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(CASE REPORT)

# Bilateral ureteral obstruction caused by a detrusor wall thickness: Case report and review of literature

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## Abstract

Benign prostatic enlargement is a common condition in elderly men, caused by a histopathologic disease called benign prostatic hyperplasia. we report a case of a 76-year-old male with a benign prostatic hyperplasia who presented kidney injury due to bilateral hydronephrosis and no amelioration after bladder catheterization. An abdominopelvic computed tomography scan was performed showing bilateral moderate ureterohydronephrosis up to the level of the ureteral orifices within a diffuse thickening of the bladder wall and the endoscopic examination showed trigonal prominence, displacing and deforming the ureteral orifice. Three-months period of ureteral stenting with transurethral resection of prostate leads to significant improvement in renal function. This case underscores the importance of considering detrusor wall thickness as a potential cause of obstructive renal insufficiency, especially in elderly males presenting with chronic retention.

**Keywords:** Detrusor wall thickness; Bilateral ureteral obstruction; Bilateral Hydronephrosis; Detrusor hypertrophy; Prostatic hyperplasia

## 1. Introduction

Benign prostatic enlargement is a common condition in elderly men, caused by a histopathologic disease called benign prostatic hyperplasia (BPH), which can lead to lower urinary tract symptoms (LUTS) [1]. Some patients suffering from benign prostatic obstruction, may be hesitant to undergo medical or surgical treatment until acute or chronic urinary retention occurs [1]. Some of them have been found to have hydronephrosis with renal insufficiency. Bilateral obstruction of the ureterovesical junction may, rarely, be caused by a severe bladder hypertrophy and compromise renal function. We present a rare case of a 76-year-old male with a BPH who presented bilateral ureterohydronephrosis and renal insufficiency without improvement after bladder catheterization, due to detrusor wall thickness.

## 2. Case presentation

A 76-year-old male has consulted in emergency for acute urinary retention, bilateral renal colic and vomiting. This patient's medical history included a 4-year history of mild LUTS without urinary infections, in treatment with tamsulosin 400 ug and no tobacco use. he was followed by his general practitioner and his creatinine was 0.84 mg/dL; Serum prostatic specific antigen level was 3.9 ng/mL six months prior to the hospital admission. The patient was afebrile and moderate bilateral flank tenderness associated with a tender palpable bladder was found on abdominal examination. On digital examination, the prostate was grossly enlarged with no palpable nodules.

The rest of the clinical assessment including neurological assessment was unremarkable. Laboratory studies showed a blood urea nitrogen of 139 mg/dL and serum creatinine of 18.6 mg/dL; sodium, 131 meq/l; potassium, 5.1 meq/l; Urine

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culture showed no growth and others biological exams were normal. Bladder catheterization was performed. The ultrasound performed showed an enlarged prostate of 78gr volume, A 13mm regular bladder wall thickness hypertrophy, post void residue of 580ml and normal size kidneys with bilateral hydronephrosis (Fig 1). the patient's clinical condition worsened, urine output was approximately 200 mL in 24 h despite intravenous fluids use.

Therefore, we suspected persistent ureteral obstruction (intrinsic or extrinsic), an abdominopelvic computed tomography (CT) scan was performed showing stable bilateral moderate ureterohydronephrosis up to the level of the ureteral orifices within a diffuse thickening of the bladder wall (Fig 2).

