



AN OBSERVATIONAL STUDY OF UROFLOWMETRY IN 100 PATIENTS WITH LOWER URINARY TRACT SYMPTOMS AT A TERTIARY CARE HOSPITAL IN SOUTH GUJARAT

Urology

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ABSTRACT

Patients with prostatomegaly, urethral stricture, detrusor overactivity among other causes present with lower urinary tract symptoms (LUTS). Among various invasive and non-invasive investigations available to reach a diagnosis, uroflowmetry is a simple, reliable, cost effective, non-invasive procedure which is still in use. The interpretation of uroflowmetry flow patterns for common causes of LUTS is relatively easy. This study is an attempt to study patients with LUTS, their uroflowmetry patterns and their effectiveness to reach a diagnosis at a tertiary care hospital in South Gujarat.

KEYWORDS

Uroflow, bladder outlet obstruction, urethral stricture, benign prostatic hyperplasia, lower urinary tract symptoms

INTRODUCTION:

Uroflowmetry is a simple, non-invasive diagnostic procedure that calculates the rate of urine expulsion as a function of time. It is recommended for patient with complains of slow urination or urination difficulties. The test may also be used to determine how well patient's lower urinary tract is functioning.

By measuring the average and maximum rates of patient's urine flow, the test can estimate the severity of any blockage or obstruction. It can also help identify other urinary problems, such as a weak bladder or enlarged prostate.

Uroflowmetry is the single best noninvasive urodynamic test to detect lower urinary tract obstruction, but cut off values are not defined accurately.

A normal uroflowmetry graph is a smooth bell-shaped curve with a rapid rise to high amplitude peak (Qmax). The time to Qmax should not exceed one third of flow time.

Qmax decreases from 25 mL/s at the age of 40 years to > 15 mL/s at age of 60 years and above with no bladder outlet obstruction. Measurements are valid if voided volume is more than 150 mL.

Age or volume correction is not currently recommended for clinical practice. The peak flow rate (PFR; Qmax) more specifically identifies patients with BPH than does the average flow rate (Qavg) Scott and coworkers (1967) and Shoukry and associates (1975) found that Qmax correlated better than symptoms with the presence or absence of obstruction as determined by pressure-flow studies. A Qmax of less than 15 mL/s denotes presence of either obstruction or bladder decompensation.

The flow rate and pattern give important clues as to the underlying dysfunction. Prolonged flow with low Qmax and extended flow time is associated with prostatomegaly. A box like pattern with low Qmax which plateaus for long time is associated with urethral stricture. However, the major limitation of uroflowmetry is that the flow rate is a composite of both the function of the detrusor and the function of the bladder outlet/urethra. It is therefore impossible to determine from a flow rate alone if voiding dysfunction is due to a detrusor pathology or bladder outlet/urethral pathology or from a combination of problems; only pressure/flow urodynamics can differentiate between such conditions. For example, prolonged flow time with an abnormally low Qmax may be due to bladder outlet/urethral obstruction or a poorly contractile detrusor muscle (detrusor underactivity).

This is an observational study on uroflowmetry patterns in 100 patients with lower urinary tract symptoms and its effectiveness in diagnosis of

bladder outlet obstruction at a tertiary care hospital in South Gujarat.

AIMS AND OBJECTIVES:

1. To study common urinary complains in age group between 20-70 years.
2. To study various graph patterns in patient with urinary symptoms.
3. To study different etiologies of lower urinary tract symptoms from uroflowmetry.

MATERIALS AND METHODS:

This retrospective clinical study comprises of 100 patients who presented with lower urinary tract symptoms in OPD/IPD at a tertiary care hospital of South Gujarat during the period of September 2020-October 2022. Data of the patients was collected from the history and their medical records. All patients underwent clinical examination, urocip 3 uroflowmetry test at our hospital and radiological investigations if required. Their graphs were correlated with symptoms and radiological findings and patients were managed accordingly.

