ureterolithiasis were treated with MET on discharge from the ER. Our data also show that only patients referred to a urologist received a metabolic evaluation. This is notable given that the vast majority of those evaluated were found to have a correctable abnormality.

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Transabdominal ultrasonography of detrusor wall thickness in women with overactive bladder

Shiu-Dong Chung, Bin Chiu, Hann-Chorng Kuo, Yao-Chi Chuang†, Chung-Cheng Wang‡, Zhonghong Guan§ and Michael B. Chancellor¶*

Division of Urology, Department of Surgery, Far Eastern Memorial Hospital, Ban Ciao, Taipei, *Department of Urology, Buddhist Tzu Chi General Hospital and Tzu Chi University, Hualien, † Department of Urology, Chang Gung Memorial Hospital, Kaohsiung Medical Center, Chang Gung University College of Medicine, Kaohsiung, ‡ Division of Urology, Department of Surgery, En Chu-Kong Hospital, Taipei, Taiwan, § Pfizer Incorporated, New York, NY, and ¶ Department of Urology, William Beaumont Hospital, Royal Oak, MI, USA

Objective: To determine the clinical usefulness of measuring detrusor wall thickness (DWT) as a noninvasive test in women with overactive bladder (OAB).

Patients, Subjects and Methods: We prospectively enrolled 122 women with dry OAB, wet OAB, and women with no OAB symptoms (control group). A 3-day voiding diary was used to differentiate between wet and dry OAB. Transabdominal ultrasonography (TAUS) measurements of DWT were taken at bladder volumes of 250–300 mL and the maximal bladder capacity by both catheter- and natural filling. Video-urodynamic studies (VUDS) were used to classify bladder dysfunction in 88 of the women.

Results: The mean (range) age of the women was 58 (20–94) years. There were 39 ‘normal’ controls, 44 women had dry OAB, and 39 had wet OAB. Of the 88 women who had VUDS, 28 had a ‘normal’ test, 30 had increased bladder sensation (IBS), and 30 had detrusor overactivity (DO). The mean DWT at 250–300 mL among three symptomatic subgroups or urodynamic subgroups showed no significant difference by either catheter- or natural-filling methods. The women with wet OAB had significantly greater DWTs than the controls at maximal bladder volume. The maximal bladder capacity was significantly greater in ‘normal’ women than in those with OAB. If we corrected maximal bladder volume to 250 mL, DWT at corrected 250 mL showed no significant difference among three symptomatic subgroups.

Conclusions: DWT measured by TAUS in women with OAB and without OAB was not different and did not differ with urodynamic status. Thus, TAUS measurement of DWT is not recommended as a useful diagnostic test for DO in women with OAB.

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Predictive factors for mortality and need for nephrectomy in patients with emphysematous pyelonephritis

Rakesh Kapoor, Kaliyaperumal Muruganandham, Anil Kumar Gulia, Manish Singla, Saurabh Agrawal, Anil Mandhani, M.S. Ansari and Aneesh Srivastava

Urology and Renal Transplantation, Sanjay Gandhi Post Graduate Institute, Medical Sciences, Lucknow, India

Objective: To analyse the factors predicting the mortality and need for nephrectomy in patients with emphysematous pyelonephritis (EPN).

Patients and Methods: Clinical features, laboratory variables, imaging studies, management strategy and the final outcomes were analysed in 39 consecutive patients with EPN. The mean (SD) age was 57 (7.2) years and the male to female ratio was 2:11. The baseline risk factors (clinical, laboratory and radiological) were compared among three groups; group 1, survived with renal salvage (26); group 2, survived after nephrectomy (eight); and group 3, died (five).

Results: The overall survival rate was 87% (34/39) and the kidney was salvaged in 67% (26) patients at a median follow-up of 18 months. Altered mental status, thrombocytopenia, renal failure and severe hyponatremia at presentation were significantly associated with mortality rate. There was no significant difference in final outcome based on radiological classification. Extensive renal parenchymal destruction of >50% (based on computed tomography) significantly predicted the need for nephrectomy ($P<0.001$) and death ($P=0.02$). Early (<1 week) nephrectomy resulted in a higher mortality rate (three of seven patients) than initial conservative management. There were no deaths in selected patients who received antibiotics alone or had delayed nephrectomy (four patients each). Of 24 patients who had minimally invasive treatment alone, two (8%) died. Minimally invasive treatment resulted in high renal salvage (22/24, 92%).

Conclusion: Altered mental status, thrombocytopenia, renal failure and severe hyponatremia at presentation are associated with higher mortality rates, whereas extensive renal parenchymal destruction is associated with a need for nephrectomy. Early nephrectomy is associated with higher mortality rates than is initial conservative management.

