# URODYNAMIC ANALYSIS OF MEN WITH LOWER URINARY TRACT SYMPTOMS.

*Dissertation submitted to*

**THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY**

*in partial fulfillment of the requirements for the award of the degree of*

**M.Ch (UROLOGY) – BRANCH – IV**

**THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY CHENNAI**

**AUGUST 2014**

# DECLARATION

I solemnly declare that this dissertation titled **"URODYNAMIC ANALYSIS OF MEN WITH LOWER URINARY TRACT SYMPTOMS"** was prepared by me in the Department of Urology, Madras Medical College & Rajiv Gandhi Government General Hospital, Chennai under the guidance and able supervision of **Prof. R.JEYARAMAN, MS, M.Ch.,** Professor & Head of the Department, Department of Urology, Madras Medical College & Rajiv Gandhi Government General Hospital, Chennai. This dissertation is submitted to the Tamil Nadu Dr. MGR Medical University, Chennai in partial fulfillment of the university requirements for the award of the degree of M.Ch. Urology.

**Dr.J.Moideen Abdul Kadhar**

Place: Chennai
Date: 29-03-14

# CERTIFICATE

This is to certify that the dissertation titled **"URODYNAMIC ANALYSIS OF MEN WITH LOWER URINARY TRACT SYMPTOMS"** submitted by **Dr.J.Moideen Abdul Kadhar** appearing for M.Ch. (Urology) degree examination in August 2014, is a bonafide record of work done by him under my guidance and supervision in partial fulfillment of requirement of the Tamil Nadu Dr.M.G.R.Medical University, Chennai. I forward this to the Tamil Nadu Dr.M.G.R.Medical University, Chennai.

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# CERTIFICATE

This is to certify that the dissertation entitled "**URODYNAMIC ANALYSIS OF MEN WITH LOWER URINARY TRACT SYMPTOMS''** is a bonafide work done by **Dr.J.Moideen Abdul Kadhar,** Madras Medical College, Chennai, in partial fulfillment of the University rules and regulations for award of MCh (Urology) under my guidance and supervision during the academic year 2011-2014.

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# ACKNOWLEDGEMENTS

First of all, I would like to thank my patients, who subjected themselves for my dissertation work.

I whole heartedly thank The Dean, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai for allowing me to avail the facilities needed for my dissertation work.

I would like to express my humble gratitude to Prof.R.Jeyaraman M.S., M.Ch, Professor and Head of the Department of Urology, for his expert guidance and help rendered for the conduct and completion of my dissertation work.

I would like to thankfully acknowledge Prof.V.Kamaraj MS, MCh and Prof.RM.Meyyappan MS, MCh, Professors in the Department of Urology, for their constant help in the dissertation work.

I sincerely thank the Assistant Professors in the Department of Urology for their continuous inspiration and support in carrying out my dissertation.

I thank my fellow past and present postgraduates who helped me in carrying out my work and preparing this dissertation.

Above all I thank the God Almighty for blessing me with enough strength to accomplish this work perfectly.

# INDEX

# INTRODUCTION

The life span of the present generation is increasing considerably so we are encountering many elderly male patients, seeking treatment for age related urological problems. The complaints of lower urinary tract related pathology also increases with age. They need proper evaluation and management and most important is to differentiate between the various etiology so that the management should be specific, ease for the patient, noninvasive and minimally invasive.

Lower urinary tract symptoms (LUTS) is the urological manifestation which increases with age significantly affecting the quality of life. 22–90% of patients presents with urinary incontinence (UI) which is the most troublesome one.

Other significant urological morbidities related to aging are the manifestation because of involuntary bladder contractions and increased residual (PVR) volume.

Bladder storage and voiding is due to a specialized physiological process. So understanding of those mechanism and that of aging process are important in the evaluation of older men with LUTS. Since many geriatric diseases are multifactorial in origin, we need a wholistic

assessment of the functional disturbances of the lower urinary tract and its associated medical illnesses.

The first step in the evaluation of older patients with LUTS is proper evaluation including, the patient's general medical condition and higher functions. Neurological examination is a part of the evaluation which includes history of stroke or extra-pyramidal symptoms. Past urological procedures and other co morbid illness play a role.

Physical examination is directed towards the cause of urinary dysfunction and evaluate other co morbidities of the patient.

Urodynamic evaluation includes recording of vesical and abdominal pressures while filling and also uroflow during voiding phase.

This procedure is invasive, expensive and takes long duration of time. Presently, UDE has become one of the routine procedures for diagnosing bladder outlet obstruction (BOO).

It has some difficulties to the patient like mild pain, dysuria and with urinary retention, mild hematuria, or infection. A wide availability in the diagnostic modalities now increases the chances for selecting less invasive tests on a patient by patient basis.

Lower urinary tract symptoms (LUTS) usually presents with three urodynamic abnormalities including Bladder outlet obstruction (BOO) ,Detrusor overactivity (DO) and Detrusor underactivity (DU)

Many patients we investigate are elderly, and we need to differentiate the elderly from young patients presenting with similar illness. In an old persons with less life expectancy,our attitude towards urodynamics shall be different.

For instance, if an elderly man who fails to respond to medical treatment for urge incontinence that persists after surgical removal of prostate, then there is no point in confirming that DO is the cause as he is not fit for ileocystoplasty. But this wont be the case in a man of 60 years of age who do daily exercises. The use of urodynamics is thus not decided by chronological age but by assessing patient's biological age.

DO, is becoming more prevalent in elderly and if there is any higher functional disturbance, then DO is almost certain. Urodynamics on such patients is often troublesome for the patient and difficult for the urodynamic staff. But we shall be prepared to do, as the UDS helps in the management of the frail elderly patients.

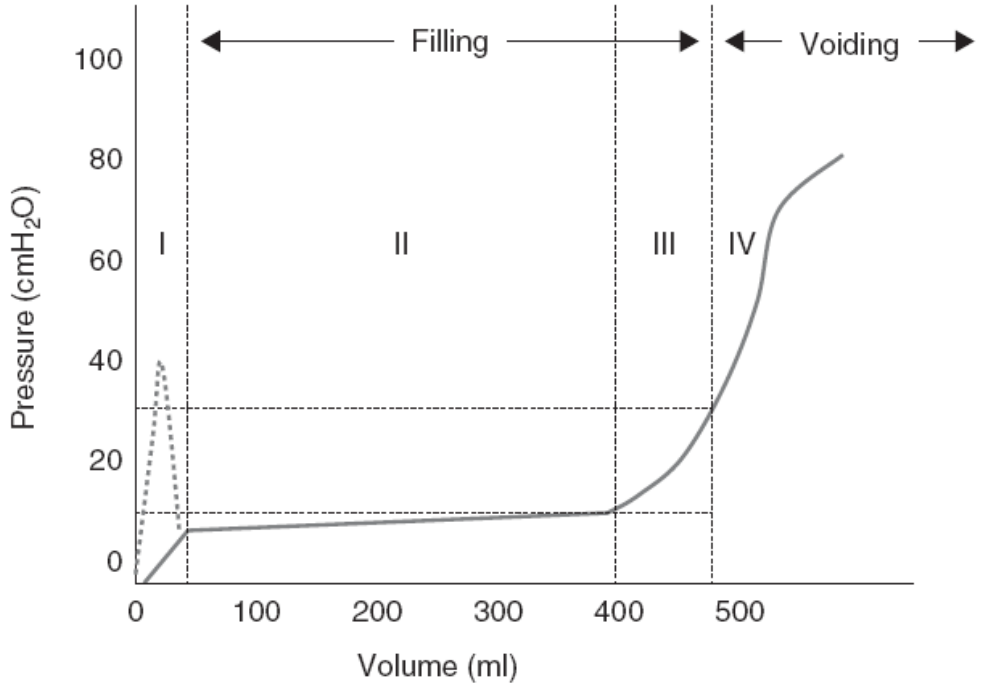
# AIM AND OBJECTIVE

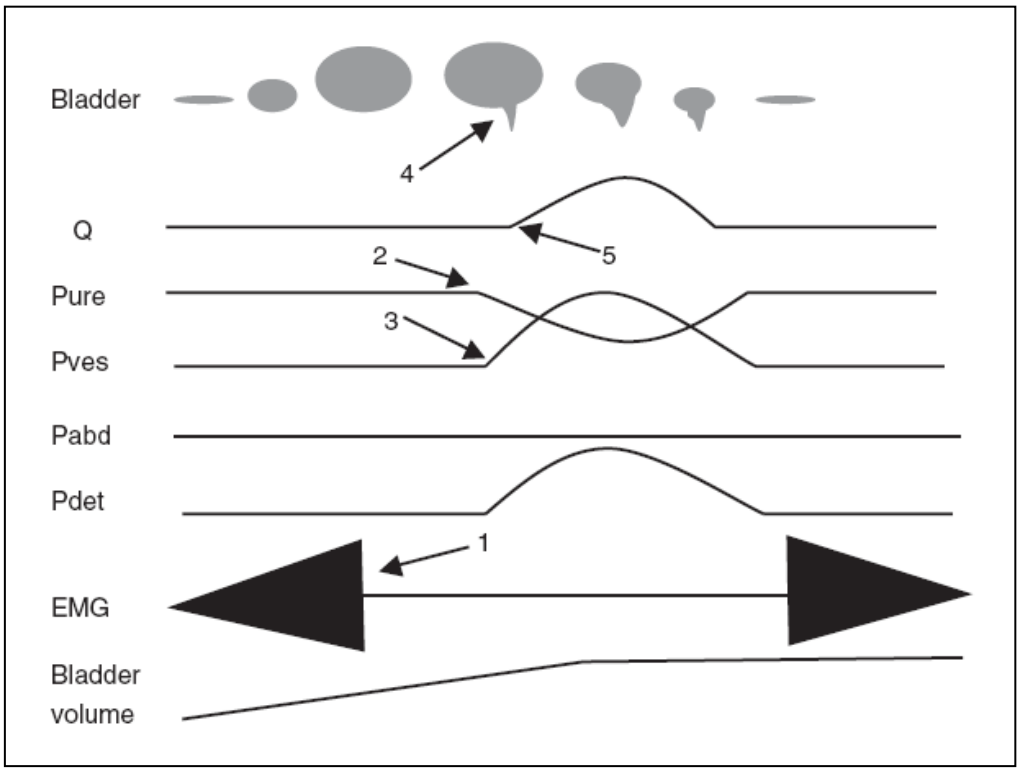
The aim of this study is to evaluate the clinical and urodynamic findings of elderly patients with LUTS (Lower Urinary Tract Symptoms) to search for accurate diagnosis and effective management.

# REVIEW OF LITERATURE

Urodynamic evaluation is the study of the functional status of lower urinary tract by adequate techniques which were guided by the guidelines of International Continence Society (ICS).It includes measurement of vesical pressure, urethral pressure profile, pressure-flow studies (PFSs), uroflowmetry, EMG of pelvic floor and simultaneous fluoroscopic visualization of the lower urinary tract by way of videocystometrogram. Such findings are analysed individually or collectively to evaluate the status of the LUT function.

Two main methods of urodynamic evaluation which exists are: 1.Conventional studies are those that take place in the UDE lab involving artificial filling of bladder and 2.Ambulatory studies which are a functional study of the lower urinary tract by natural filling replicating the everyday activities. It requires the pressure within the bladder(intravesical pressure) and pressure around the bladder(abdominal pressure)which is measured from vaginal or rectal, or a bowel stoma. Detrusor pressure is passive and active forces on the wall of bladder as a component of intravesical pressure. Cystometry is the technique by which the volume and pressure relationship of the bladder is measured while bladder filling. Physiologic filling rate is a rate of filling less than the predicted maximum(which is body weight kg divided by 4).




**[NORMAL (1) relaxation of the striated muscles of the sphincter (EMG silence), (2) fall in urethral pressure, (3) rise in detrusor pressure, (4) opening of the urethra, and (5) uroflow.]**

The above figure shows the normal UDE pattern with little detrusor activity during filling phase and at starting of voiding,the sphincter relaxes and patient voids.

The various abnormal patterns of the urodynamic study reflects the underlying detrusor function, its compliance and the status of outflow.A positive urethral closure pressure during bladder filling even in the presence of increased abdominal pressure is maintained by normal urethral closure mechanism. Incompetent urethral closer mechanism is defined as one which allows urinary leakage in the absence of detrusor contraction.

Opening pressure is the pressure recorded at the onset of urine flow. The lowest pressure recorded at maximum flow rate is called Pressure at maximum flow.

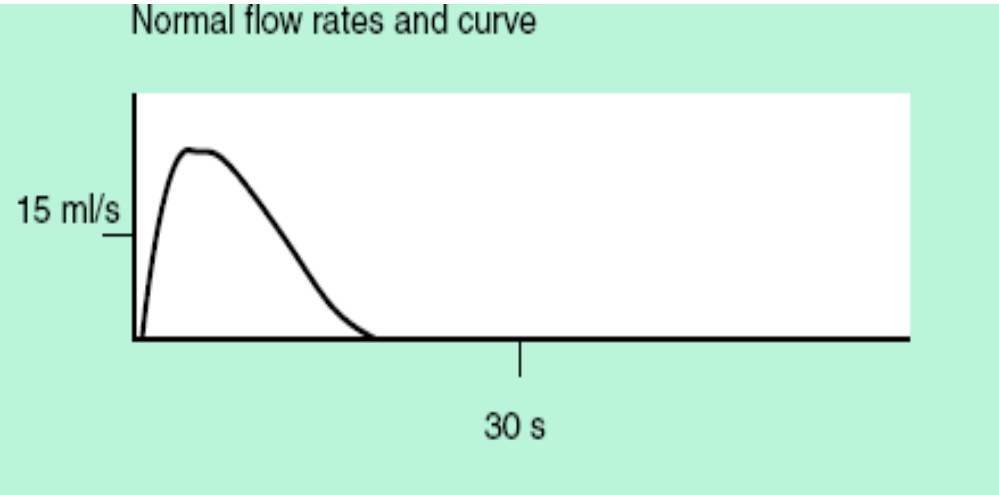
## COMPONENTS OF URODYNAMIC STUDY [1]

The measurement of urine flow over time is called ‘Uroflowmetry’. It is a noninvasive and an objective study that reveal an abnormal voiding phase. . Normal uroflow is a bell-shaped curve .

The maximum urinary flow ($Q_{max}$) is the most important uroflowmetry parameter,which is volume dependent. A $Q_{max}$ of <12 ml $s^{-1}$ with at least 160 ml of voided volume is considered low and indicate

either bladder outlet obstruction (BOO) or detrusor under activity(DO). These two conditions are differentiated by PFSs.

