

## THE ROLE OF URODYNAMICS STUDY IN PREDICTION OF SHORT TERM OUTCOME OF PROSTATECTOMY IN PATIENTS WITH CHRONIC URINARY RETENTION

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### ABSTRACT:

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**Background:** Urodynamics study is the proper method to evaluate the degree of bladder outlet obstruction (BOO) and the status of detrusor contractility during voiding. Both BOO and DU cause a decreased urinary flow rate and increased post void residual urine volume (PVR).

Recent studies show diverse recommendations about the value of preoperative UDS in patients with chronic urinary retention.

**Aim of the work:** Identify preoperative UDS criteria upon which we can properly expect the short term postoperative outcome after prostatectomy in patients with chronic urinary retention.

**Patients and methods:** Sample of 30 patients were included in our study diagnosed with benign prostatic enlargement (BPE) and complicated with chronic urinary retention (CUR). They underwent evaluation by preoperative UDS and post prostatectomy PVR and uroflowmetry.

**Results:** When correlating preoperative UDS with postoperative PVR, the presence of normal bladder sensation and evidence of obstruction according to URA nomogram were an indicator of postoperative significant reduction in PVR.

Also, correlating preoperative UDS with postoperative maximum flow rate, the presence of normal bladder sensation was an indicator of postoperative significant rise in Q-max.

**Conclusion:** Normal bladder sensitivity and obstructed patients according to Abrams - Griffiths (AG) and the Schäfer pressure/flow (LinPURR) nomograms are strong predictors of operative success in patients with chronic urinary retention. Thus, urodynamic evaluation should be systematically indicated for patients with chronic retention and BPE when considering surgical treatment.

**Keywords:** Chronic urinary retention, urodynamics study, post void residual urine, maximum flow rate.

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### INTRODUCTION:

Benign prostatic enlargement or BPE is a common condition to the extent that about 20% of the men have some degree of hyperplasia by the fifth decade of life which increases to almost 90 % by the eighth

decade. At the age of 55, approximately 25% of men report obstructive voiding symptoms. At the age of 75, 50 % of men complain of decreased force and calibre of their urinary stream<sup>(1)</sup>.

The International Continence Society (ICS) defined chronic urinary retention (CUR) as a non-painful bladder that remains palpable after voiding. <sup>(2)</sup>

CUR is suggested when patient retains a substantial amount of urine in the bladder after each voiding, persistent residual volumes of >300 ml after voiding. And other subjective data as patient description of low volume micturition, increased frequency, difficult initiating and maintaining micturition and nocturnal incontinence. <sup>(3)</sup>

In research settings, CUR is defined as a persistent inability to completely evacuate the bladder despite maintaining the ability to urinate, which results in elevated post void residual urine volumes (PVR). Standard PVR volume necessary to diagnose CUR is still controversial<sup>(4)</sup>.

Basic assessment of the lower urinary tract symptoms (LUTS) does not determine whether voiding LUTS is due to bladder outlet obstruction (BOO) or detrusor underactivity (DU), UDS is the method of choice to evaluate the degree of BOO and the status of detrusor contractility during voiding, however it's controversial whether prostatectomy should be avoided in patients without BOO or those with DU.<sup>(5)</sup>

So we closely followed up our patients during pre and postoperative periods aiming to offer a guide upon which urologists can follow or researchers can proceed from that point and on for the good of the patients.

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### **AIM OF THE WORK:**

Identifying preoperative UDS criteria upon which we can properly expect the short term postoperative outcome after prostatectomy in patients with chronic urinary retention.

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### **PATIENTS AND METHODS:**

This is a cross-sectional study that was conducted at the Demerdash university hospital from October 2014 till November

2015. It started after approval of the research ethics committee, Faculty of Medicine, Ain Shams University. Informed consent was taken from all participants. Data confidentiality was maintained.

Our study included a sample of 30 patients who were previously diagnosed with BPE and complicated with chronic urinary retention.

Inclusion and exclusion criteria were as follows: **Inclusion criteria** patients with (age of 50 years or more, persistent PVRU > 300 ml) while, **Exclusion criteria** patients with (previous prostate surgery, prostate cancer and current urinary tract infection).

### **Study Procedure:**

Preoperative full UDS was done then all patients had Prostatectomy and afterwards postoperative symptoms assessment, uroflowmetry, PVRU were done.

