



Research Article

URODYNAMIC EVALUATION OF DIABETIC PATIENTS PRESENTING WITH VOIDING DYSFUNCTION

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ABSTRACT

Introduction: Diabetic bladder dysfunction is one of the most bothersome and common complications of diabetes mellitus. The exact incidence in diabetic patients is uncertain, as unselected patients generally are asymptomatic. If investigated, up to 50% may report symptoms of voiding dysfunction. This study demonstrates the importance of urodynamic studies in evaluating voiding dysfunction in diabetics before initiation of therapy and to study the relationship between diabetic voiding dysfunction and vesico sphincteric behaviour with the aid of urodynamics

Materials And Methods: Diabetic patients presenting with voiding dysfunction to the Department of Urology in Govt. Kilpauk Medical College Hospital and Govt. Royapettah Hospital from February 2014 to february 2015 . A total of 64 diabetic patients with various voiding problems were evaluated.

Results: Among 64 patients, 51 patients were found to have positive outcomes. Thus 79.6 % patients had atleast one of the urodynamic diagnoses. Most common age group were 60-69 years. Majority of patients had voiding LUTS (35) followed by storage LUTS(29). Duration of diabetes was not statistically significant. By statistical analysis there was no correlation of age & gender with bladder contractility index.but there was a strong correlation between patient complaints and bladder contractility indexAlso there was strong correlation between duration of diabetes and BCI.

Conclusion: Since there is a plethora of urodynamic outcomes in diabetic patients irrespective of the symptoms, urodynamics plays a valuable role in management of these patients. The practice of urodynamics before treatment in these patients can avoid unnecessary surgeries and treatment failures.

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INTRODUCTION

Diabetic bladder dysfunction is one of the most bothersome and common complications of diabetes mellitus. Studies say that up to 40% of diabetics will have some type of voiding dysfunction. The bladder dysfunction specifically associated with diabetes mellitus is called diabetic cystopathy, a term coined by Frimodt-Moller. It is defined as a disturbance in the function of the urinary bladder in diabetic patients characterized by loss of sensation and increase in bladder capacity without signs of mechanical outlet obstruction. The exact incidence in diabetic patients is uncertain, as unselected patients generally are asymptomatic. If investigated, up to 50% may report symptoms of voiding dysfunction.

DCP initially selectively damages the autonomic afferent nerves, leaving motor function intact but producing impairment of the sensation of bladder fullness. Chronically elevated blood sugars are associated with loss of unmyelinated and myelinated fibres, blunted nerve fiber reproduction wallerian degeneration.

Studies say that early changes in bladder function are due to functional adaptation to bladder over distension and/or an increase in bladder work due by polyuria caused by hyperglycemia. The nerve growth factor NGF also has a role in DCP due to its effect on the afferent dorsal root ganglion.

Diabetic bladder dysfunction includes storage problems such as urge incontinence and overactive bladder, voiding problems like poor emptying or overflow incontinence or poor emptying and other less clinically defined entities such as increased capacity and decreased sensation. The diverse symptoms include bladder overactivity, underactivity, and acontractile bladder. It's prevalence among diabetic individuals has been estimated as being between 43% and 87%.

Diabetic bladder dysfunction coexistent with BOO can present with diagnostic dilemmas as to the cause of symptoms. By clinical examination & urodynamic study, the cause could be ascertained, thus avoiding unnecessary surgeries. This study demonstrates the importance of urodynamic studies in evaluating voiding dysfunction in diabetics before initiation of therapy and to study the relationship between diabetic

voiding dysfunction and vesico sphincteric behaviour with the aid of urodynamics

MATERIALS AND METHODS

Diabetic patients presenting with voiding dysfunction to the Department of Urology in Govt. Kilpauk Medical College Hospital and Govt. Royapettah Hospital from February 2014 to february 2015 . A total of 64 diabetic patients with various voiding problems were evaluated according to history, clinical examination and investigations especially full urodynamic assessment.