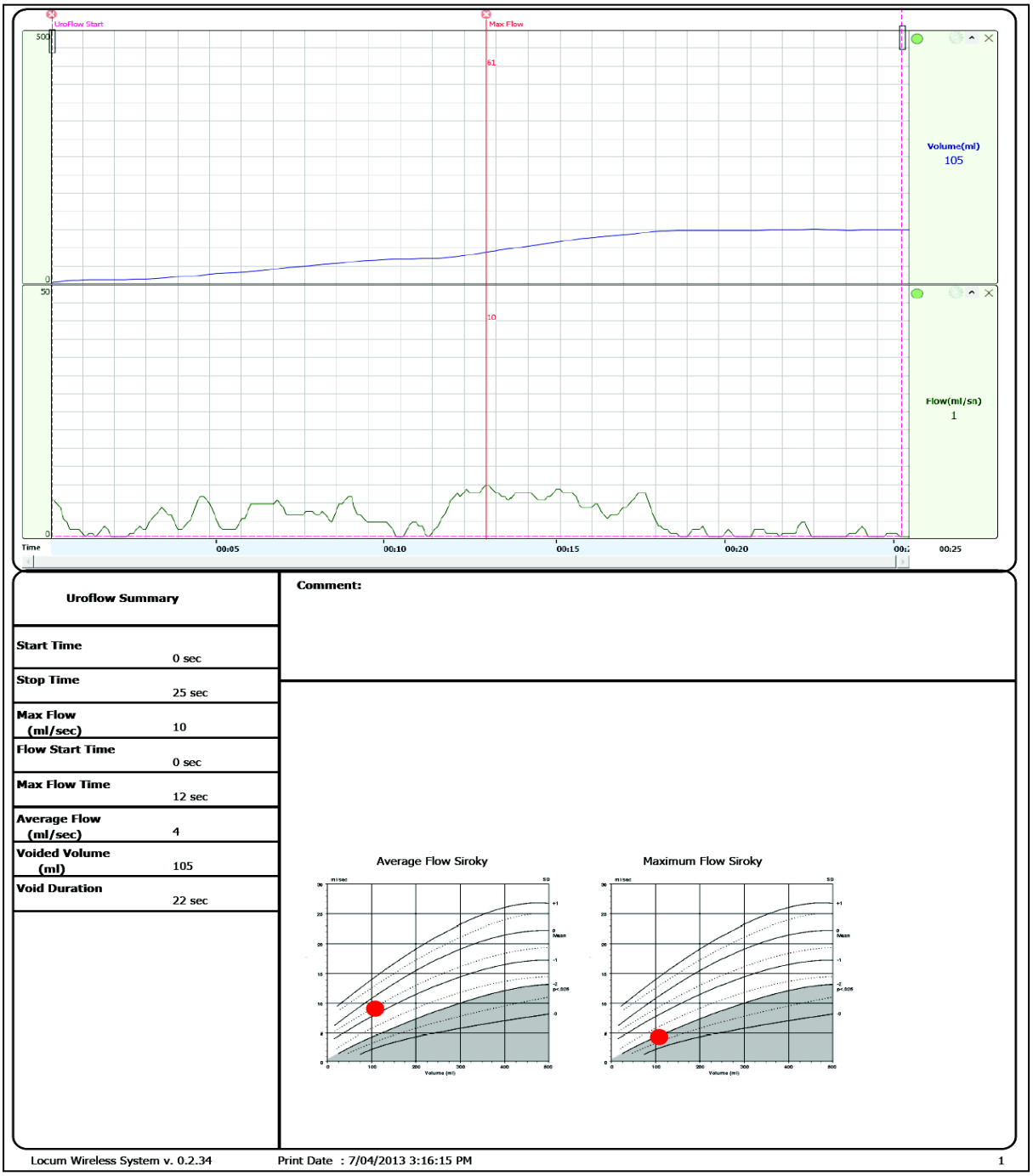
Disease progression and management decision is thus dictated by the flow pattern and the UDE curves especially in case of BOO.The following figure shows the normal uroflow pattern and the typical pattern of curve.[1]




As older patients pass small volumes with irritative features,it is difficult to obtain uroflowmetry. There will be difficulty in voiding for some patients because of environment. Also, uroflowmetry wont arrive at a particular diagnosis, because contraction of the bladder muscle and the obstruction of outflow varies.

In a patient with significant obstruction infravesically, as long as there is a compensation of detrusor for the increased urethral resistance ,flow may be there. Patients with outlet obstruction or detrusor failure a

poor urinary stream may be seen. Even though, uroflowmetry has some drawbacks, still it is widely used as the first step in the evaluation of a case of LUTS. The fact is that it is always associated with the evaluation of post void volume reflecting the degree of pathology



The volume of urine remaining in the bladder after voiding is called PVR. **It** is an excellent assessment of bladder emptying. It can be calculated by ultrasound or through a catheter. Elevated PVR indicates a problem with emptying may be due to the poor activity of the bladder. So it needs may prompt further testing. Butit wont establish a definite diagnosis.

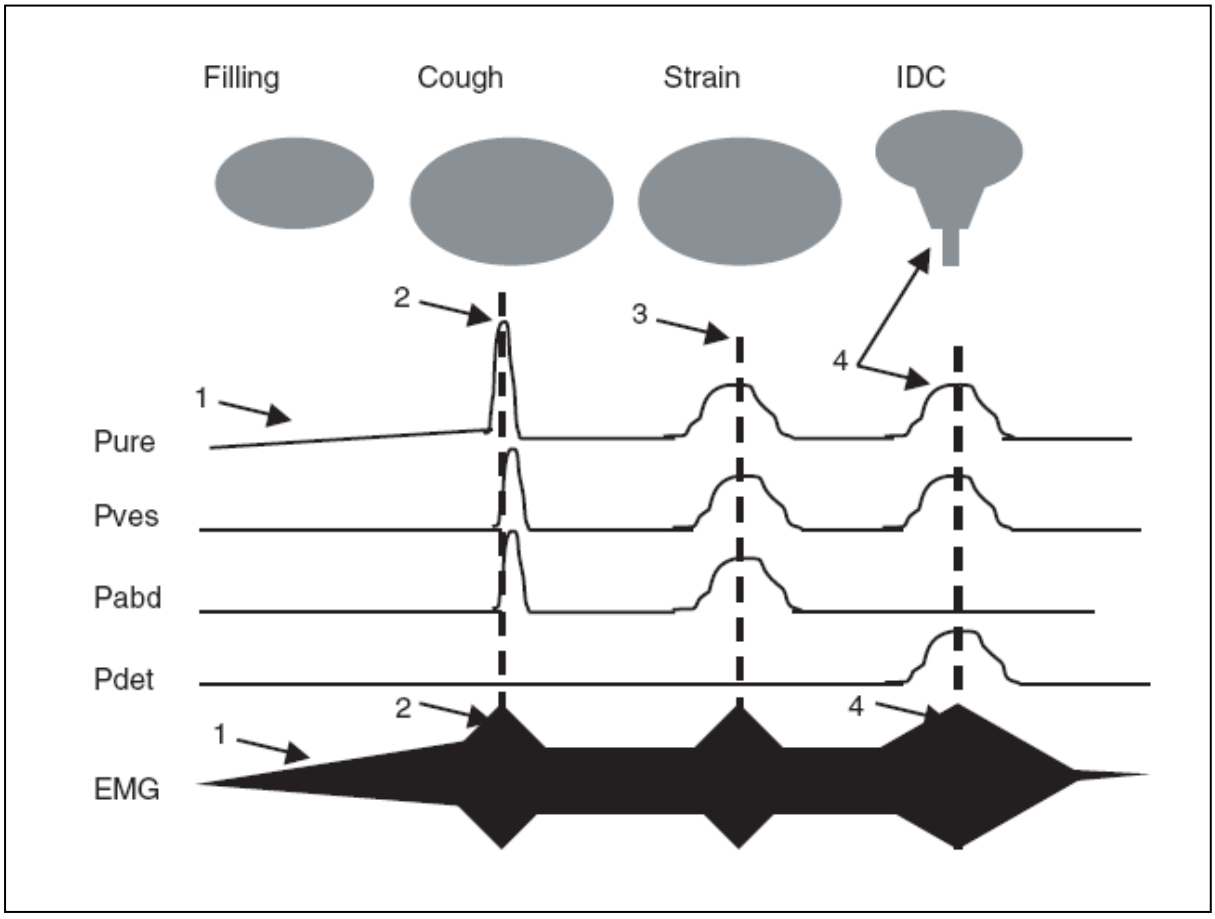
This applies to the elderly individuals also.It monitors the disease progression in known BOO patients and to identify high risk patients. In the absence of severe BOO but with a PVR more than 100 ml, poor contraction of the detrusor is suspected.

Electromyography (EMG):

The study of the electric potentials produced by the depolarization of muscle membranes is Electromyography (EMG).

In the technique of UDS, EMG measurement of the perineal sphincteric muscles is done to evaluate possible abnormalities of perineal muscle function. EMG is obtained via electrodes placed in or near the muscle to be measured.It is generally associated with lower urinary tract symptoms and dysfunction. EMG activity is measured during both filling and emptying.

The intraluminal pressure along the length of the urethra is depicted by Urethral pressure profile (UPP) as a graph. The fluid pressure needed to just open a closed urethra is defined as Urethral pressure. It is obtained by the withdrawal of a catheter based pressure sensor along the length of the urethra [3]




**[Normal storage reflexes]**

**Filling cystometry:**

While filling this test measures of the bladder's pressures. Presence of involuntary contractions of detrusor, sensation of bladder, its capacity

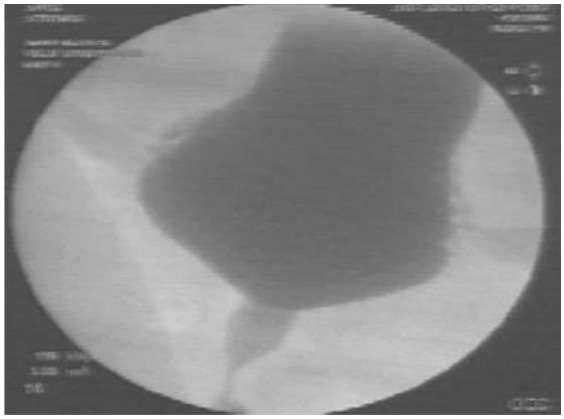
and other parameters like compliance, and leak point pressure are studied during cystometry.

Normal aging may change many aspects of the physiology of micturition.The above figure demonstrate the normal storage reflux.It should be noted that the detrusor pressure(P det) cannot be measured directly but it is calculated by the difference between vesical and abdominal pressure.

$$P_{det} = P_{ves} - P_{abd}.$$

It is a common finding to note some contractions of detrusor usually occur during bladder filling. Such involuntary detrusor contractions are associated with urgency or even with urgency incontinence.

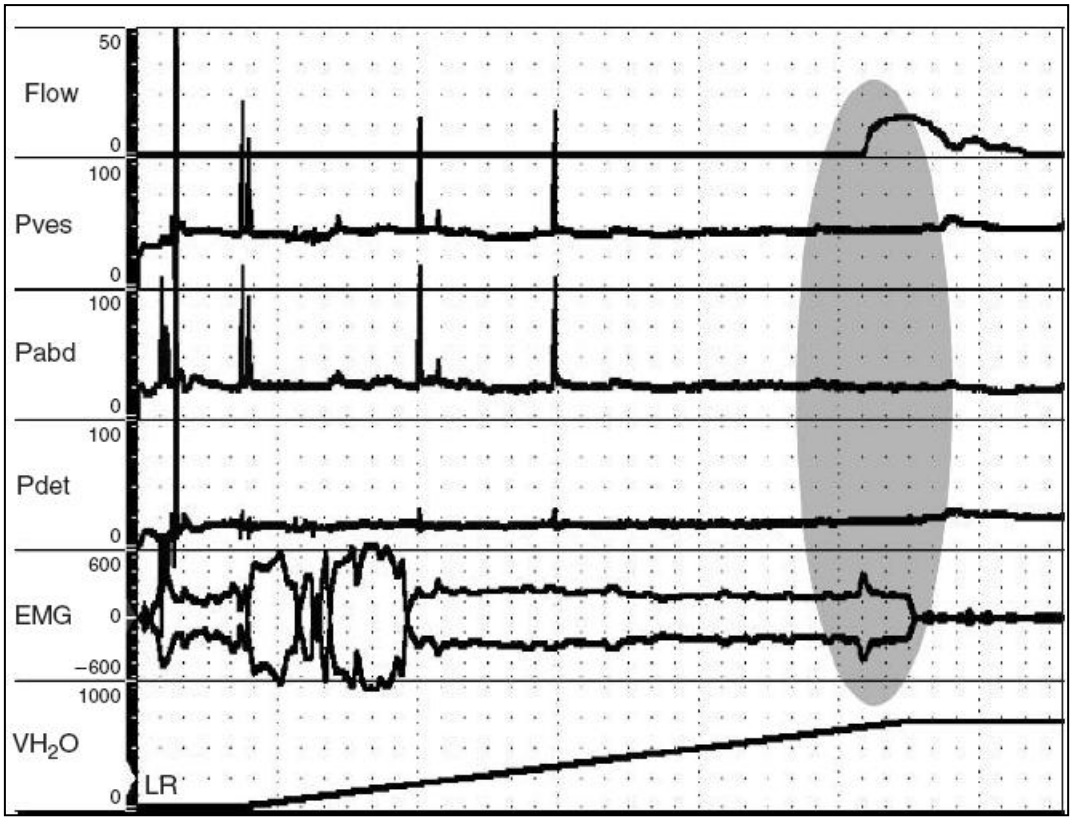
Videocystometrogram (VCMG) involves bladder filing with a radiopaque contrast medium while doing filling cystometry to allow simultaneous fluoroscopic visualization of the bladder and urethra during the filling and voiding phases. This technique results in pressure measurements obtained along with structural information .



**[X-ray during voiding - normal bladder neck and an open urethra.]**

This requires more expensive and complex equipment. Standard UDS shall give most information needed in clinical practice.So, most units perform VCMG in specific cases only including complex cases involving anatomic abnormalities, failed past surgical procedures or associated neurological problems. Inspite of the anatomical description associated with the functional data,it is still of limited role in older patients.

Detrusor overactivity (DO) is a *urodynamic parameter* which is characterized by IDCs during the filling phase.As explained before,DO may be either neurogenic DO or idiopathic.The term *idiopathic* is a misnomer in that in a non-neurogenic patient,the cause of DO is clearly apparent.[2]"




**Normal micturition without an appreciable rise in Pdet**.

Ideally, UDS should reproduce the patient's symptoms, so urgency or urgency incontinence shall be accompanied by DO, although in neurogenic DO.[3]

As explained before, in the elderly patients, overactivity of detrusor (DO) is noted very commonly in UDE pattern,resulting in urinary incontinence. Up to 50% it is observed in asymptomatic older patients. So the patient's symptoms are vividly shown in urodynamic test.