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Reducing blood loss in open radical retropubic prostatectomy with prophylactic periprostatic sutures

Gustavo F. Carvalhal, Christopher R. Griffin, Donghui Kan, Stacy Loeb* and William J. Catalona

Department of Urology, Northwestern University Feinberg School of Medicine, Chicago, IL, and *Department of Urology, James Buchanan Brady Urological Institute, Johns Hopkins, Baltimore, MD, USA

Objective: To determine whether the placement of small-calibre, rapidly absorbed prophylactic periprostatic sutures before the mobilization of the prostate could reduce blood loss during open retropubic radical prostatectomy (RRP).

Patients and Methods: In 2007, during open RRP, we began placing prophylactic haemostatic sutures of 4-0 and 3-0 plain catgut in the anterior portions of the distal neurovascular bundles (NVBs) and lateral to the proximal NVBs and prostate pedicles before initiating the nerve-sparing dissection and mobilizing the prostate gland. To evaluate whether this reduced intraoperative blood loss, we compared estimated blood loss (EBL), non-autologous transfusion rates, and postoperative haemoglobin (Hb) levels between 100 consecutive patients treated immediately before and 100 consecutive patients treated immediately after the adoption of the prophylactic periprostatic suture technique.

Results: Before the use of prophylactic haemostatic sutures, the mean intraoperative blood loss was 1285 mL, and one patient (1%) received an intraoperative non-autologous transfusion. After the adoption of prophylactic sutures, the mean EBL was 700 mL ($P<0.001$), and there were no transfusions. The mean Hb concentration the morning after RRP was 10.9 g/dL before and 11.8 g/dL after the initiation of prophylactic haemostatic sutures ($P<0.001$).

Conclusion: Prophylactic periprostatic haemostatic sutures significantly reduce intraoperative blood loss during open RRP.

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Effect of fluid management on fluid intake and urge incontinence in a trial for overactive bladder in women

Philippe Zimmern, Heather J. Litman*, Elizabeth Mueller†, Peggy Norton‡ and Patricia Goode§ for the Urinary Incontinence Treatment Network

UT Southwestern Medical Center, Dallas, TX, *New England Research Institute, Watertown, MA,

† Loyola Medical Center, Maywood, IL, ‡ University of Utah Health Sciences Center, Salt Lake City, UT, and § University of Alabama, Birmingham, AL, USA

Objectives: To explore whether instruction in fluid management resulted in changes in fluid intake and incontinence over a 10-week study period in women with urinary urge incontinence (UUI), as fluid management might be a critical strategy in treating this condition.

Patients and Methods: In the 'Behaviour Enhances Drug Reduction of Incontinence' trial, women with predominant UUI were randomized to daily treatment with tolterodine or tolterodine combined with behavioural therapies, among which were individualized instructions on fluid management. Patients in both groups received general fluid management instructions, while in the drug+behaviour arm, those with excessive urine output (>2.1 L/day) had additional individualized instruction during each of four study visits to learn behavioural strategies. Variables measured at baseline and at 10 weeks were type of incontinence, using the Medical, Epidemiological, and Social Aspects of Aging questionnaire, severity of incontinence by number of incontinence episodes based on a 7-day diary, number of voids/24 h (F24), urgency rating, 24-h fluid intake (I24) and 24-h volume voided (V24), volume average (Vavg), pad use, bothersomeness of UUI (Urogenital Distress Inventory and Overactive Bladder questionnaire), and quality of life (Incontinence Impact Questionnaire-7 and Short-Form-12).

Results: Leakage episodes/24 h, V24, I24 and average urgency ratings all significantly decreased from baseline to 10 weeks ($P<0.001$ for each). Vavg increased ($P<0.001$), as did voids/L intake ($P=0.01$). None of the changes in diary variable outcomes differed by treatment group after accounting for these changes between baseline and 10 weeks. In a

multivariable model, treatment group was not associated with change in V24 from baseline to 10 weeks ($P=0.81$), but the difference in the number of accidents/diary day, F24, I24, and average voids/day each were positively related with the change in V24 ($P<0.001$ for each). Patients had a response to fluid management instructions; the decrease in the percentage of women with a V of >2.1 L between

baseline and follow-up was statistically significant ($P=0.01$ McNemar's test).

Conclusion: General fluid instructions can contribute to the reduction in UUI symptoms for women taking anticholinergic medications, but additional individualized instructions along with other behavioural therapies did little to further improve the outcome.

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