The various urodynamic parameters like mean bladder capacity, mean first sensation of filling, the incidence of detrusor hyperreflexia, detrusor areflexia, impaired detrusor contractility were studied. The relationship between diabetic voiding dysfunction and vesicosphincteric behaviour was studied. Diabetic patients with voiding dysfunction and with long history of diabetes were Included. Newly diagnosed diabetes mellitus, Coexistent bladder growth .Coexistent bladder calculus, Coexistent spinal cord injury were excluded.

Procedure

Our study population included 64 consecutive diabetic patients with voiding dysfunction. After obtaining informed, all patients were subjected to detailed history, physical examination and basic investigations. All details were recorded as per the proforma (ANNEXURE). After treating any urinary tract infection if present, all patients were subjected to Urodynamic evaluation at Rajiv Gandhi Government General Hospital using Aymed UDE Locum Wireless System v. 0.2.34 machine. Laxative was given on night before study. Prior to catheterization and initiation of UDE, patient is asked to void. The UDE machine is primed every time before using it. We used a single urinary catheter of size 6 Fr, which had two channels, one for the p ves and the other for bladder filling. The catheter is fixed after insertion. A lubricated rectal catheter 6 F was introduced such that the tip is at 10 cm to 15 cm above the anal verge. Filling cystometry was done at a rate of 25-40 ml. per minute using normal saline at room temperature with the patient reclining. Voiding is was done in the sitting position once capacity was achieved.

During bladder filling, bladder sensation (first sensation of filling, normal desire to void, strong desire to void, urgency or pain) detrusor activity, bladder compliance, bladder capacity and leak point pressure are assessed. During voiding, the voided volume, maximum flow rate (Q max), the average flow rate, the maximum p det(max pdet), the p det on maximum flow are recorded. Analysis of the above parameters are done. The Student t test was used to compare the irritative and obstructive LUTS groups, and the Chi square test is used to analyse the urodynamic parameters. p-values < 0.05 were considered statistically significant. The various urodynamic curves included poor compliance, detrusor overactivity, detrusor underactivity, detrusor hyperreflexia with impaired contractility, acontractile large capacity bladder.

OBSERVATION AND RESULTS

64 diabetic patients with voiding dysfunction were evaluated. Among 64 patients, 51 patients were found to have positive outcomes. Thus 79.6 % patients had atleast one of the

urodynamic diagnoses. This high rate of positive outcome shows us the importance of urodynamic evaluation in diabetic patients before initiation of therapy. Most common age group were 60- 69 years. But age was not statistically significant ($p>0.05$). In our study, males aret the predominant population. Sex distribution was not statistically significant($p>0.05$). Majority of patients had voiding LUTS (35) followed by storage LUTS(29). Duration of diabetes in majority of patients was 10 – 20 years but duration was not statistically significant. 26% of patients had large capacity and18% had delayed sensation.

Detrusor pressures were elevated in 20% of patients. Majority had good compliance. 46% of patients had preserved bladder contractility, 42% had weak contractile bladder, 10% of those who had elevated BCI had outlet obstruction in the form of prostate/DUS. 31 patients had significant residual urine of which 27 had weak contractility, 4 had bladder outlet obstruction. By statistical analysis there was no correlation of age & gender with bladder contractility index.but there was a strong correlation between patient complaints and bladder contractility index (pvalue= 0.0001). Also there was strong correlation between duration of diabetes and BCI (pvalue=0.0231). There was no correlation between bladder capacity and bladder contractility index. By statistical analysis there was a bladder contractility index.