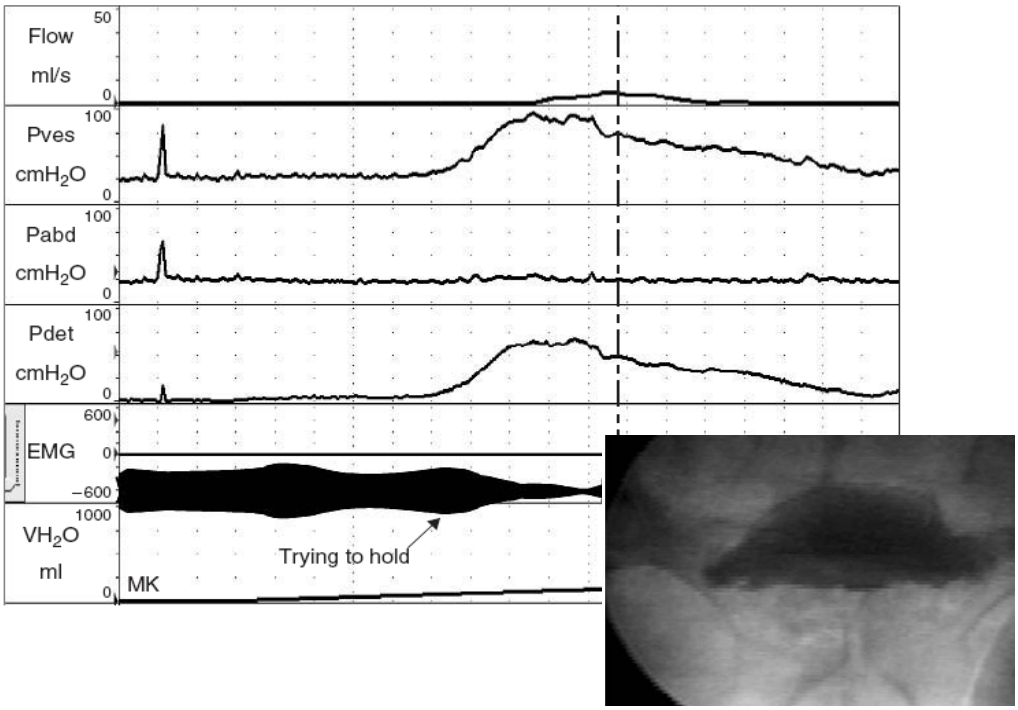
DO and decreased bladder compliance are the common bladder manifestations. This shall improve in most of the patients after the

obstruction is relieved. In case of the older people, the changes seen in the bladder are due to the sequelae of aging and may not be attributed to obstruction.

Clinically, patients with detrusor hyperactivity with impaired contractile function is not different from patients with DO with normal contractility. UDS of patients with detrusor hyperactivity with impaired contractile function have more PVR and are incapable of producing effective detrusor contractions during voiding.Urodynamic tests too shall wont show any signs of BOO or abnormalities of sphincter. But, the pathogenesis of detrusor hyperactivity with impaired contractile function unknown..

Detrusor hyperactivity with impaired contractile function must be differentiated from BOO, since both leads to high resuidal volume and be associated with DO in up to 50% of patients.

The diagnosis of detrusor overactivity with defective contractility of bladder function should be manifested through the clinical results and hence the need of UDE is stressed in older patient.




**Grade 2 obstruction and type 3 detrusor overactivity**[3]

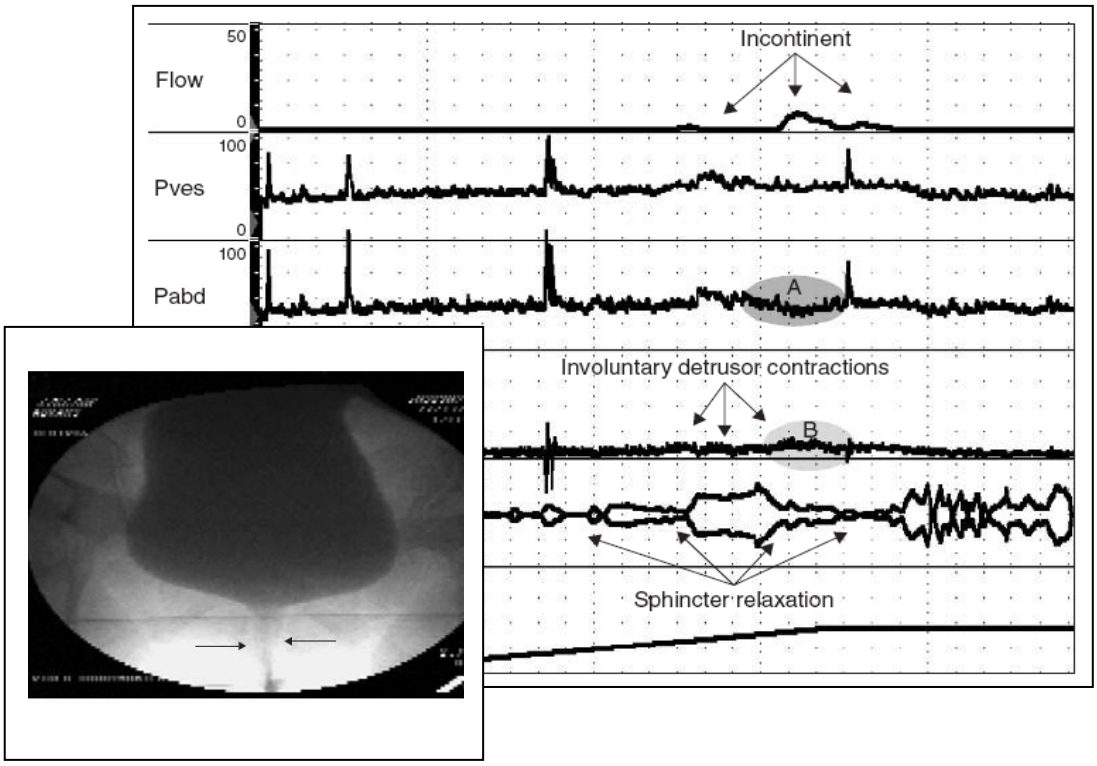
**Pressure-flow studies in Elderly:**

PFS measures the voiding phase. While monitoring intravesical, sabdominal pressure and detrusor pressure is calculated. It is very common in older patients to have such disorders. It has been found that 48% of patients in elderly age group more than 60 years of age are found to be obstructed.

There are 3 voiding patterns identified during this analysis.

Obstructed pattern which is characterized by decreased flow but with increase in detrusor pressure.[5] Unobstructed pattern is characterized by decreased detrusor pressure but with normal flow.Yet another pattern

is called hypocontractility which is characterized by decreased flow but with decreased detrusor pressure.[1]



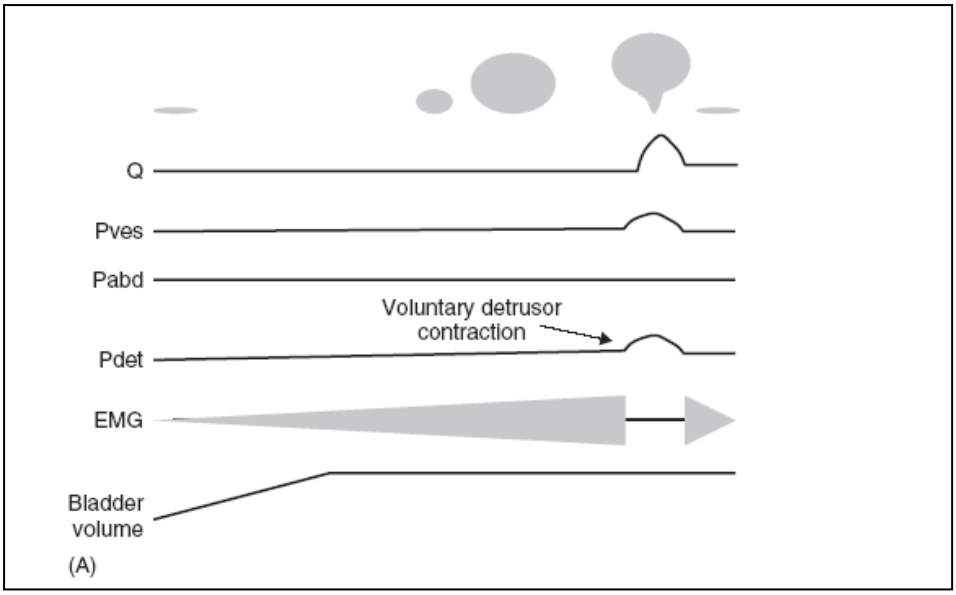

Bladder outlet obstruction index (BOOI) is calculated by the maximum detrusor pressure and maximum flow rate. The index is calculated by

$$BOOI = p \text{ det } Q_{max} - 2\ Q_{max}.$$

BOOI <20-No obstruction

BOOI = 20–40 - equivocal

BOOI >40 - obstructed




**Without involuntary detrusor contractions**[3]

Detrusor function on voiding phase is divided by the ICS into three classes as normal, underactive and acontractile[6]To characterize those with DU, bladder contractility index was used.

BCI=p det Q max+5 Q max

A BCI below 100 is indicative of DUA

Men of 50 years and older commonly presents with LUTS. The causes of are multifactorial.It includes mainly four problems:(1) impaired contractility (2)BOO, (3) sensory urgency, and (4) detrusor overactivity. The irritative symptoms of urgency and frequency associates with voiding symptoms of poor stream and hesitancy. DO with or without BOO presents with urge incontinence. It is well estab lished that both coexist in advancement of age and with the degree of obstruction.

The question of the manner in which UDS helps is in the management of male LUTS has been a debatable one for period of time. Whether it is an useful tool in the diagnosis of BOO before TURP?

In a complex situation which requires more invasive treatment, an accurate diagnosis will be needed. Often it is up to the physician to decide the magnitude of information needed to make a proper decision on treatment protocols.

It is a known fact that irritative symptoms and urge incontinence are commonly present in those who have undergone surgery like TURP even though there is a reduction of obstruction and relieves symptoms.

This may be because of the fact that these irritative LUTS exhibit multiple combinations. So in such cases UDS ofter a good help in predicting reduction of these symptoms .Irritative symptoms have a higher probabililty of reduction after interventional procedure (e.g., TURP).

Some studies stresses the need for performing routine urodynamic study, before TURP, as still controversial.For decades the concern has been only to the effects on upper tract due to high voiding pressures with decreased compliance.

These structural modifications of bladder will ultimately become irreversible, many surgeons would argue that early relief of significant obstruction is the priority in the management of such cases.

# MATERIALS AND METHODS

## TITLE OF THE STUDY

Urodynamic Analysis Of Men With Lower Urinary Tract Symptoms.

## PERIOD OF STUDY

March 2013 to February 2014

## STUDY DESIGN

Prospective Observational study

## PLACE OF STUDY

The study was conducted in the Department of Urology, Madras Medical College and Rajiv Gandhi Government Hospital, Chennai- 3

## ETHICAL CLEARANCE

The institutional ethical review board at our hospital approved the study. No: 32032013.

## INCLUSION CRITERIA:

The study included all male patients of age older than 50 years with LUTS,with or without urinary retention and with or without co morbid illness.

**EXCLUSION CRITERIA:**

We exluded men with age less than 50 years with symptoms and all female cases.

**METHOD OF STUDY :**

Our study population included 100 consecutive men with age more than 50 years with history indicative of lower urinary tract symptoms. Informed consent was obtained from each patient prior to participation in this study. All patients were interviewed in order to obtain detailed personal and medical histories. The patients were divided into irritative and obstructive symptom groups according to their chief complaints. Irritative symptoms are urinary frequency, nocturia urgency and/or urge incontinence; obstructive symptoms included straining,weak stream, intermittency and incomplete emptying. All details were recorded as per the proforma(Appendix). All patients were required to complete 24-hour voiding diary and pad test for 3-day frequency volume chart in order to document urinary volume, incontinence and urgency episodes, and daytime and nighttime frequencies. International Prostate Symptom Score (I-PSS) has been calculated for the cases.Urinalysis, urine culture, noninvasive free flow uroflowmetry, post-void residual urine volume measurement were performed.

All patients are subjected to Urodynamic evaluation using Aymed UDE Locum Wireless System v. 0.2.34 machine. Laxative was given on night before study.Patient is preparation on day of procedure. Patient is confirmed to have culture free and was started on antibiotics before procedure. 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 has two channels, one for the measurement of p ves and the other for bladder filling. The catheter is fixed after insertion.

The rectal catheter 6 F is introduced, using lubricant,through the anus so that the tip is positioned 10 cm to 15 cm above the anal verge.

The perianal area should be dried and the catheter taped as close as possible to 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 also done in the same position once capacity is achieved.

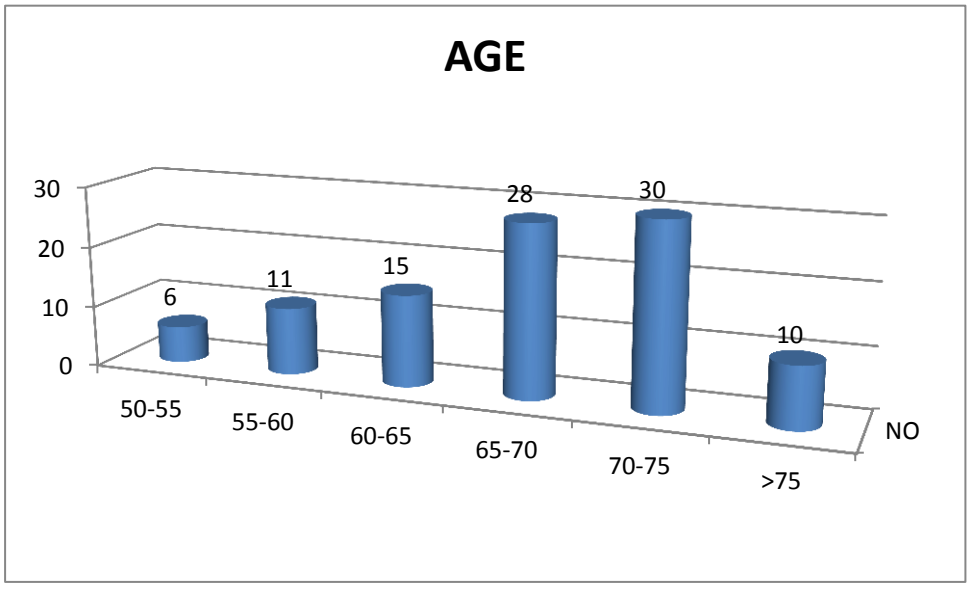
During bladder filling, bladder sensation(first sensation of filling,normal desire to void, strong desire to void, urgency or pain) detrusor activity, bladder compliance, bladder capacity and leak point pressure are assessed.During voiding,the voided volume, maximum flow rate(Q max),the average flow 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.

