Routine ultrasound in acute retention of urine

Mohammed H. Al-Durazi, *FRCSEd, FRCSI,* ***Hamad A. Al-Helo,*** *MBBS, AFRCS,* ***Sara M. Al-Reefi,*** *MD,*
Sara M. Al-Sanaa, *MD,* ***Waleed A. Abdulwahab,*** *MD, FRCSI.*

ABSTRACT

Objective: To evaluate the frequency of urological abnormalities in routine urinary tract ultrasonography (renal and pelvic) in patients with urinary retention secondary to benign prostatic hyperplasia.

Methods: All patients presented to Salmaniya Medical Complex, Bahrain with acute retention of urine secondary to benign prostatic hyperplasia (BPH) in the period between January 2001 and December 2001 were included. The frequency of urological abnormalities, other than BPH, was obtained.

Results: One hundred patients were enrolled with a mean age of 67 years. Forty-one patients (41%) had other urological abnormalities. Among these, 3 cases of malignancy were discovered incidentally. A case of renal cell carcinoma, which was completely excised, and 4 cases of bladder tumor, 2 were new cases and 2 were previously known cases of cancer bladder. Other urological abnormalities were renal stones (9 cases), renal cysts (9 cases), hydronephrosis (14 cases) and bladder stones (5 cases). Asymptomatic non-urological abnormalities were gallstones (3 cases), liver cirrhosis (one case) and hepatic hemangioma (one case). Renal impairment was found in 18% of all patients and 80% with hydronephrosis. Four patients had hypoechoic nodules, and all had cancer prostate.

Conclusion: Significant fraction of patients with acute urinary retention due to BPH have another pathology; although the majority are trivial and it did not influence the immediate management, some are life threatening such as renal cell carcinoma and bladder tumor. Hydronephrosis can be missed if one depends solely on renal biochemistry. Thus, routine evaluation of such patients with pelvic and renal ultrasonography is justified.

Saudi Med J 2003; Vol. 24 (4): 373-375

Benign prostatic hyperplasia (BPH) is one of the most common urological disorders affecting aging men. Patients presenting with clinical picture suggestive of benign prostatic hyperplasia may harbor other urological abnormalities. These can be directly related to their prostate for example, bladder stones or bladder diverticula, or can be just a coincident finding for example, bladder tumor. Many urologists no longer carry renal or pelvic ultrasonography for men with urinary retention secondary to BPH.[1] However, with increased accessibility to many imaging modalities, there has been a steady increase in the incidental detection of broad range of intra-abdominal pathologies including urological ones.[1,2] It generally remains a matter of conjecture as to whether or not patients with BPH presenting with urinary retention will benefit from renal and pelvic sonography. In our study, we have noted that a significant number of patients with acute urinary retention due to BPH had harbored other urological abnormalities. We sought to assess the magnitude of such phenomena and subsequently the value of routine pelvic and renal ultrasonography in assessing this sector of patients.

From the Urology Unit, Department of Surgery (Al-Durazi, Al-Helo, Abdulwahab), Salmaniya Medical Complex and the Department of Surgery (Al-Durazi, Al-Reefi, Al-Sanaa) Arabian Gulf University, *Bahrain.*

Received 30th September 2002. Accepted for publication in final form 18th January 2003.

Address correspondence and reprint request to: Dr. Mohammed H. Al-Durazi, Urology Unit, Department of Surgery, Salmaniya Medical Complex, PO Box 12, *Bahrain*. Tel. +973 255555 Ext. 7728/7406. E-mail: mddurazi@hotmail.com

Methods. A total of 100 patients were presented to the Urology Unit, Salmaniya Medical Complex, Bahrain in the period between January 2001 and December 2001 with acute urinary retention secondary to BPH. Their basic evaluation included, detailed history, physical examination including digital rectal examination, urinalysis, measurement of renal function parameters (BUN, serum creatinine and serum electrolytes), and measurement of serum prostate-specific antigen (PSA). All patients had trans-abdominal ultrasonography (upper abdomen, renal and pelvic including bladder and prostate) before undergoing transurethral resection of their prostate. The incidence of abnormalities (urological and non-urological) other than BPH was calculated.