Inclusion Criteria:

1. Age: 20 to 70 years of age group
2. Gender: Male
3. Patient with urinary complains

Exclusion Criteria:

1. Patient with urinary catheter in situ (urinary retention)
2. Patient above 70 years and below 20 years

OBSERVATIONS AND DISCUSSION:

In the present study among 100 patients, 49 had complaint of frequency of urination, 49 had difficulty in micturition, 46 had weak stream and 50 had urgency of urination.

Patient having diabetes due to recurrent infection and history of trauma due to traumatic cause are more prone to develop bladder outlet obstruction due to urethral stricture. In our study out of 15 patients of urethral stricture, 4 patients were having diabetes and 8 patients had history of trauma.

In the present study, we compared outcome as following where maximum number of patients with lower urinary tract symptoms belonged to the age group of 61-70 years (45) and it is consistent with the study of kinjal dodiya et al, where maximum patients belonged to the age group of 60-70 years (40).

Table 1

AGE	NUMBER OF PATIENTS
20-30	10

31-40	7
41-50	16
51-60	22
61-70	45

Among 100 patients 75% had continuous prolonged curve (prostatomegaly), 7 % had dysfunctional voiding curve (detrusor overactivity), 3% had normal curve, 15% had box variety curve (urethral stricture), which correlates with study kinjal dodiya et al where maximum curve pattern was continuous prolonged curve which was 53%.

Table 2

UROFLOW PATTERN	NUMBER OF PATIENTS
CONTINUOUS PROLONGED CURVE	75
BOX VARIETY CURVE	15
NORMAL CURVE	3
DYSFUNCTIONAL VOIDING CURVE	7

In this research of 100 patients, 90 patients were having obstructive uroflow pattern and 10 patients had inconclusive result. With help of ultrasonography findings, out of 90 patients, 75 patients were diagnosed with BPH and with the help of ascending urethrogram, 15 patients were diagnosed with urethral stricture. Rest of the patients with inconclusive results require further invasive flow and pressure study which is correlates with study of kinjal dodiya et al where in maximum 53% patients were diagnosed as BPH by graph pattern of uroflowmeter.