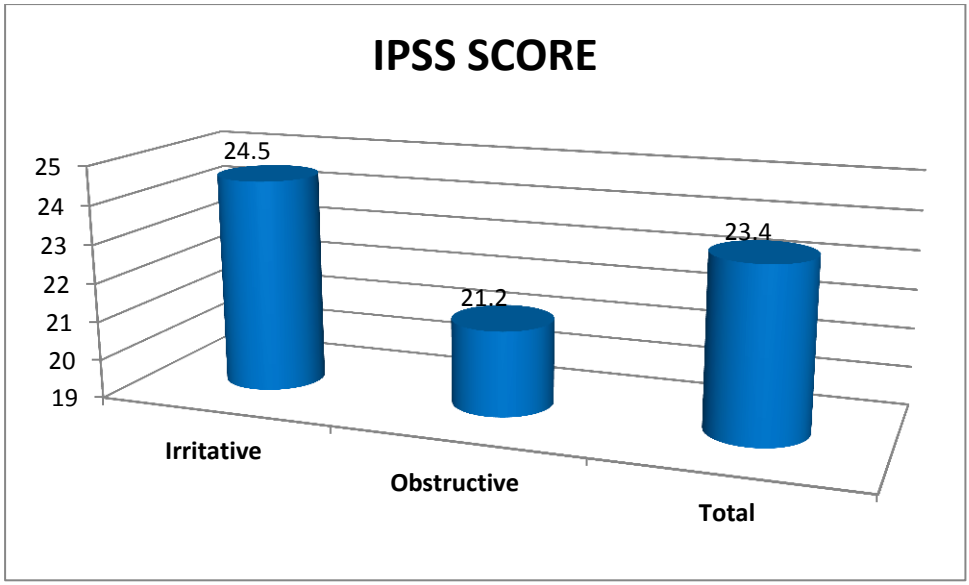
# RESULTS

Out of the total 100 patients evaluated, 60 patients presented with irritative LUTS and 40 patients presented with obstructive LUTS.

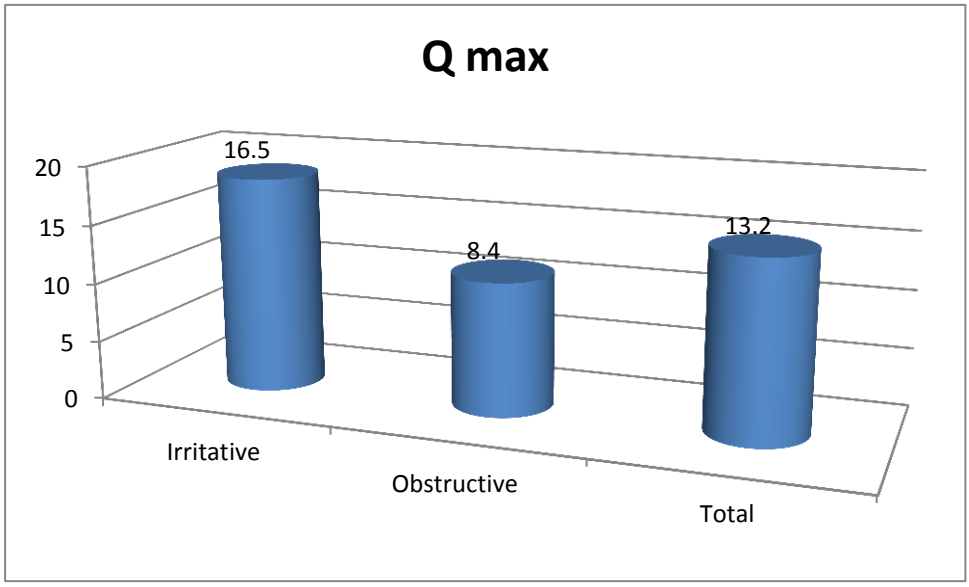
The maximum age group falls under 70-75 category. The mean age in Irritative group is 68.2 while on obstructive group is 71.9.Overall mean age is 70.8 on analysis. p value is 0.67 which is not statistically significant.



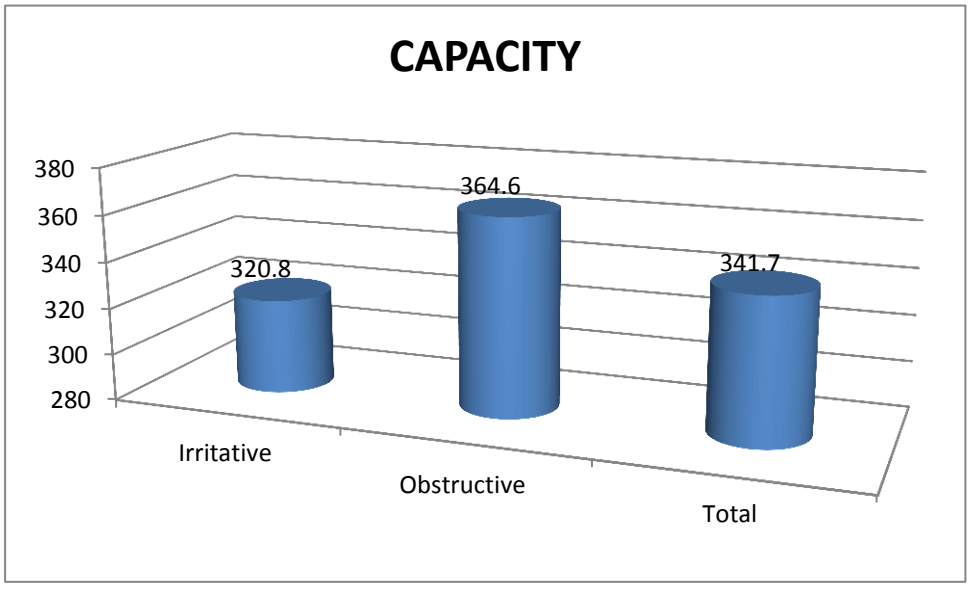

IPSS score showed mean score of 24.5 in irritative LUTS group whereas 21.2 in obstructive LUTS group and the overall mean score being 23.4. p value is 0.14 which is not statistically significant.



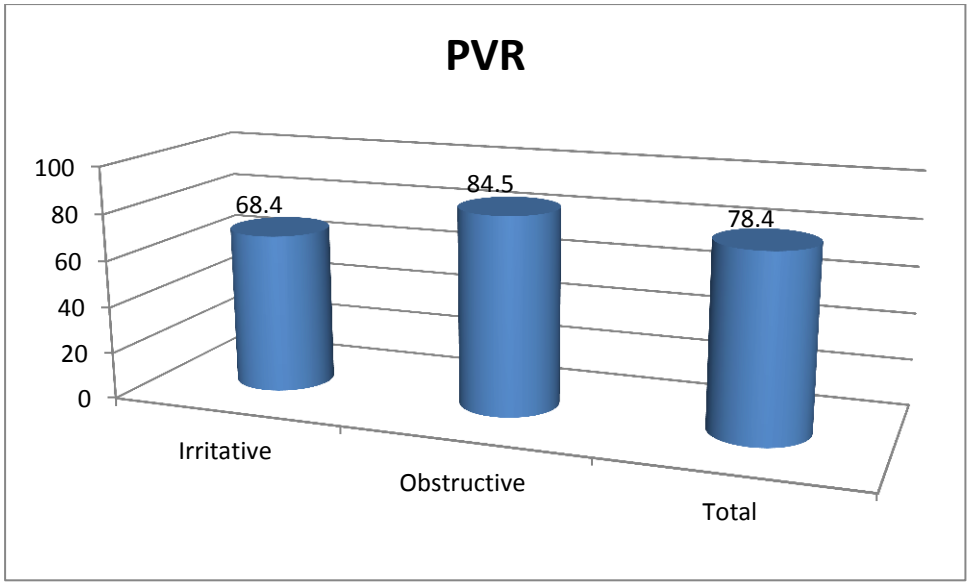

The mean value of maximum flow rate (Q max) is 16.5 in irritative LUTS group whereas 8.4 in case of obstructive LUTS. Overall mean Q max being 13.2. p value is 0.03 which is statistically significant.



The mean value of bladder capacity is 320.8 ml in irritative LUTS group whereas 364.6 ml in case of obstructive LUTS group.Overall mean bladder capacity being 341.7 ml. p value is 0.34 which is not statistically significant.

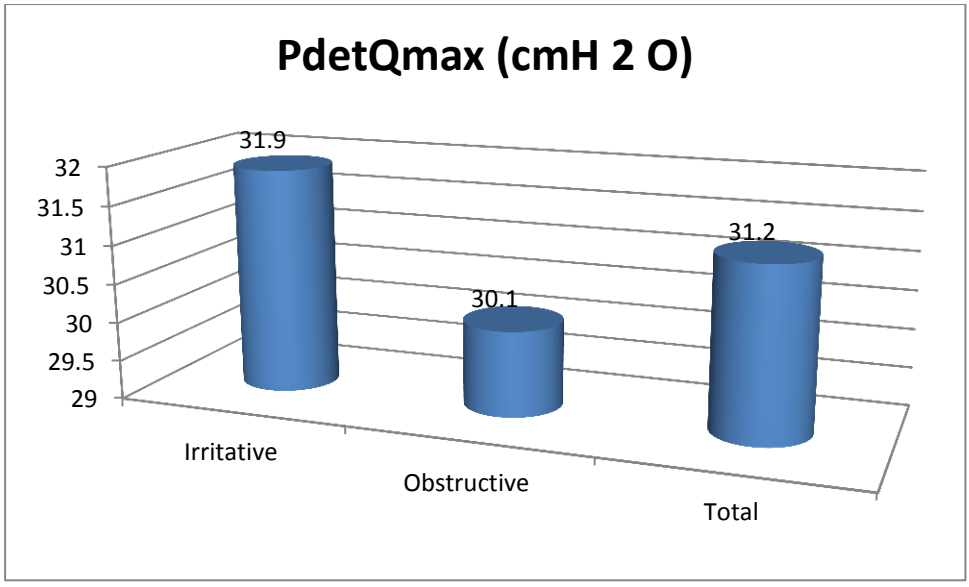



The mean value of PVR is 68.4 ml in irritative LUTS group whereas 84.5ml in case of obstructive LUTS group. Overall mean PVR being 78.4 ml. p value is 0.24 which is not statistically significant.

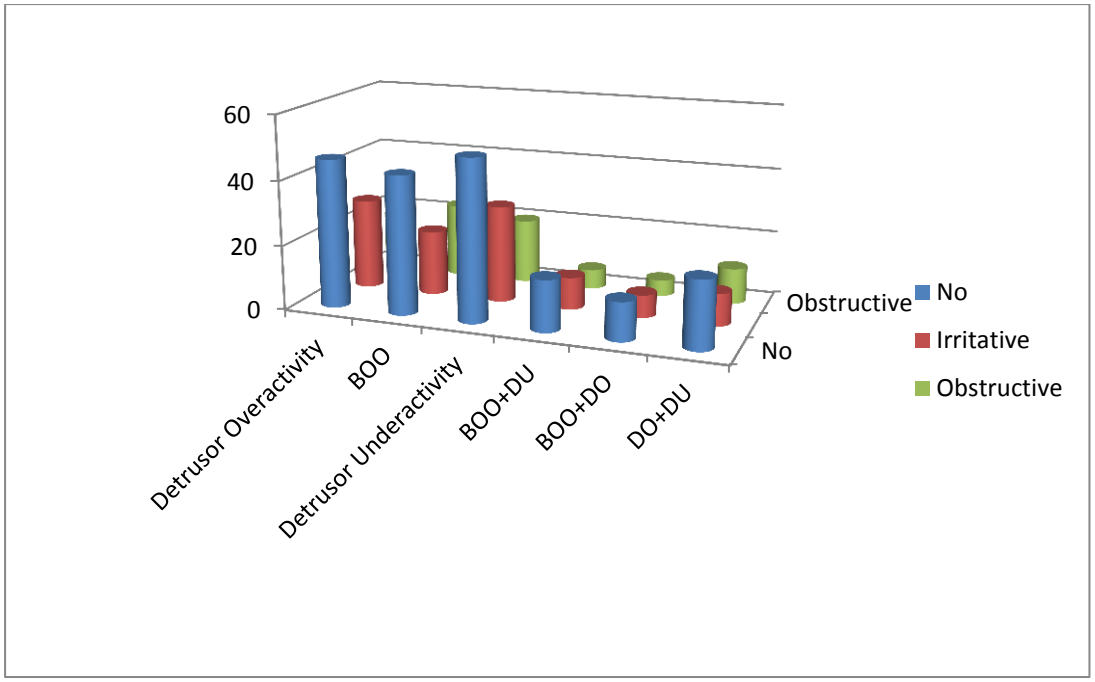



The detrusor pressure during the filling face is being calculated and analysed. Detrusor overactivity is identified in many patients. During voiding phase the maximum detrusor pressure and the detrusor pressure during maximum flow ($p$ det $Q_{max}$ ) is calculated.

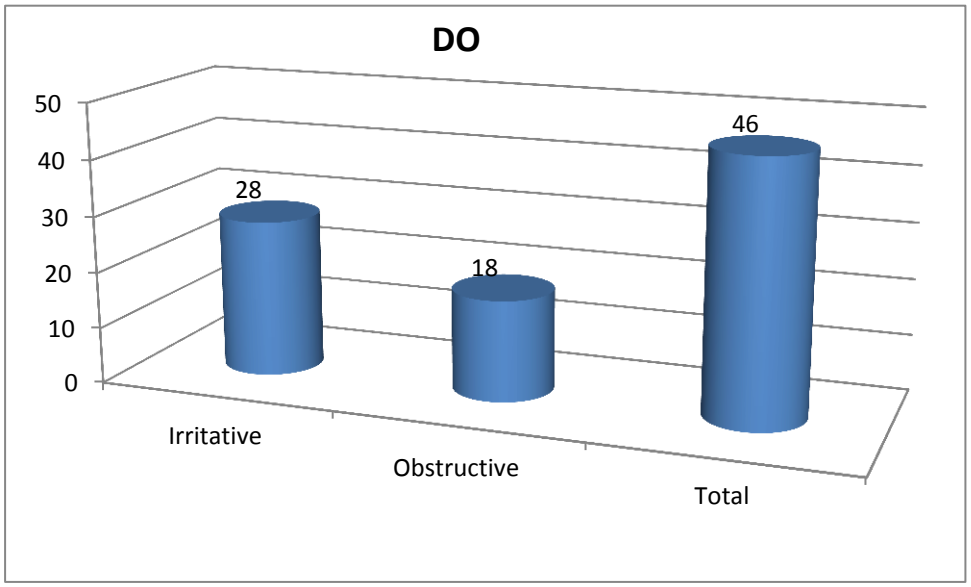
The mean value of $p$ det $Q_{max}$ is 31.9 cm H2O in irritative LUTS group whereas it is 30.1 cm H2O in case of obstructive LUTS group. Overall mean $p$ det $Q_{max}$ being 31.2 cm H2O.The p value is 0.34 which is not statistically significant.