### **Preoperative assessment:**

It included patient history (Age, duration of the complaint, recurrent attacks of acute urinary retention (AUR), presence of chronic indwelling catheters, DM), Symptoms were assessed via: international prostatic symptoms score (IPSS) and quality of life index (QOLI), also Imaging assessment was done in the form of pelvic ultrasonography to measure prostate size and estimation of PVR. Nevertheless, maximum flow rate was recorded and Urodynamic evaluation was performed using laborite delphis KT equipment using 6Fr double lumen catheter, one channel is used for filling, and pressure was recorded through the other.

BOO diagnosis was based on pressure/flow (P/F) study. Patients with a Q-max < 12 ml/s associated with Schäfer's nomogram level  $\geq 2$  were classified as obstructed.

### **Surgical intervention:**

Prostatectomy was done using any of the following techniques, TURP, laser prostatectomy or transvesical prostatectomy.

**Postoperative one month follow up:**

we considered these items as parameters to judge success, postoperative PVR<100 ml and Q-max> 15 ml/sec. and classified our patients into two groups, (success and failure group), and this pattern was applied to the pre-mentioned parameters and to the overall success.

**Statistical Methods:**

Collected data were regularly submitted in an excel sheet for final statistical analysis. Data management and statistical analysis were done using SPSS vs.25 (IBM, Armonk, New York, United states). Numerical data was summarized as means and standard deviations or medians and ranges. Categorical data was summarized as numbers and percentages. The statistical analysis was first descriptive then data analysis based on the evaluation of qualitative variables using Pearson Chi-square test, while the independent T-test was used to compare and correlate our variables to either success or failure. A significance level of p of less than 0.05 was used.

64.97 ± 6.85, with PVR ranged from 300 to 614 with mean 357.79 and SD 68.05, their maximum flow rate ranged from 0 (patient was in AUR on top of CUR) to 6 ml/sec with mean of 3.

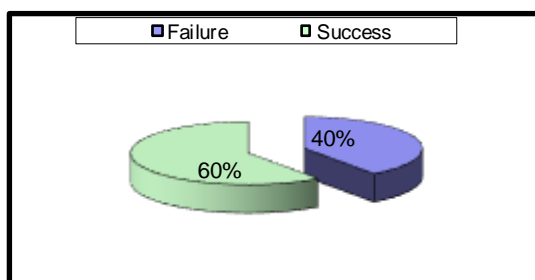
They had preoperative full UDS with the given results, sensation was normal in 16 patients, increased in 4 patients& diminished in 10 patients, with percentage of 53.3%, 13.3%& 33.3% respectively. capacity was average in 12 patients and reduced in 18 patients, with percentage of 40% and 60%, DO was observed in 12 patients representing 40% of the cases, compliance was good in 14 patients and poor in 16 patients, (46.7% and 53.3% respectively), Detrusor contractility was normal in 8 patients and weak in 22 patients (26.7%& 73.3% respectively), URA nomogram was obstructed in 14 patients and unfortunately was not assessed in the rest of the patients with percentage of 87.5% obstructed, LinPURR nomogram was obstructed in 12 patients and equivocal in 4 patients and unfortunately was not assessed in 14 patients with percentage of 75% obstructed and 25% equivocal.

**RESULTS:**

All thirty male patients among age group ranged from 54-78 years old with mean of

(1) Correlation of the preoperative UDS with postoperative PVR results

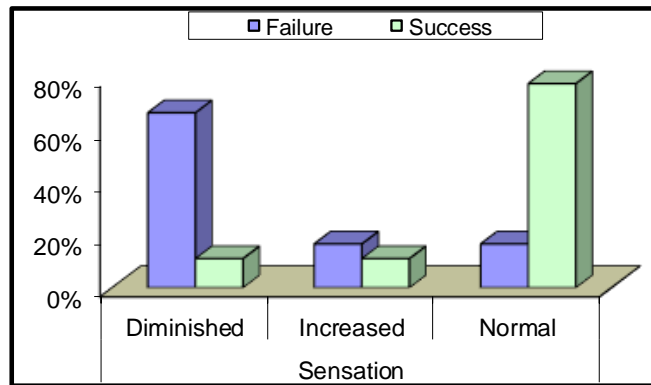
(Either PVR is less than 100 ml indicating success or more indicating failure)