DISCUSSION

Sixty four diabetic patients who presented with voiding dysfunction were studied with the aid of urodynamics. Following are the results The most common age group affected ranges from 60-69 years with a median of 63 years. The rate of diabetic dysfunction in patients aged > 50 years is 95.31% The majority were males (70%) and (30%) were females [1]. Among the males, 80% and among females, 81% were affected Neither the age nor the sex was found having significant impact on the urodynamic group patterns[2]. Majority of our patients had voiding LUTS (43.75%) followed by storage LUTS (40.63%). Only 10.9% presented with retention which used to be most common manifestation Earlier[3]. This shows the increased awareness among the public to seek medical attention. Majority of the patients were in the 10-20years duration group with a median of 16 years[17]. By statistical analysis, duration of DM does not influence the outcome except bladder contractility index In our study group, delayed sensation was found only in 18.75% of the patients[4]. The sensation was preserved in the rest. About 66% of patients had normal bladder capacity, with only 26% with large capacity bladder[5]. The older concept of classical diabetic cystopathy (delayed sensation and large capacity bladder) is not the most common finding in our study. Poor compliance is found 20.3% of the patients[6]. According to bladder contractility index, 42% had weak force and normal force in 48% Among 65 patients, 31(42%) patients had significant residual urine[18]. However among them, only 27 patients had positive urodynamic finding[19]. Although (80%) of the studied group were found having abnormal urodynamic pattern, only (6%) of them were having pureclassical areflexia, while the commonest group is detrusor underactivity (40%). Among the underactive detrusor group, 34% had an associated overactive component which is called detrusor hyperreflexia with impaired contractility. Out of the 65 patients, 14% patients had DHIC[7]. Among the patients who presented with obstructive luts, 59% had positive

urodynamic finding[8]. All cases of retention had detrusor acontractility component. Almost all patients with irritative luts had detrusor overactive component of which five (19%) had detrusor underactivity as well which greatly alters the mode of management [9]. DHIC has varied presentations-storage, voiding dysfunction, retention & incontinence, eventhough the majority had storage dysfunction[10].

Comparing symptoms vs bladder contractility index, there is a strong correlation. Peak flow rate. Residual urine strongly correlate with bladder contractility index[11]. In histological study of the autonomic nerve fibers of the urinary bladder wall, the most marked alterations occurred found in subjects with poorly controlled diabetes (Lena *et al*) however, Mathew *et al* believe that duration and severity of diabetes is not associated with bladder dysfunction[12]. All the urodynamic abnormal patterns can present with retention as seen in our work, and by this concept the hyperreflexic group represent a dilemma in diagnosis due to the intermingle effect of BOO in elderly male population with prostatic enlargement[13]. By analysing our overactive males presenting with voiding dysfunction, we found that in at least three of them, their abnormal pattern was not related to prostatic obstruction as cleared from their neurological exam, urodynamic evaluation, and cystoscopy[14]. It has been documented that detrusor overactivity is a manifestation of diabetic patients. However, it is uncertain whether diabetes per se induces detrusor overactivity since other concomitant conditions, including suprasacral neurological lesion or BPH possibly cause the same condition. Recent study by Hong-Jeng *et al*, they found urethral outlet (smooth and striated muscle dysfunctions) during reflex bladder contractions in diabetic induced rats[15]. This study may help to explain the mechanism of detrusor hyperreflexia in diabetic patients[16]. We found that 8 out of the 15 male patients in the overactive, underactive, and acontractile groups whom ages were 60 years old with prostate more than 30 ml in size, will remain having retention or very poor evacuation of bladder after prostatectomy as predicted by full neurological exam, urodynamic evaluation, and cystoscopy done preoperatively thus their prostate was not the important cause of their retention[20]. Stressing on the role of urodynamic studies in preventing unnecessary prostatectomies in diabetic males.

CONCLUSION

The urodynamic study suggest that the classical diabetic cystopathy is not the only common urodynamic finding in patients with diabetes mellitus. In our work the presented urodynamic pattern were

1. detrusor underactivity-28.13%
2. detrusor overactivity-20.31%
3. detrusor acontractility-6.25%
4. DHIC-14.06%

and still some had normal urodynamic pattern. Age, sex, duration of diabetes had no correlation to outcome. Since there is a plethora of urodynamic outcomes in diabetic patients irrespective of the symptoms, urodynamics plays a valuable role in management of these patients. The practice of urodynamics before treatment in these patients can avoid unnecessary surgeries and treatment failures.

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