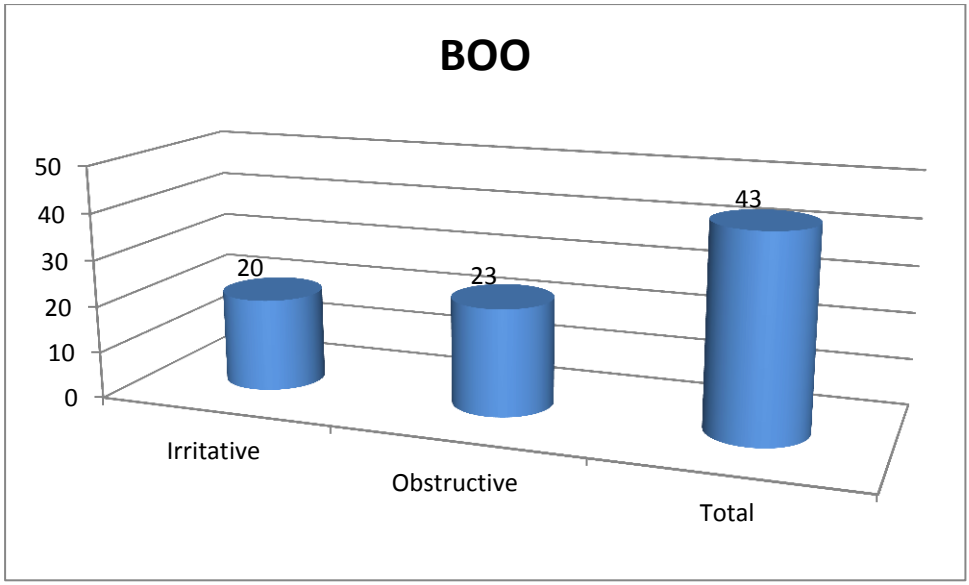

| S NO | UDE parameter | No | Irritative | Obstructive |
|---|---|---|---|---|
| 1 | Detrusor Overactivity | 46 | 28 | 18 |
| 2 | BOO | 43 | 20 | 23 |
| 3 | Detrusor Underactivity | 50 | 30 | 20 |
| 4 | BOO+DU | 16 | 10 | 6 |
| 5 | BOO+DO | 12 | 7 | 5 |
| 6 | DO+DU | 21 | 10 | 11 |




Detrusor overactivity(DO) has been observed that 46 patients .Among them, 18 patients belongs to the obstructive group and 28 patients are from irritative LUTS group.

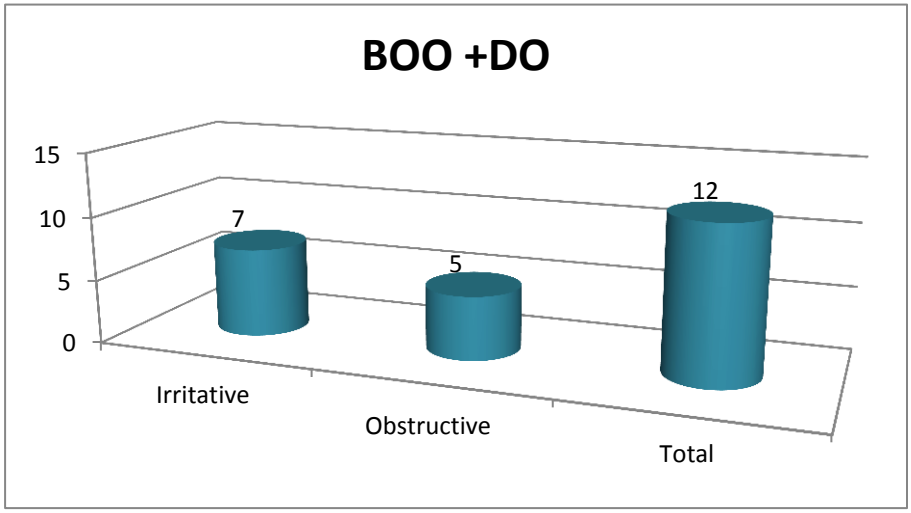



The bladder outlet obstruction (BOO) is being calculated using the formula BOOI= $p$ det $Q_{max}$ – 2 $Q_{max}$).

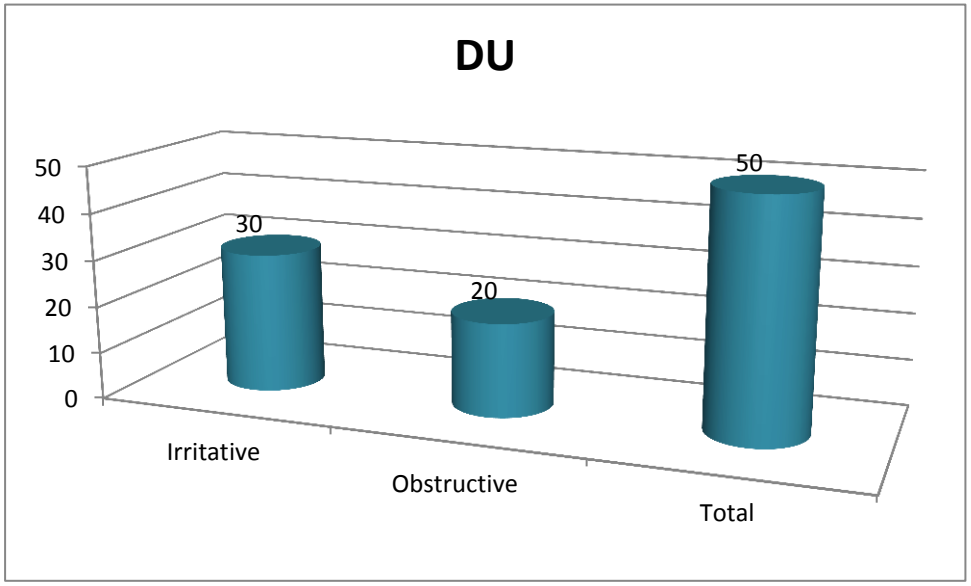



It has been observed that 43 patients showed BOO. Among them, 23 patients belongs to the obstructive group and 20 patients are from irritative LUTS group.

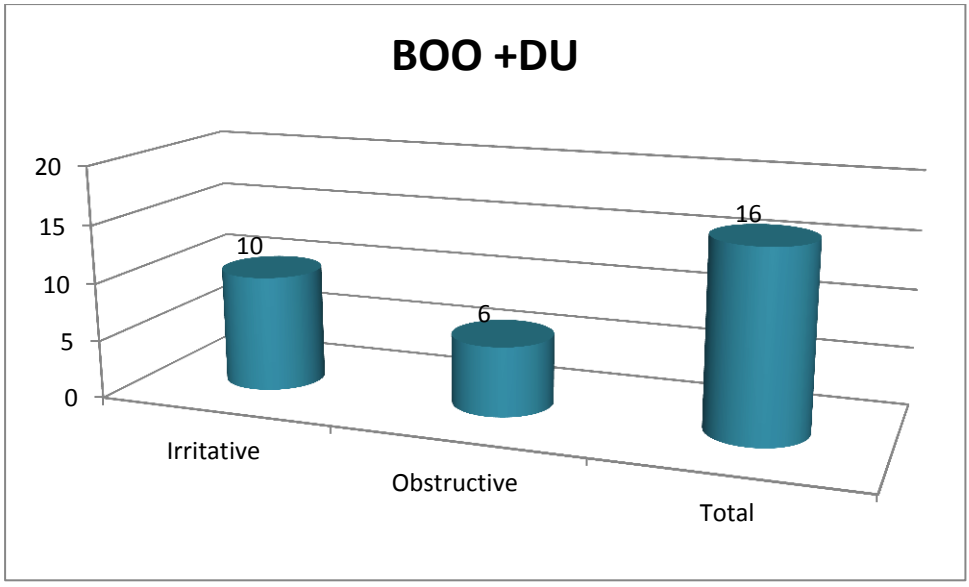
Many cases presented with bladder outlet obstruction (BOO) and DO. It has been observed that 12 patients showed BOO+DO. Among them, 5 patients belongs to the obstructive group and 7 patients are from irritative LUTS group.



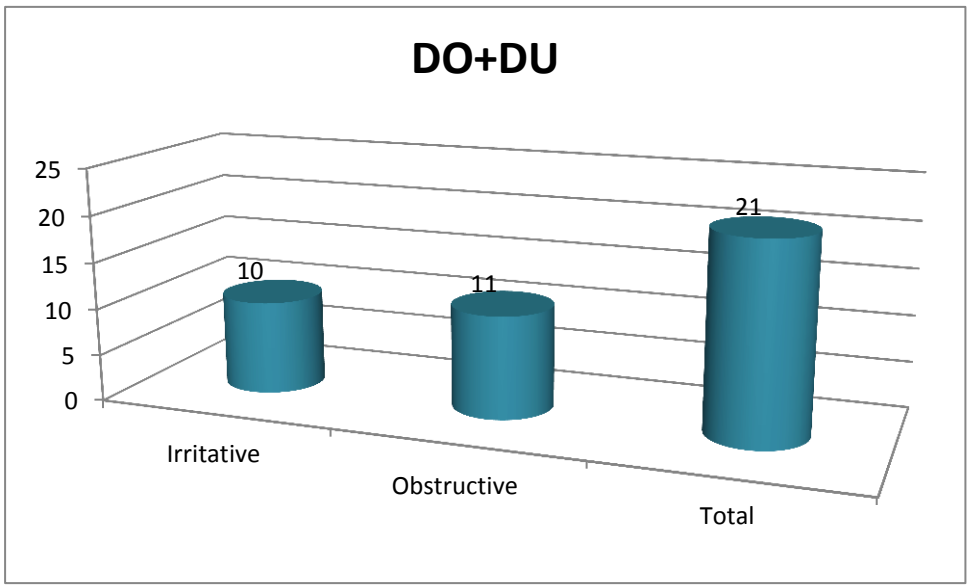
Detrusor underactivity (DU),is being calculated using the bladder contractility index (BCI). BCI=p detQmax + 5 Qmax. A value below 100 is pathognomic of DU. It has been observed that 50 patients showed DU.Among them, 20 patients belongs to the obstructive group and 30 patients are from irritative LUTS group.



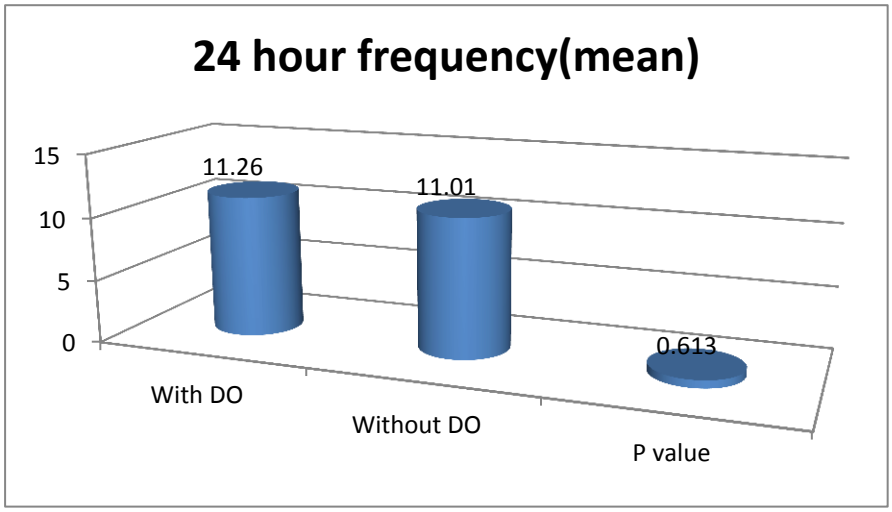

Many cases presented with bladder outlet obstruction (BOO) and DU. It has been observed that 16 patients showed BOO+DU. Among them, 6 patients belongs to the obstructive group and 10 patients are from irritative LUTS group.




Some cases presented with detrusor overactity(DO) and DU. It has been observed that 21 patients showed DO+DU. Among them, 11 patients belongs to the obstructive group and 10 patients are from irritative LUTS group.



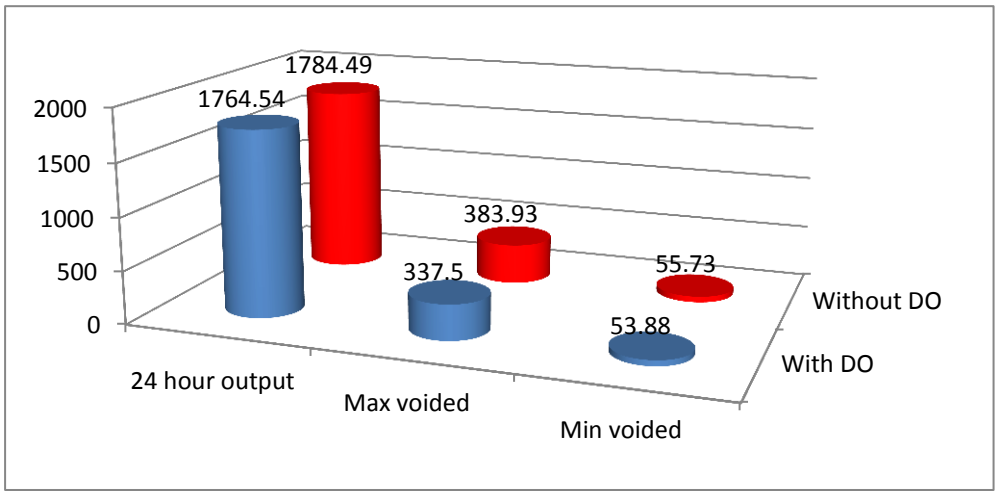
**Detrusor overactivity**




The clinical and the urodynamic parameters are compared.The urgency and the frequency are related with the detrusor overactivity.For those who showed DO has a mean 24 hours frequency of 11.26 wheras those without DO has a mean 24 hours frequency of 11.01;the p value

being 0.613. The 24 hour urine output was correlated with the detrusor overactivity.