(Diagram 1) Success and failure according to post-operative PVR

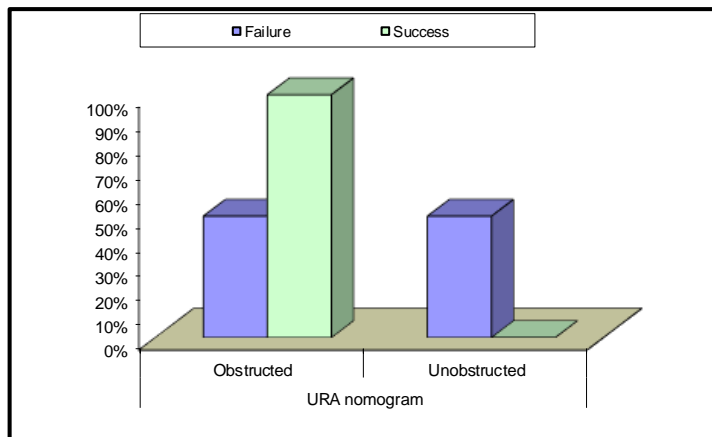
Among the success group 77.8% of the patients showed normal sensation, 11.1% showed diminished sensation and about 11.1% showed increased sensation, meanwhile the failure group showed about

16.7% with normal sensation, 66.7% with diminished sensation and 16.7% with increased sensation, showing significant relationship.



(Diagram 2) correlation between preoperative sensation and postoperative outcome based on postoperative PVR

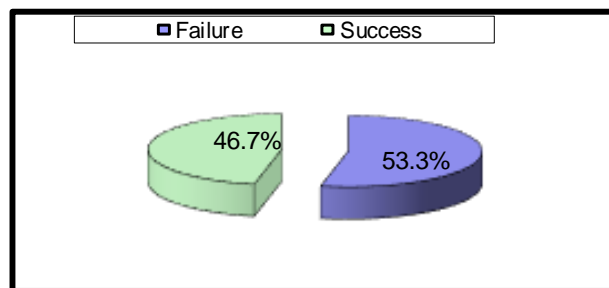
About 100 % of the patients in the success group were obstructed according to URA nomogram, while 50% in the failure group showed the same finding, showing significant relationship.



(Diagram 3) correlation between preoperative URA nomogram and postoperative outcome based on postop PVRU

-On the other hand all other UDS parameters were not significant in predicting postoperative reduction in PVR.

(2) Correlation of the preoperative UDS with postoperative Q-max results (either Q-max is more than 15 indicating success or less indicating failure)

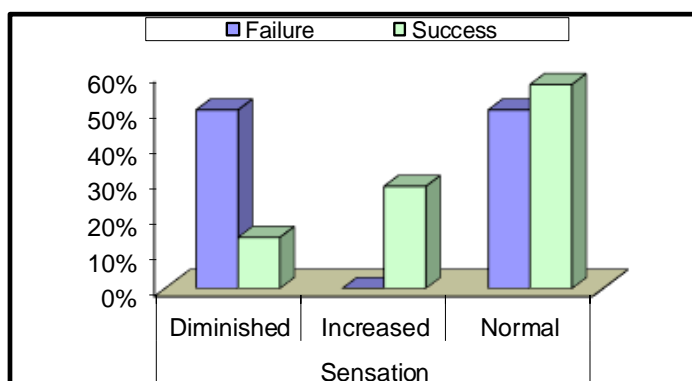


(Diagram 4) Success and failure according to post-operative Q-max

About 57.1% of the patients in the success group shows normal sensation, while 50% in the failure group shows normal sensation also 50% in the failure group shows

diminished sensation, and 14.3 % in the success group shows the same finding more over about 28.6% in the success group

showed increased sensation while zero% in the failure group showed increased sensation, showing significant relationship.



(Diagram 5) correlation between preoperative sensation and postoperative outcome based on postoperative Q-max

-About 100 % of the patients in the success group were obstructed according to URA nomogram, while 75% in the failure group shows the same finding, giving no significance.

-On the same pattern all other UDS parameters were not significant to predict post prostatectomy rise in maximum flow rate above 15 ml/sec.

**DISCUSSION:**

In light of the available literature so far, short term outcome post prostatectomy in patients with CUR continues to be a significant problem and has led to the adoption of UDS as a tool to predict the surgical outcome.

However, our results showed that normal bladder sensations and average compliance were strong predictor of operative success. Normal preoperative sensations noted in most of those with postoperative satisfactory symptom score (IPSS < 10) and postoperative PVRU below 100 cc. Radomsky and colleagues examined several preoperative urodynamic parameters in patients with mean

age 69.5 years, mean retention volume 1,172 ml. and mean symptom score 15.5. However, they noted that poor sensation, large retention volume and lack of detrusor compliance were more common in postoperative non-voiding men.<sup>(6)</sup>