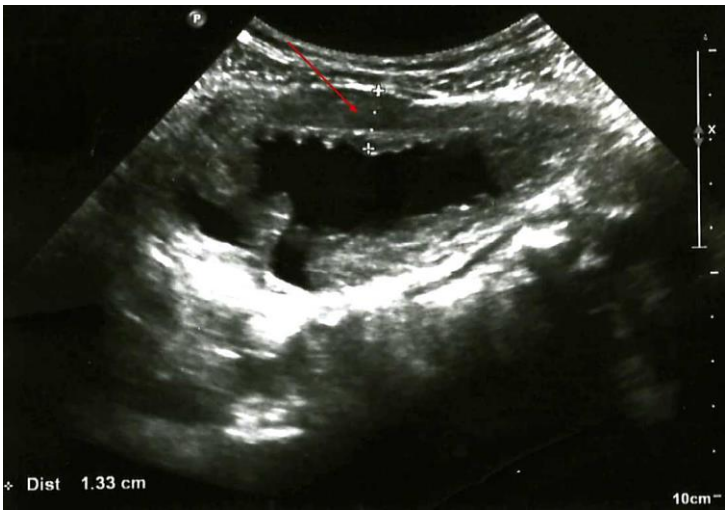


**Figure 1** Bladder ultrasound in axial view showing a regular bladder wall thickening (red arrow).

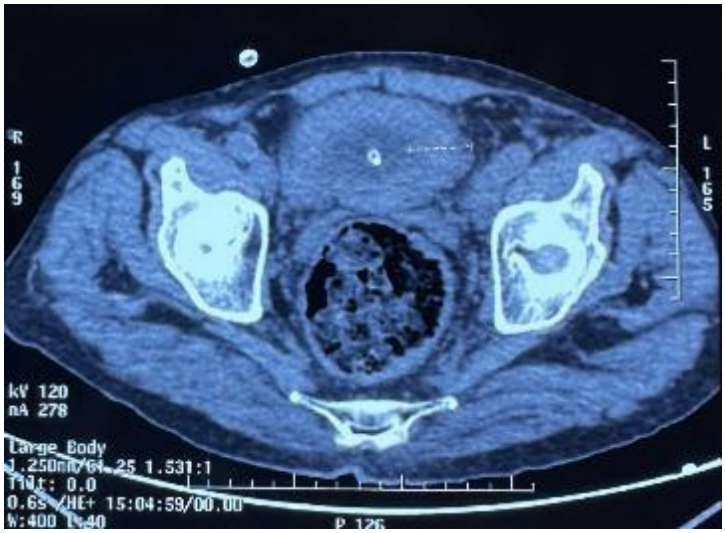


**Figure 2** Axial caudal pelvic CT scan showing a diffuse thickening of urinary bladder wall.

The retrograde pyelogram and endoscopic examination showed evidence of a ‘‘fish-hook’’ configuration of the distal ureter as well as a prostate median lobe elevating the trigone and the bladder base, displacing and deforming the ureteral orifice (figure 3,4).

It was decided to attempt a three-months period of ureteral stenting for him. Brisk urine output was noticed after bilateral JJ stents were placed, the patient’s symptoms had rapidly resolved and renal function improved with a decrease in creatinine level to baseline within 2 days. He underwent transurethral resection of prostate, post-operative period was uneventful and he had comfortable urination. A pathologic examination revealed benign prostatic gland hyperplasia without evidence of malignancy. At the 3-months post-operative outpatient control, JJ stent was removed. After more than 1 year of follow-up, the patient has not presented hydronephrosis or renal insufficiency.

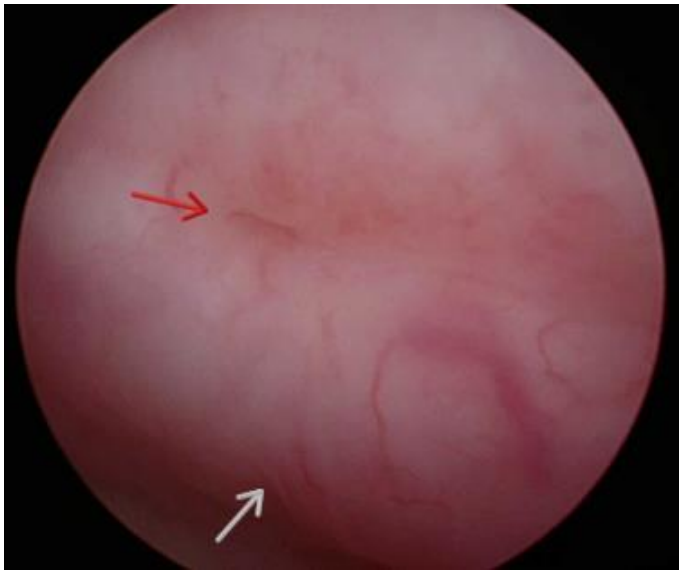

**Figure 3** Cystoscopy view of the trigonal prominence (white arrow) deforming the right ureteral orifice (red arrow).

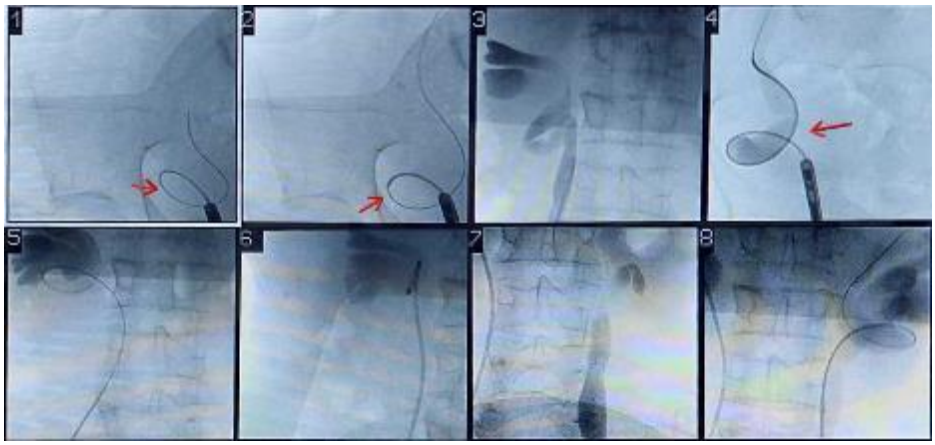

**Figure 4** Retrograde pyelogram showing evidence of a ‘‘fish-hook’’ configuration of the distal right ureter (red arrow).