The mean 24 hour urine output of those with DO is a 1764.54 ml and those without DO is 1784.49 ml; p value being 0.82,the mean amount of maximum output in those with DO is 337.5 ml and those without DO is 383.93 ml ;p value being 0.27,the mean amount of minimum output in patients with DO is 3.88 ml and without DO is 55.73 ml ;p value being 0.428 which is not statistically significant.




| Variables | With DO | Without DO | P value |
|---|---|---|---|
| 24 hour frequency(mean) | 11.26 | 11.01 | 0.613 |
| 24 hour production(mean) | 1764.54 | 1784.49 | 0.82 |
| Maximum voided volume(mean) | 337.5 | 383.93 | 0.207 |
| Minimum voided volume (mean) | 53.88 | 55.73 | 0.428 |

**Rajiv Gandhi Govt General Hospital**

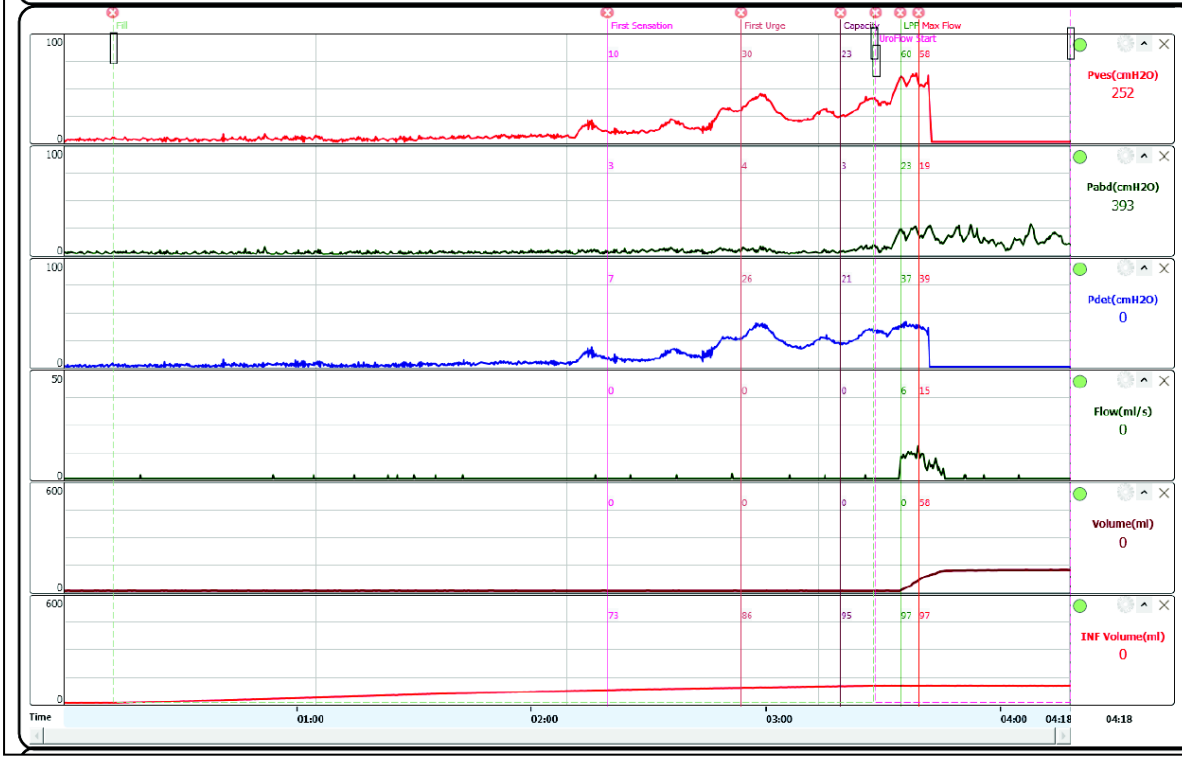
Chennai-600 001

Department Of Urology (URO 1)

Test Type :PRESSURE FLOW

Date :19/07/2013 5:11:00 PM

| | |
|---|---|
| **Identity Number** | 750 |
| **Name Surname** | Antony Mr |
| **Birthdate** | 04.09.1949 |
| **Marital Status** | Married |
| **Gender** | Male 64 year |



**Rajiv Gandhi Govt General Hospital**

Chennai-600 001

Department Of Urology (URO 1)

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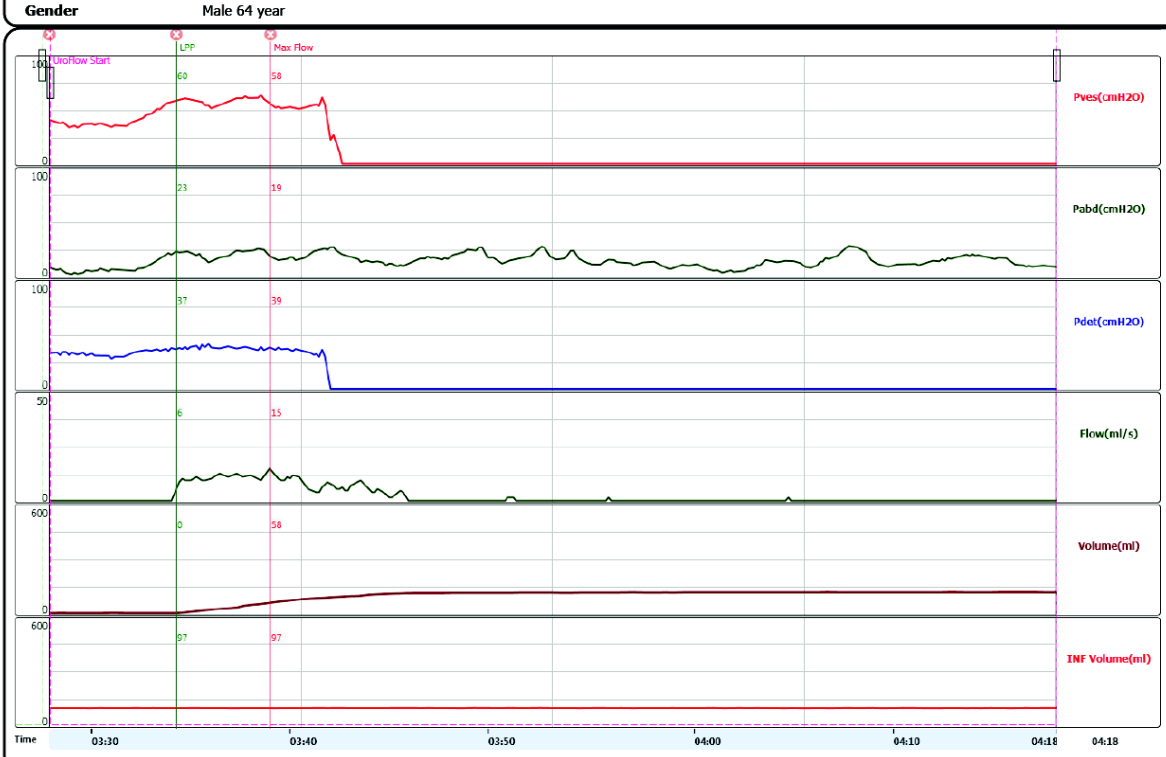



| Uroflow Summary | |
|---|---|
| **Start Time** | 3 minute 27 sec |
| **Stop Time** | 4 minute 18 sec |
| **Max Flow (ml/sec)** | 15 |
| **Flow Start Time** | 3 minute 33 sec |
| **Max Flow Time** | 3 minute 38 sec |
| **Average Flow (ml/sec)** | 2.2 |
| **Voided Volume (ml)** | 116 |
| **Void Duration** | 31 sec |
| **PDet When Max Flow (cmH2O)** | 38 |
| **Max PDet (cmH2O)** | 42 |
| **Max Flow When Max PDet (ml/sec)** | 10 |
| **Pves For Max Flow (ml/sec)** | 57 |

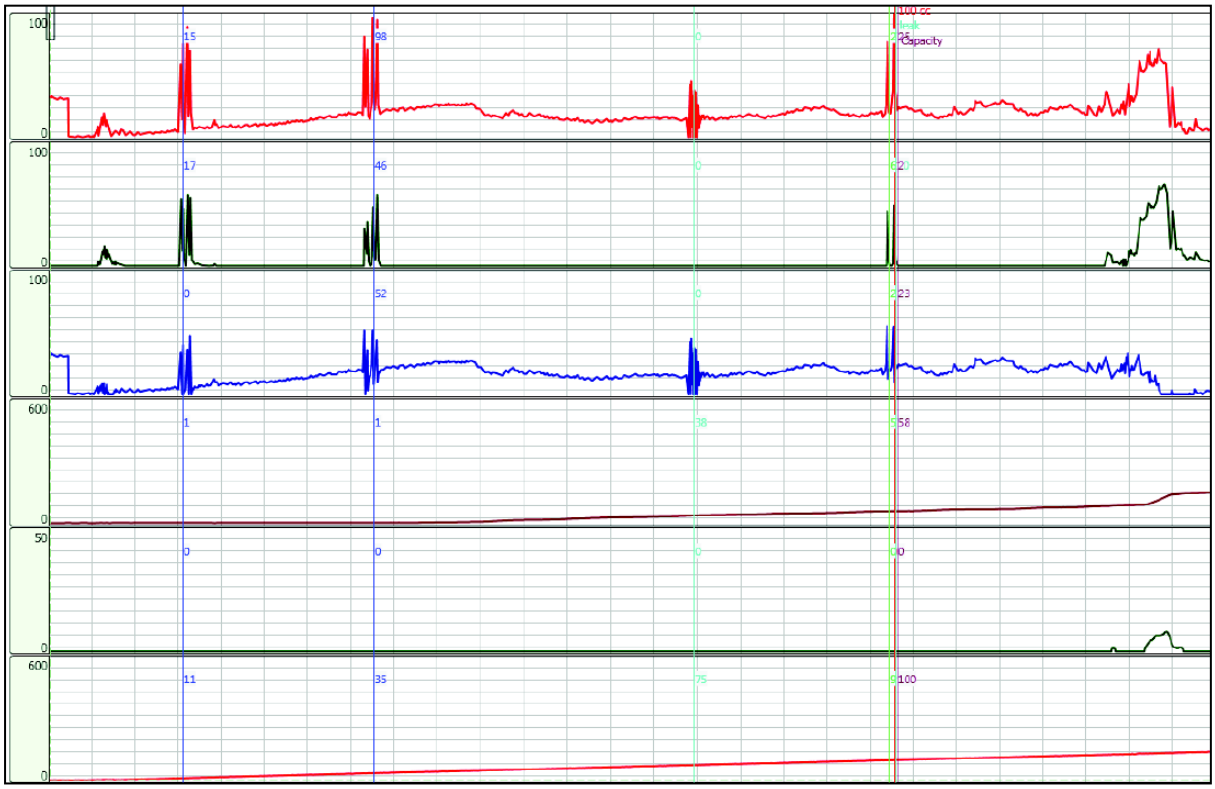
=Event Summary (1) =

| Event Name | Time (hour:minute:sec) | Pabd cmH2O | Pves cmH2O | Pdet cmH2O | Volume ml | Flow ml/sec | INF |
|---|---|---|---|---|---|---|---|
| LPP | 00:03:34 | 23 | 60 | 36 | 0 | 5 | 96 |
| Max Flow | 00:03:38 | 18 | 57 | 38 | 57 | 15 | 97 |

| Fill Summary | |
|---|---|
| **Start Time** | 12 sec |
| **Stop Time** | 3 minute 27 sec |
| **VFill (ml)** | 97 |
| **Max PAbd (cmH2O)** | 8.46118721461187 |
| **Max PVes (cmH2O)** | 45 |
| **Max PDet (cmH2O)** | 41 |
| **Compliance dVFill/ dPdet (cmH2O)** | 3 |
| **Pump Speed (ml/min) (ml/minute)** | Avg 24<br>Max 38 |

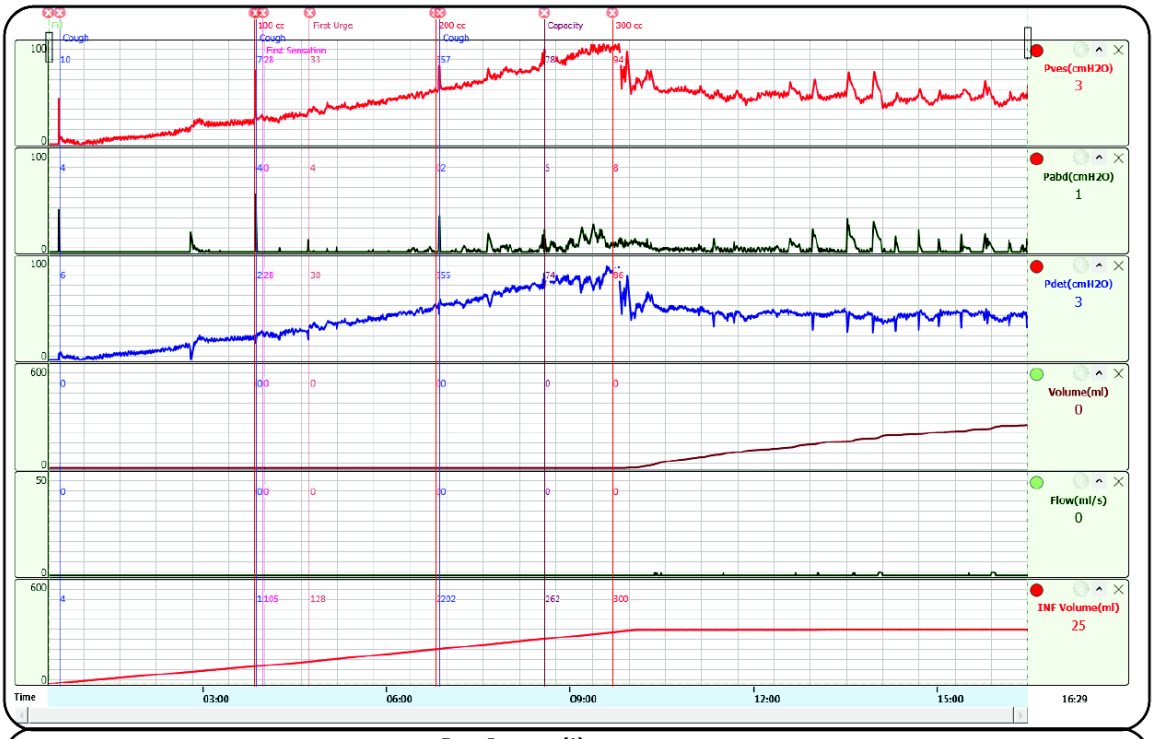
=Event Summary (1) =

| Event Name | Time (hour:minute:sec) | Pabd cmH2O | Pves cmH2O | Pdet cmH2O | Volume ml | Flow ml/sec | INF |
|---|---|---|---|---|---|---|---|
| First Sensation | 00:02:19 | 2 | 10 | 7 | 0 | 0 | 73 |
| First Urge | 00:02:53 | 4 | 29 | 25 | 0 | 0 | 85 |
| Capacity | 00:03:18 | 2 | 23 | 20 | 0 | 0 | 95 |