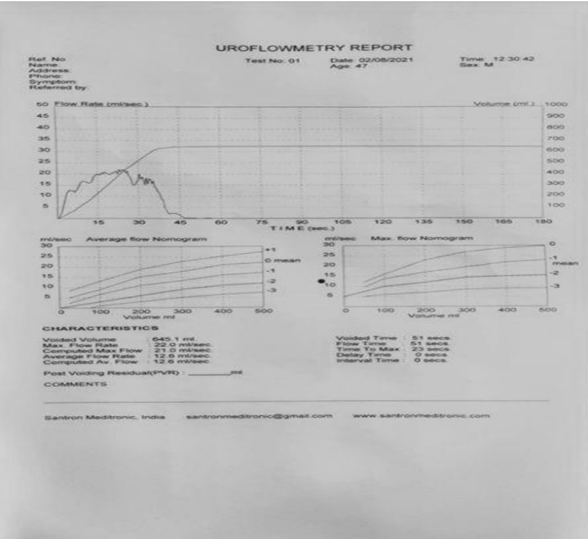


Figure 1: Normal UROFLOW Curve

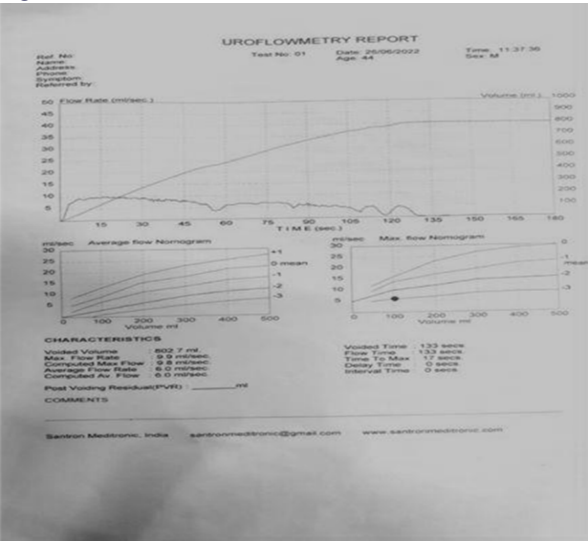


Figure 2: Prolonged Uroflow Curve Suggestive Of Benign Prostatic Hyperplasia

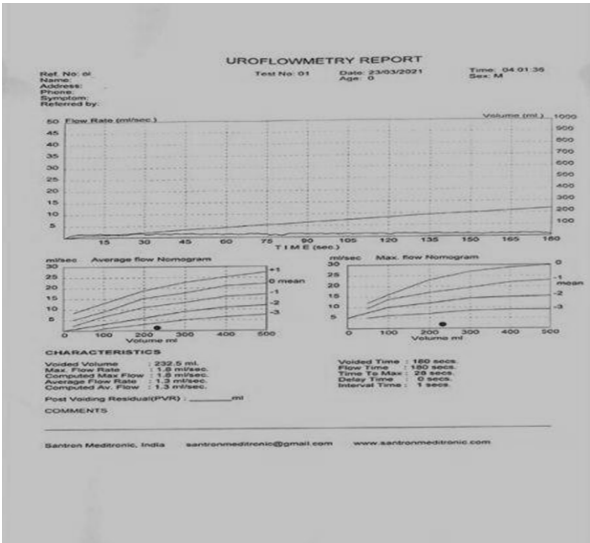


Figure 3: Uroflow Curve With Plateau Shape Suggestive Of Constrictive Bladder Outlet Obstruction: Urethral Stricture

Average Qmax of BOO was 9.06 m/sec and mean voided volume was 267ml which correlates with study of kinjal dodiya et al where average Qmax was 9.09 ml/sec in patients with BOO and mean voided volume as 227.6 ml.

Table 3

AGE GROUP	Q AVG (MEAN+/-SD) (ML/SEC)	Q MAX (MEAN+/-SD) (ML/SEC)	VOIDED VOLUME (MEAN+/-SD) (ML)
20-30 YEARS	4.98+/-2.22	13.8+/-7.58	290.6+/-61.49
31-40 YEARS	3.88+/-0.76	7.85+/-4.01	273.57+/-49.88
41-50 YEARS	4.23+/-0.66	9.5+/-3.98	284.12+/-75.48
51-60 YEARS	4.41+/-1.31	9.5+/-4.50	255.09+/-79.15
61-70 YEARS	4.06+/-0.95	9.04+/-2.42	275.4+/-62.29

The suspicion of BOO is the most frequent reason to perform uroflow measurements in men. The uroflow does not have the capacity to study the obstructed voiding, it can only suggest BOO. Still, it is well accepted from clinical studies and statistical analyses that for a Qmax fewer than 10 ml/s there are 90% chances that BOO exist and similar findings were also found in our study.

Table 4

DIAGNOSIS	NUMBER OF PATIENTS
BENIGN PROSTATIC HYPERPLASIA	75
URETHRAL STRICTURE	15
NORMAL	3
INCONCLUSIVE	7

CONCLUSION:

From our study we found that, common urinary complaints were urgency of urination, frequency & difficulty in micturition. Age group from 60-70 years often presented with bladder outflow obstruction. Prolonged curve is commonly seen in benign prostatic hyperplasia and box variety curve is seen in urethral stricture.

Uroflowmetry is overall useful in diagnosis of benign prostatic hyperplasia and urethral stricture which can be supported by ultrasonography of prostate with pre void and residual volume (PVR) and RGU respectively to avoid other invasive and more difficult pressure/flow study. However, diagnosis of detrusor muscle over activity and neurogenic bladder require further more invasive urodynamic study to confirm diagnosis.

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