## 3. Discussion

Benign prostatic enlargement is a common condition in elderly men, caused by a histopathologic disease called BPH, which usually develops after the fourth decade of life. It can lead to LUTS or complications such as urinary retention, hydronephrosis, urinary tract infections, bladder stones, bladder diverticula, vesicoureteral reflux, renal insufficiency or hematuria. In the elderly male, the most common cause of urinary retention is BPH [1].

Earlier studies have associated cases of hydronephrosis with bladder outlet obstruction (BOO) and vesicoureteral reflux resulting from prostate enlargement in benign prostatic hyperplasia [2]. Nevertheless, in our case, the detrusor wall thickness was the cause of compression of the ureterovesical junction, as a result of chronic urinary tract obstruction from BPH.

The ureterovesical junction (UVJ) has an important physiologic effect as it enables the unidirectional flow of urine and allows the bladder to receive urine boluses at low pressures. Structurally, UVJ is the narrowest part of the ureter and starts where the ureter meets the bladder wall and penetrates through the detrusor muscle [2]. The ureter continues its course beneath the bladder mucosa for a distance of 1.5 to 2 cm backed by a strong plate of bladder muscle before reaching its endpoint at the ureteral orifice [2].

Two acquired pathophysiologic mechanisms have been proposed regarding UVJ dysfunction in patients with BPH [2]:

- Most commonly, functional obstruction of the UVJ due to increase of ureteral resistance through the ureteral tunnel when there is bladder overdistension (urinary retention) because of poor bladder contractility or increased outlet resistance.
- The second mechanism is that severe bladder muscle hypertrophy induced anatomic obstruction of the UVJ associated with chronic obstruction.

Detrusor wall thickness is known to increase with age even in asymptomatic persons, a detrusor hypertrophy has been associated with LUTS and BOO, and the degree of thickness seems to depend on the severity of obstruction [2].

Imaging studies are an excellent diagnostic tool, the CT scan is the best imaging modality for the etiological diagnosis [3]. Nevertheless, bladder thickening and bilateral ureterohydronephrosis can mimic features seen in vesical carcinoma [2,3]. Cystoscopy enables visualization of the macroscopic appearance of normal mucosa without suspicious bladder lesions, and the diagnostic of an anatomic obstruction [2].

Acute kidney injury (AKI) caused by a detrusor wall thickness is a rare complication of prostatic hyperplasia with few reported cases [2]. As a result, there is no consensus on the optimal approach. Increased urine production is an early indicator of renal improvement in patients with oliguric AKI. Typically, this increase is a physiological response and tends to be self-limiting within the initial 24 hours after obstruction relief. During this period, the kidneys attempt to regulate the body's internal environment through fluid and electrolyte balance before reverting to the normal condition of urine production [3]. This entails close monitoring of urinary output during the first 24 hours. As outlet obstruction isn't the only factor contributing to AKI in these situations, simply bypassing the infravesical obstruction with a Foley catheter won't completely relieve the upper tract obstruction and correct the uropathy.

Riyach et al. [4] reported a rare similar case of bilateral ureteral obstruction due to a benign prostatic hypertrophy bladder in a 65-year-old male; they suggested that ureterohydronephrosis was secondary to distal ureter obstruction, thereby causing AKI, bilateral JJ stent insertion for three months with transurethral resection of the prostate leads to comfortable urination and recovery of renal function.

Ureteral stents or percutaneous nephrostomy placement are essential to ensure a free urine flow [2,3]. In our case, the placement of JJ stents allowed recovery of normal urine output and normalization of renal function, thus confirming the presence of an anatomical obstruction at the ureterovesical junction.

## 4. Conclusion

Detrusor wall thickness is a rare condition that affects the bladder wall and can cause an obstructive urinary syndrome. This case reminds clinicians to keep a high index of suspicion in case of worsening kidney function or oliguria following bladder drainage for urinary retention, a possible presence of anatomic UVJ obstruction caused by detrusor wall thickness. Currently, there is no consensus or well-established guidelines regarding appropriate type of drainage of upper tract nor the time required. Timely diagnosis and appropriate management, including JJ stent placement with surgical treatment of benign prostatic obstruction, can leads to significant improvement in renal function.

## Compliance with ethical standards

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### *Disclosure of Conflict of interest*

There is no conflict of interest to declare.

### *Statement of informed consent*

Written informed consent was obtained from the patient for reporting this case and its associated images. The consent is available for review on request.

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