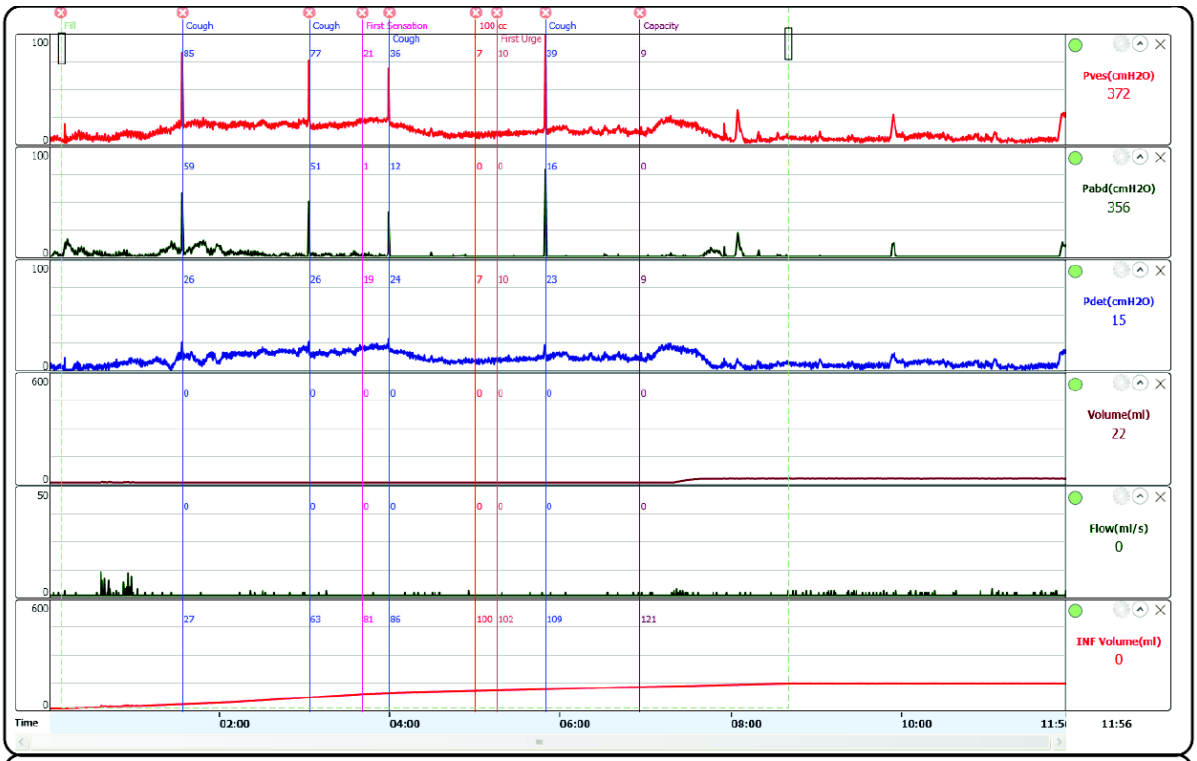
| Fill Summary | |
|---|---|
| **Start Time** | 0 sec |
| **Stop Time** | 4 minute 57 sec |
| **VFill (ml)** | 140 |
| **Max PAbd (cmH2O)** | 67.006 |
| **Max PVes (cmH2O)** | 101.845 |
| **Max PDet (cmH2O)** | 56 |
| **Compliance dVFill/ dPdet (cmH2O)** | 18.2 |
| **Pump Speed (ml/min) (ml/minute)** | Avg 24<br>Max 40 |

| Event Name | =Event Summary Time (hour:minute:sec) | (1) = Pdet cmH2O | Flow ml/sec | Volume ml | INF | Pves cmH2O | Pabd cmH2O |
|---|---|---|---|---|---|---|---|
| Cough | 00:00:34 | 0 | 0 | 1 | 10 | 14 | 16 |
| Cough | 00:01:23 | 52 | 0 | 1 | 35 | 98 | 46 |
| artifact | 00:02:44 | 0 | 0 | 37 | 74 | 0 | 0 |
| Valsalva | 00:03:34 | 20 | 0 | 57 | 98 | 26 | 6 |
| 100 cc | 00:03:35 | 55 | 0 | 58 | 99 | 67 | 11 |
| leak | 00:03:35 | 22 | 0 | 58 | 100 | 32 | 9 |
| Capacity | 00:03:36 | 22 | 0 | 58 | 100 | 24 | 2 |



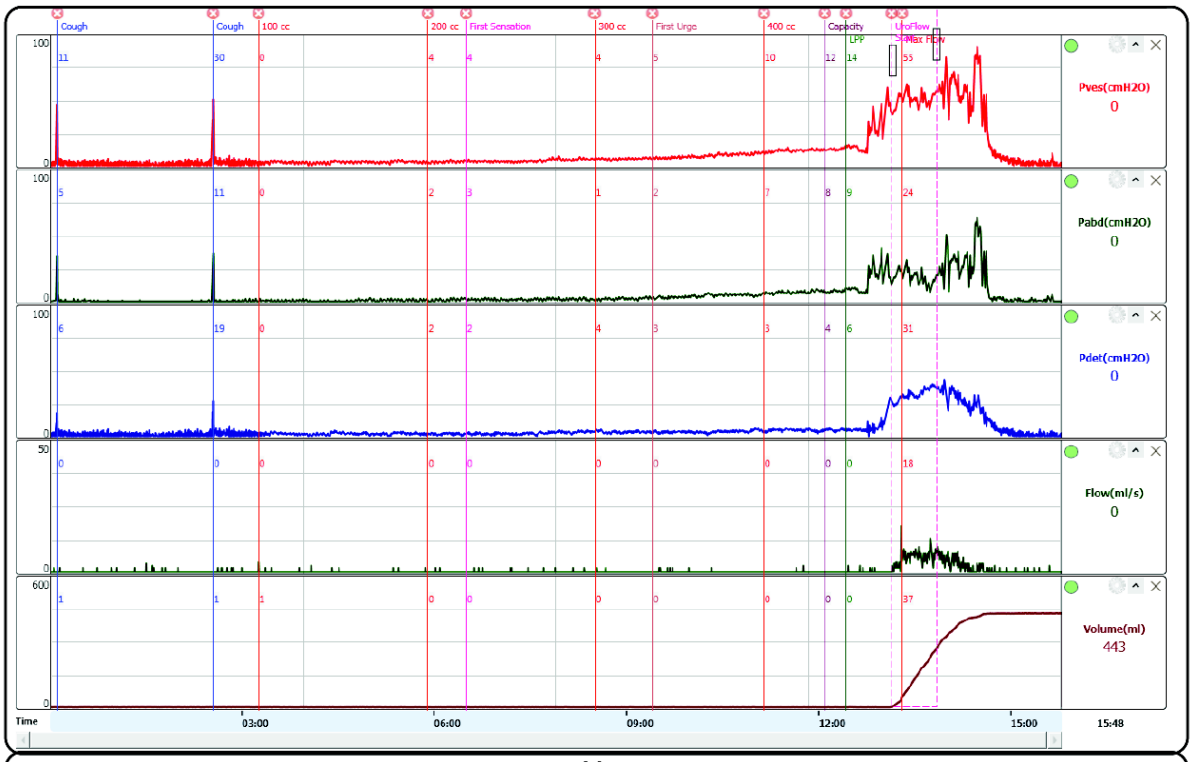

| Fill Summary | |
|---|---|
| **Start Time** | 27 sec |
| **Stop Time** | 16 minute 29 sec |
| **VFill (ml)** | 316 |
| **Max PAbd (cmH2O)** | 56.213 |
| **Max PVes (cmH2O)** | 98.62 |
| **Max PDet (cmH2O)** | 91 |
| **Compliance dVFill/ dPdet (cmH2O)** | 8.7 |
| **Pump Speed (ml/min) (ml/minute)** | Avg 24<br>Max 40 |

| Event Name | =Event Summary Time (hour:minute:sec) | (1) = Pdet cmH2O | Flow ml/sec | Volume ml | INF | Pabd cmH2O | Pves cmH2O |
|---|---|---|---|---|---|---|---|
| Cough | 00:00:38 | 6 | 0 | 0 | 3 | 4 | 10 |
| 100 cc | 00:03:49 | 21 | 0 | 0 | 99 | 0 | 21 |
| Cough | 00:03:51 | 22 | 0 | 0 | 101 | 47 | 69 |
| First Sensation | 00:03:57 | 27 | 0 | 0 | 104 | 0 | 27 |
| First Urge | 00:04:43 | 29 | 0 | 0 | 128 | 3 | 33 |
| 200 cc | 00:06:47 | 53 | 0 | 0 | 199 | 0 | 53 |
| Cough | 00:06:51 | 54 | 0 | 0 | 202 | 2 | 57 |
| Capacity | 00:08:34 | 73 | 0 | 0 | 261 | 4 | 78 |
| 300 cc | 00:09:40 | 86 | 0 | 0 | 299 | 8 | 94 |



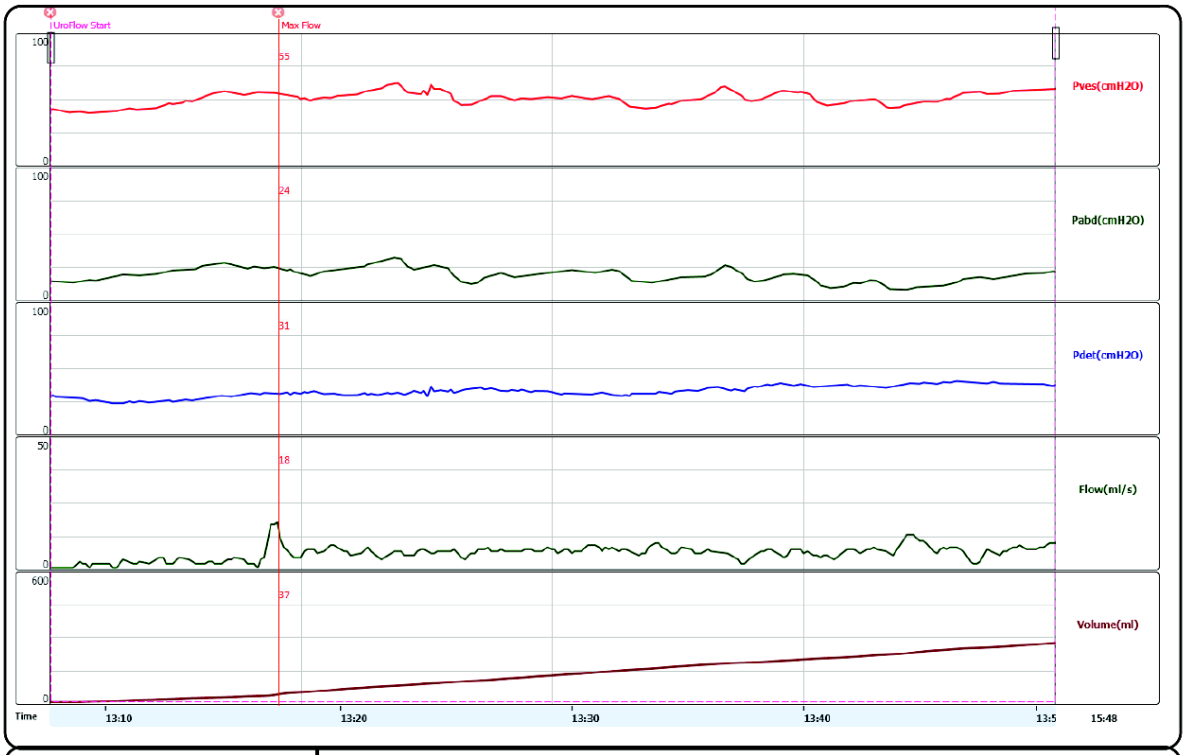

=Event Summary (1) =

| Event Name | Time (hour:minute:sec) | Pdet cmH2O | Flow ml/sec | Volume ml | INF | Pabd cmH2O | Pves cmH2O |
|---|---|---|---|---|---|---|---|
| Cough | 00:01:33 | 25 | 0 | 0 | 26 | 58 | 84 |
| Cough | 00:03:02 | 26 | 0 | 0 | 63 | 51 | 77 |
| First Sensation | 00:03:40 | 19 | 0 | 0 | 80 | 1 | 20 |
| Cough | 00:03:59 | 23 | 0 | 0 | 86 | 11 | 35 |
| 100 cc | 00:05:00 | 6 | 0 | 0 | 99 | 0 | 6 |
| First Urge | 00:05:14 | 9 | 0 | 0 | 101 | 0 | 9 |
| Cough | 00:05:49 | 22 | 0 | 0 | 108 | 16 | 38 |
| Capacity | 00:06:54 | 9 | 0 | 0 | 121 | 0 | 9 |




=Event Summary (1) =

| Event Name | Time (hour:minute:sec) | Pabd cmH2O | Pves cmH2O | Pdet cmH2O | Volume ml | Flow ml/sec | INF |
|---|---|---|---|---|---|---|---|
| Cough | 00:00:06 | 4 | 10 | 6 | 1 | 0 | 0 |
| Cough | 00:02:32 | 11 | 29 | 18 | 1 | 0 | 70 |
| 100 cc | 00:03:14 | 0 | 0 | 0 | 0 | 0 | 97 |
| 200 cc | 00:05:53 | 1 | 3 | 2 | 0 | 0 | 199 |
| First Sensation | 00:06:29 | 2 | 4 | 1 | 0 | 0 | 222 |
| 300 cc | 00:08:29 | 0 | 4 | 3 | 0 | 0 | 299 |
| First Urge | 00:09:23 | 2 | 5 | 2 | 0 | 0 | 334 |
| 400 cc | 00:11:07 | 6 | 9 | 3 | 0 | 0 | 399 |
| Capacity | 00:12:04 | 8 | 12 | 4 | 0 | 0 | 436 |
| LPP | 00:12:24 | 8 | 14 | 5 | 0 | 0 | 449 |
| Max Flow | 00:13:17 | 24 | 54 | 30 | 36 | 17 | 455 |




| Uroflow Summary | |
|---|---|
| Start Time | 13 minute 7 sec |
| Stop Time | 13 minute 50 sec |
| Max Flow (ml/sec) | 17 |
| Flow Start Time | 13 minute 7 sec |
| Max Flow Time | 13 minute 17 sec |
| Average Flow (ml/sec) | 6.3 |
| Voided Volume (ml) | 275 |
| Void Duration | 43 sec |
| PDet When Max Flow (cmH2O) | 30 |
| Max PDet (cmH2O) | 44 |
| Max Flow When Max PDet (ml/sec) | 3 |
| Pves For Max Flow (ml/sec) | 54 |

=Event Summary (1) =

| Event Name | Time (hour:minute:sec) | Pabd cmH2O | Pves cmH2O | Pdet cmH2O | Volume ml | Flow ml/sec | INF |
|---|---|---|---|---|---|---|---|
| Max Flow | 00:13:17 | 24 | 54 | 30 | 36 | 17 | 455 |

# DISCUSSION

Lower urinary tract symptoms affects up to 80% of the elderly population in men.[11]It is complex and multifactorial when LUTS occurs in older men. Weak stream is the main complaint of many patients. The basic evaluation including including relevant medical history, symptom assessment ,clinical examination, urine analysis should be done in LUTS occurring in old men prior to subject the patient for UDS.[7]

For those men with LUTS with features of BOO, UDS is mainly used. With LUTS history alone we cant diagnose BOO[8]. As an initial assessment Urinary flow rate measurement is very useful which is a good tool during or after treatment to monitor the treatment response.

As it is a non invasive test and has clinical value,uroflow measurement is recommended as a part of the specialized investigation to be performed before planning on any active therapy.

It has been proved that more than one third of older men with LUTS do not have urodynamic evidence of obstruction. 30% of patients with decreased flow rate have hypocontractility of detrusor as their main problem.So a low flow rate is not diagnostic of BOO.