In our study preoperative BOO evident by AG number, URA nomogram and Lin PURR nomogram was significantly related to postoperative improvement in symptom score (IPSS) and PVRU. This result matches with prospective studies done by Hakenberg showed that the degree of obstruction as expressed by AG number influenced the improvement in postoperative flow rate but not in symptoms after TURP. In a multivariate analysis, only age was an independent predictor of the outcome variables of flow rate.<sup>(7)</sup>

Similarly, in our study 66% of those diagnosed with DU showed postoperative improvement as regard Q-max and PVR, suggesting recovery of their detrusor function. Also Matani and colleagues made TURP for 39 patients with poor detrusor function, pre and postoperative assessment of detrusor function via UDS and other clinical data were done, postoperative UDS showed that maximum detrusor pressure (Pdet) was

raised from 26 to 32 cm H<sub>2</sub>O suggesting improvement of the detrusor function. At 24 weeks only 9 patients representing 18.75% were unable to pass urine and therefore classified as treatment failure, this data confirms that patients with DU may regain their detrusor function after prostatectomy.<sup>(8)</sup>

#### **Limitations:**

Finally, we have to say that there were few obstacles which may limit the application of our results, like short postoperative follow up duration, small sample size, multiple prostatectomy techniques done by more than one surgeon.

#### **Conclusions and Recommendations:**

Normal bladder sensitivity and obstructed patients according to AG and LinPURR nomograms are strong predictors of operative success in patients with chronic urinary retention.

We recommend that urodynamic evaluation should be systematically indicated for patients with chronic retention and BPE when considering surgical treatment.

#### **Conflict of interest:**

There is no conflict of interest.

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## دور دراسة ديناميكية التبول في توقع النتائج قصيرة المدى لمرضى الإنسداد البولي المزمن بعد عملية إستئصال البروستاتا

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**الخلفية:** أن دراسة ديناميكية التبول قبل التدخل جراحي هي وسيلة فعالة لتوقع تحسن اعراض المريض بعد خضوعه لعملية استئصال البروستاتا المتفاقمة بالانسداد البولي المزمن.

وحيث ان تحديد سرعة سريان البول تقيم صعوبة تدفق البول لسبب انسداد مخرج المثانة و لسبب المثانة المرتخية أيضا و لكنها لا تفرق بينهما ولذلك فإن دراسة انقباض عضلة المثانة والمتغيرات الأخرى خلال دراسة ديناميكية التبول يوضح ويميز بينهما ويشخص المثانة المرتخية.

ان تحسن حالة المريض بعد العملية يقاس بمقياس سرعة سريان البول وكمية البول المتبقية في المثانة بعد التبول.

**الهدف من الدراسة:** هو معرفة مدى منفعة دراسة ديناميكية التبول على توقع النتائج القصيرة المدى لإستئصال البروستاتا في مرضى الإنسداد البولي المزمن.

**المرضى والأساليب:** تم تقييم العلاقات بين درجة تاثر مجموعة من المرضى من العيادات الخارجية لمستشفى عين شمس الجامعي (الدمرداش) باعراض انسداد عنق المثانة الناتج عن تضخم البروستاتا الحميد طبقا للمقياس العالمى لاعراض البروستاتا وبين بعض المقاييس الأخرى مثل عمر المريض وطول الفترة التي كان المريض يعاني خلالها و تكرار حالات الانسداد البولي الحاد و وجود مرض السكر من عدمه و وجود امراض تتعلق بالجهاز العصبي و عمليات جراحية سابقة في العمود الفقري او الحوض و كذلك حجم البروستاتا وكمية البول المتبقية ما بعد التبول و مقياس اندفاع البول ونتائج ديناميكية التبول.

**النتائج:** اثبات وجود علاقة بين نجاح عملية استئصال البروستاتا بناء على سرعة سريان البول وبين درجة حساسية المثانة، فكلما كانت درجة حساسية المثانة طبيعية كلما كان بالإمكان توقع نجاح العملية.

كما تم اثبات وجود علاقة بين نجاح عملية استئصال البروستاتا بناء على كمية البول المتبقية في المثانة بعد التبول وبين درجة حساسية المثانة، فكلما كانت درجة حساسية المثانة طبيعية كلما كان بالإمكان توقع نجاح العملية.

**الاستنتاج:** هناك علاقة بين نجاح عملية استئصال البروستاتا في مرضى الإنسداد البولي المزمن بناء على كمية البول المتبقية في المثانة بعد التبول وبين انسداد مخرج البول بناء على معايير ديناميكية التبول، فكان نجاح العملية ملحوظا في المرضى الذين يعانون من انسداد بولي والذين مازالوا يحتفظون بدرجة حساسية جيدة للمثانة.