Results. One hundred patients were included in the study. Their age range was 54-96 years with a mean of 67 years. Forty-one patients (41%) had other urological abnormalities detected incidentally. Among these, 3 patients (3%) had malignancies (2 bladder tumor and one renal cell carcinoma). Another 2 patients had bladder tumor but were known cases of cancer bladder resected several times before they come with acute retention of urine. Eighteen patients had a degree of renal impairment (defined as serum creatinine more than 140 umol/L). All patients underwent trans-urethral resection of the prostate (TURP). Patients with bladder tumor had resection of tumor (TURBT) at the same operative session but that with renal cell carcinoma had radical nephrectomy a week later. Five patients had bladder stones (one had multiple) with an average diameter of 3 cm (0.5-5.5 cm). Renal cysts were seen in 9 patients, all were trivial except for one large measured 7.5 cm in one patient. All cases of renal cysts and stones were asymptomatic. Two cases of hydronephrosis were on the left, one on the right and 4 bilateral. All were mild except for one severe hydronephrosis with hydroureter. Four patients with hydronephrosis (80%) had impaired renal function. Two patients had small right kidneys, both had normal renal function. Hypoechoic prostatic nodule was seen in 4 patients, all had high PSA level and all had carcinoma of the prostate confirmed by histological examination of the resected tissue. Six patients (6%) had non-urological conditions, gallstones (3 patients), liver cirrhosis (one patient) and hepatic hemangioma (one patient).

Discussion. Benign prostatic hyperplasia is one of the most common urological conditions to affect male beyond middle age. Patients often present with lower urinary tract symptoms (LUTS). This may be superimposed by acute urinary retention (AUR). Although uncommon, prolonged outflow obstruction can result in bladder stone formation, deterioration in the renal function and formation of bladder diverticula. Differential diagnosis of LUTS in the aging male population includes both urological and non-urological causes.[3] Bladder tumor, urinary tract infection, cerebrovascular accidents, diabetes mellitus, and others can cause LUTS identical to BPH. Patients presenting with acute urinary retention secondary to BPH can harbor another abnormality that may be overlooked. After review of the literature, it appears that routine imaging of the upper urinary tract for patients with urinary retention secondary to BPH is not warranted.[4-7] Many advocate using imaging tests in patients with BPH and either hematuria, laboratory evidence of renal insufficiency (elevated BUN or creatinine), or a history of urinary tract infection, urolithiasis, previous urinary tract surgery, or congenital or acquired renal disease.[2,6] Preoperative urography (IVP) used to be performed routinely as a preoperative assessment before prostatectomy.[6] Many studies have considered the value of such approach in this clinical setting.[7] The main arguments against routine IVP relate to cost, radiation exposure and the small but real risk of contrast medium reactions. The use of ultrasound (US) of the upper or lower urinary tract has been suggested as an alternative to IVP.[7] Villis et al[5] tested to value of IVP for patients with acute retention of urine before prostatectomy. Thirty-eight (19.7%) urological abnormalities were noted in 180 urograms performed. In many previous reports, a major justification quoted for the routine use of the IVP in patients with bladder outflow obstruction was the search for asymptomatic upper tract abnormalities, particularly "renal cancers" (renal carcinoma and upper tract transitional cell carcinoma).[7] Matthews et al[8] suggested that ultrasonography gave as much useful information on the upper tracts as IVP. One case of renal cell carcinoma was found among the 100 cases involved in our study (1%). It was confined to the kidney and was excised completely. This would have been neglected until it was incidentally detected in US. Bundrick and Katz,[9] in a similar prospective study, found 2 renal carcinomas and one transitional cell carcinoma, among 180 patients screened, citing this unusually high yield of occult cancers to support their augment in favor of routine urography for all patients with symptoms of bladder-outlet obstruction. In 1988, Brooks[7] stated, from a review of 17 series, that the incidence of asymptomatic RCC in men investigated for prostatism with IVP was 0.4% (17 out of 4466), a very low value. He also offered the counter-argument that this incidental finding would be of crucial importance as RCC discovered incidentally tends to be less advanced than symptomatic tumors, and gives rise to the expectation of longer survival. Several recent epidemiological and population-based studies report the incidence of incidentally detected RCC as 15-61% of all cases of RCC.[1] Many proved that incidentally discovered RCC have lower clinicopathological stage and statistically significant survival advantage.[1,10] This suggests that opportunities, which arise from appropriate screening of the upper tracts during routine urological interventions, should be endorsed.[1] Undoubtedly it is important to detect upper tract dilatation in patients with BPH so that surgery can be advised before renal damage

occurs. Thus, there is a good argument to provide renal ultrasonography to assess for hydronephrosis in patients with LUTS or patients with acute retention. Patients with retention of urine and hydronephrosis should not be offered a voiding trial. Hydronephrosis occurs long before the biochemical derangement of renal parameters is apparent.[11] In this study, 20% of patients with hydronephrosis had normal renal parameters. Though cystoscopy is the most reliable method of excluding bladder pathology,[8] bladder tumors can be overlooked unless careful cystoscopic evaluation of the bladder is carried out at time of TURP. Matthews et al[8] reported 3 patients with bladder tumor discovered incidentally. Since all had hematuria and only one was discovered by ultrasonography, he stated that US would seem to be unreliable method of diagnosing bladder tumor. In our series, 4 cases of bladder tumor were accurately detected by US. This high yield can be attributed to the better resolution of today's ultrasonic machines. The argument that hematuria can be a guide for bladder tumor (or renal tumor) is invalid in patients with acute retention of urine. Urine retained after insertion of catheter is unreliable for hematuria. Ultrasound is also a reliable way of assessing wall thickness and residual urine in patients with BPH, signs of severity of the long-standing bladder out-flow obstruction.[8] Indeed ultrasonography of the bladder is now commonly used in urology department for assessing LUTS. Moreover, the detection of bladder tumor may alter the type of anesthesia and the surgical approach. Renal cysts and renal stones, which were most of the remaining abnormalities shown in ultrasonography, did not call for any special alteration in the treatment. Certainly, all were addressed in a later stage. Ultrasound can accurately differentiate between a renal tumor and a cyst, a major limitation of IVP.[1] The incidence of diverticula is generally 2.2% in patients with BPH and retention.[5] Some of the diverticula may be large to warrant surgery. Though, most would have been found at preliminary cystoscopy, the surgeon might need to change his surgical approach or do preoperative cystography. The detection of bladder calculi may influence the surgical technique. Many will only need cystolithotripsy with TURP, but some larger stones might need an open approach. Non-urological findings were found in 5 patients when the radiologist was interested to expand his area of examination, all were asymptomatic. In our study, 41% of those with acute urinary retention secondary to BPH had another unexpected pathology. Certainly, that is an over estimate as trivial conditions such as simple renal cysts and small renal stones were also included. However, 5 patients (5%) had malignancy unrelated to their prostate. Talner attributed the high prevalence of renal cell carcinoma in the prostatism group to a defect in the study design.[4] He stated that all reported series suffered from selection bias, when urologists who found one or more occult cancers were more likely to report series that those who did not, and that when to begin and end a series is arbitrary. Our study didn't suffer that bias as the period of one year was set a head. Though number of patients in the study is small, a significant fraction of them harbored a potentially life-threatening pathology. We think that evaluating a patient with BPH presenting with urinary retention is a good opportunity to assess him for such abnormalities. In addition, this imaging modality is noninvasive, quick, cost-efficient and devoid of the harmful reaction to the contrast media of the urogram. We think that routine ultrasonic evaluation of bladder and kidneys is warranted. However, data from larger series is needed to formulate a policy regarding such approach.

References

1. Masood J, Lane T, Koye B, Vandal MT, Barua JM, Hill JT. Renal cell carcinoma: incidental detection during routine ultrasonography in men presenting with lower urinary tract symptoms. ***BJU Int*** 2001; 88: 671-764.
2. Grossfeld GD, Coakley FV. Benign prostatic hyperplasia: clinical overview and value of diagnostic imaging. ***Radiol Clin North Am*** 2000; 38: 31-47.
3. Kirby RS, McConnell JD. Fast Facts-Benign Prostatic Hyperplasia. 3rd ed. England (UK): Health Press Limited; 1999. p. 20.
4. Talner LB. Routine Urography in Men with Prostatism. ***AJR*** 1986; 147: 960-961.
5. Villis M, Manmeet S, Blandy JP. Is Urography Necessary for Patients with Acute Retention of Urine Before Prostatectomy? ***Br J Urol*** 1974; 46: 73-76.
6. O'Rielly PH. Assessment Before prostatectomy. ***Br Med J*** 1987; 294: 1370-1371.
7. Brooks P. Prostatism, intravenous urography and asymptomatic renal cancer. ***Br J Urol*** 1988; 62: 1-3.
8. Matthews PN, Quayle JB, Joseph AEA, Williams JE, Wilkinson KW, Riddle PR. The use of ultrasound in the investigation of prostatism. ***Br J Urol*** 1982; 54: 536-538.
9. Bundrick TJ, Katz PG. Excretory urography in patients with prostatism. ***AJR*** 1986; 147: 957-959.
10. Siow WY, Yip SK, Ng LG, Tan PH, Cheng WS, Foo KT. Renal cell carcinoma: incidental detection and pathological staging. ***J R Coll Surg Edinb*** 2000; 45: 291-295.
11. Dalla-Palma L, Bazzocchi M, Pozzi-Mucelli RS, Stacul F, Rossi M, Agostini R. Ultrasonography in the diagnosis of hydronephrosis in patients with normal renal function. ***Urol Radiol*** 1983; 5: 221-226.