Similarly a normal or high flow rate does not rule out obstruction because 8% of symptomatic men with a $Q_{max}$ greater than 15 ml/s are found to present with outlet obstruction. Ideally two flow rates should be obtained, both with a volume greater than 150 ml voided urine. Inspite of repeated recordings, the $Q_{max}$ results at the available voided volumes should be considered in case such voided volume cannot be obtained by the patient.

So it is imperative that UDS studies are recommended before definitive invasive therapy in men with a $Q_{max}$greater than 10 ml/s.In cases with $Q_{max}$ is less than 10 ml/s then there is more likely of obstruction and so PFSs are not always needed. In the evaluation of patients before surgical therapies, or when a precise diagnosis of BOO is important UDS has a definitive role.

It has been proven that only if the details obtained shows that it will affect the treatment decision, in particular, if any operative procedure is being contemplated ,invasive UDS in the form of PFSs should be performed. There is evidence that with urodynamically proven BOO ,the outcome of outlet obstruction procedure is significantly better in such patients.

When patients with LUTS but without BOO, they are less likely to benefit from invasive treatments such as surgery which is planned to relieve outlet obstruction. In men over the age of 80 years prior to trans-resection of the prostate (TURP) it is useful to have PFS because of increaded morbidity and mortality associated with invasive procedures like TURP in this age group of patients, and there may be a possibility that their symptoms could be due to conditions other than BOO like age related change.

Some of the aging changes recorded includes decrease of $Q_{max}$, an increase of PVR volume, a decline in bladder capacity and of bladder compliance.[13]This study confirms the same fact.The mean bladder capacity being 341.7 ml; mean PVR is 78.4 ml and the mean Q max being 13.2.

Detrusor pressure at maximum urinary flow rate is the most important parameter of the PFS.[12] A $Q_{max}$ of 10–15 ml/s and an International Prostate Symptom Score (IPSS) more than 7 without BOO are common in men over the age of 75 who have symptoms of LUTS.[10]

Any surgical intervention in the form of TURP would not be helpful in these cases[9]. In our study the detrusor pressure at maximum urinary flow rate (p det Qmax) being 31.2 cm H2O.

To identify the cause of voiding dysfunction in older men really presents a challenging task. It can be due to many causes including BOO or DU. The only way to differentiate between these two is to perform PFSs and it is more important when surgery is being planned, because in patients with documented BOO ,there is an improved outcome.

Many of the older patients have asymptomatic bladder dysfunction such as a reduction in the bladder capacity and DO. UDS shall demonstrate all of these conditions.Many authors believe that UDS should be used liberally in the elderly. However, some UDS are invasive and are associated with complications and side effects.

Some studies showed a significant association between presence of asymptomatic bacteriuria before cystometry and the age factor. So depends on the clinical evaluation, the type of test and time to perform it and the potential treatment plan has to be systematically performed.

In general, in specific cases and only after ruling out reversible causes of voiding dysfunction,invasive UDS study are performed. In older patients UDS are indicated in those with significant LUTS and coexisting neurologic disease, previous surgery on the lower urinary tract, high PVR volumes, and whenever a surgical procedure is being considered.

UDS is recommended in tough and intractable cases which are not responding to medical or behavioural therapy, and in whom further management is planned. Detailed assessment are mandatory in complicated cases in patients with high comorbidities.

The two main causes of lower urinary tract symptoms in men are bladder outlet obstruction and/or detrusor overactivity (70% and 46%, respectively). There are less details regarding the relationship of lower urinary tract symptoms with detrusor overactivity in men.

The results of this study showed a strong correlation of the symptoms with urodynamics findings. Men presenting with the symptoms of urgency and urge incontinence have typically been diagnosed with idiopathic detrusor overactivity.

Others have reported that storage symptoms correlate well with many of the cases of overactive bladder and it has also been reported that the triad of urgency, frequency and urge incontinence is associated with an detrusor overactivity in around 88% of cases.

During an evaluation of lower urinary tract symptoms in neurologically intact men without obstruction,there are more than half of the patients presented with idiopathic detrusor overactivity, symptoms did not correlate with the urodynamic diagnosis.

In this study, the patients complained mainly of the irritative and obstructive symptoms, study it has been observed that 46 patients showed detrusor overactivity (DO). Among them, 18 patients belongs to the obstructive group and 28 patients are from irritative LUTS group which are statistically significant ($p < 0.01$) . whereas bladder outlet obstruction and detrusor underactivity are not significant statistically. These results predict the symptoms of detrusor overactivity.

Lee ,1999 studied 100 people with lower urinary tract symptoms, UDE results showed 51% with BOO ; 37% showed detrusor underactivity, and 47% were having detrusor overactivity[12].

In our study, detrusor dysfunction was detected in 75 of 100 patients. (75%).Fifty patients showed demonstrable evidence of DU of

whom 21 had concomitant DO, while 16 had concomitant bladder outlet obstruction (BOO). BOO and DO was identified in 43 and 46 patients, respectively.

Idiopathic detrusor overactivity in men may be the only urodynamics finding but it is often associated with concomitant bladder outlet obstruction. Thomas and Abrams, BJU2000 reviewed the urodynamic diagnosis in a large series of men referred for the urodynamic evaluation of lower urinary tract symptoms[8].

Bladder outlet obstruction was the most common urodynamics finding, occurring in around 70% of the study population.Nearly half of the patients with obstruction also had idiopathic detrusor overactivity . In this study 43% of the patients had bladder outlet obstruction, of whom 12% had concomitant detrusor overactivity.

# CONCLUSION

This study supports the use of urodynamic study in the evaluation of elderly men more than 50 years old presenting with LUTS.

A significant proportion of elderly patients was found to have urodynamic abnormalities such as detrusor overactivity(DO)or detrusor under activity (DU) or bladder outlet obstruction(BOO) and additionally,the urodynamic abnormalities are widely differing, reflecting the variation in underlying etiologies

Detrusor overactivity in patients with LUTS significantly affects their symptom score and perception of quality of life. Moreover, it is strongly affected by the degree of obstruction on uroflowmetry, post-void residual urine estimation as assessed by pressure flow study.

So urodynamic study plays an important role in establishing a correct diagnosis in elderly patients with LUTS and deciding on additional treatments.

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# MASTER CHART

| S NO | Name | Age | IPSS | Capacity(ml) | PVR(ml) | Max PDet (cmH2O) | Q max (ml/s) | p det Q max |
|---|---|---|---|---|---|---|---|---|
| 1 | Anthony | 66 | 25 | 415 | 56 | 41 | 15 | 38 |
| 2 | Arulappan | 75 | 22 | 366 | 73 | 83 | 10 | 45 |
| 3 | Perumal | 56 | 20 | 320 | 62 | 8 | 11 | 26 |
| 4 | MadanRaj | 52 | 22 | 330 | 56 | 27 | 10 | 33 |
| 5 | Kothandarajan | 73 | 24 | 340 | 67 | 22 | 17 | 38 |
| 6 | Lateef | 64 | 19 | 360 | 76 | 7 | 7 | 26 |
| 7 | Suresh | 59 | 21 | 380 | 45 | 31 | 18 | 34 |
| 8 | Dinesh | 72 | 20 | 330 | 76 | 8 | 6 | 10 |
| 9 | Arjunan | 71 | 19 | 322 | 55 | 3 | 15 | 33 |
| 10 | Arunkumar | 68 | 22 | 280 | 62 | 21 | 8 | 10 |
| 11 | Shankaran | 77 | 25 | 320 | 67 | 20 | 11 | 36 |
| 12 | Ranganathan | 55 | 22 | 360 | 58 | 6 | 10 | 37 |
| 13 | Karhick | 68 | 25 | 340 | 55 | 14 | 16 | 34 |
| 14 | Shanmugasundaram | 66 | 22 | 324 | 65 | 6 | 12 | 11 |
| 15 | Perumal | 74 | 18 | 328 | 50 | 22 | 16 | 35 |
| 16 | Moorthy | 72 | 21 | 320 | 62 | 9 | 14 | 10 |
| 17 | Jacob Pandian | 59 | 23 | 365 | 60 | 5 | 15 | 10 |
| 18 | Elangovan | 73 | 24 | 345 | 50 | 15 | 18 | 35 |
| 19 | Arjunan | 67 | 19 | 335 | 55 | 32 | 16 | 32 |
| 20 | Arumugam | 72 | 21 | 305 | 75 | 2 | 5 | 10 |
| 21 | Manikandan | 53 | 20 | 290 | 80 | 6 | 6 | 9 |
| 22 | Mahesh | 69 | 22 | 285 | 76 | 38 | 7 | 33 |
| 23 | Syed Rizwan | 70 | 24 | 330 | 88 | 33 | 8 | 28 |
| 24 | Dhananjayan | 56 | 21 | 280 | 65 | 7 | 11 | 10 |
| 25 | Bilal | 77 | 20 | 300 | 90 | 26 | 7 | 31 |
| 26 | Thangaraj | 63 | 23 | 320 | 59 | 23 | 17 | 26 |
| 27 | Saravanan | 72 | 20 | 350 | 78 | 6 | 7 | 10 |
| 28 | Ganesan | 64 | 19 | 295 | 83 | 12 | 8 | 28 |
| 29 | Manikandan | 71 | 24 | 300 | 56 | 33 | 16 | 31 |
| 30 | Karthikeyan | 69 | 21 | 350 | 89 | 21 | 6 | 27 |
| 31 | Moorthy | 66 | 24 | 379 | 85 | 8 | 7 | 12 |
| 32 | Santhakumar | 73 | 20 | 350 | 66 | 12 | 14 | 19 |
| 33 | Abdul Hameed | 75 | 23 | 330 | 87 | 24 | 8 | 32 |
| 34 | Suresh | 68 | 21 | 270 | 85 | 45 | 6 | 37 |
| 35 | Senthilkumar | 51 | 20 | 310 | 60 | 7 | 12 | 10 |
| 36 | Murugesan | 58 | 23 | 355 | 78 | 41 | 5 | 36 |
| 37 | Shanmugam | 80 | 18 | 325 | 85 | 30 | 6 | 32 |
| 38 | Jameel | 75 | 24 | 320 | 68 | 5 | 15 | 10 |
| 39 | Panchavarnam | 77 | 21 | 330 | 76 | 31 | 9 | 30 |
| 40 | Balasubramaniyam | 57 | 19 | 350 | 80 | 22 | 7 | 34 |
| 41 | Natarajan | 66 | 22 | 345 | 68 | 7 | 15 | 12 |
| 42 | Vijaykumar | 72 | 23 | 320 | 60 | 12 | 13 | 31 |
| 43 | Shanmuham | 64 | 21 | 330 | 56 | 23 | 15 | 33 |
| 44 | Kumar | 70 | 19 | 345 | 59 | 25 | 17 | 32 |
| 45 | Bose | 67 | 24 | 315 | 50 | 20 | 16 | 35 |
| 46 | Kalaiarasan | 59 | 21 | 320 | 62 | 30 | 13 | 30 |
| 47 | Dillibabu | 66 | 20 | 330 | 65 | 6 | 14 | 10 |
| 48 | Naveenkumar | 52 | 19 | 350 | 68 | 12 | 12 | 30 |
| 49 | Gopiramalingam | 74 | 24 | 360 | 70 | 10 | 8 | 36 |
| 50 | Arulappan | 69 | 21 | 340 | 50 | 34 | 19 | 31 |
| 51 | Krishnamoorthy | 65 | 22 | 345 | 54 | 23 | 13 | 27 |
| 52 | Rajamohan | 58 | 19 | 320 | 60 | 23 | 11 | 28 |
| 53 | Rameshkumar | 63 | 25 | 360 | 70 | 31 | 10 | 36 |
| 54 | Robert | 75 | 22 | 350 | 85 | 11 | 10 | 12 |
| 55 | Jagan | 53 | 23 | 340 | 69 | 44 | 13 | 32 |
| 56 | Subramaniyan | 82 | 23 | 310 | 67 | 8 | 14 | 10 |
| 57 | Murugan | 56 | 19 | 280 | 50 | 15 | 16 | 21 |

| S NO | Name | Age | IPSS | Capacity(ml) | PVR(ml) | Max PDet (cmH2O) | Q max (ml/s) | p det Q max |
|---|---|---|---|---|---|---|---|---|
| 58 | Vasanthkumar | 65 | 24 | 300 | 70 | 16 | 9 | 18 |
| 59 | Loganathan | 73 | 21 | 325 | 75 | 7 | 8 | 11 |
| 60 | Murugan Karuppan | 64 | 22 | 345 | 64 | 23 | 12 | 21 |
| 61 | Kallalazhar | 74 | 24 | 280 | 58 | 25 | 15 | 35 |
| 62 | Datchinamoorthy | 66 | 19 | 320 | 55 | 12 | 14 | 22 |
| 63 | Ramachandran | 63 | 21 | 355 | 60 | 29 | 13 | 24 |
| 64 | Abdullah | 72 | 20 | 340 | 65 | 20 | 11 | 32 |
| 65 | Krishnakumar | 56 | 23 | 325 | 54 | 25 | 17 | 22 |
| 66 | Devan | 68 | 17 | 320 | 55 | 15 | 16 | 34 |
| 67 | Sarathkumar | 53 | 19 | 335 | 58 | 23 | 11 | 35 |
| 68 | Patchayappan | 73 | 20 | 290 | 54 | 11 | 10 | 33 |
| 69 | Muthuswamy | 69 | 22 | 275 | 58 | 16 | 14 | 29 |
| 70 | Arjunan | 75 | 23 | 330 | 60 | 21 | 16 | 31 |
| 71 | Ramarao | 73 | 19 | 330 | 68 | 30 | 15 | 35 |
| 72 | Chinnaiyyah | 68 | 20 | 360 | 80 | 10 | 6 | 23 |
| 73 | Vignesh | 56 | 18 | 320 | 84 | 5 | 7 | 12 |
| 74 | Asirvatham | 69 | 21 | 310 | 70 | 12 | 10 | 28 |
| 75 | Rajan Madhavan | 72 | 18 | 355 | 90 | 32 | 7 | 34 |
| 76 | Gopi Parthasarathy | 66 | 20 | 340 | 80 | 10 | 8 | 13 |
| 77 | John | 62 | 22 | 290 | 75 | 5 | 10 | 12 |
| 78 | Baghavan | 59 | 18 | 310 | 70 | 10 | 7 | 9 |
| 79 | Malaisamy | 56 | 22 | 300 | 85 | 5 | 7 | 10 |
| 80 | Elumalai | 69 | 18 | 350 | 75 | 6 | 10 | 11 |
| 81 | Balakrishnan | 70 | 24 | 365 | 65 | 13 | 13 | 33 |
| 82 | Asirvatham | 60 | 21 | 270 | 60 | 22 | 12 | 28 |
| 83 | Rajasekar | 80 | 22 | 290 | 90 | 30 | 6 | 27 |
| 84 | Ravi | 50 | 19 | 350 | 75 | 21 | 9 | 23 |
| 85 | Dharman | 68 | 20 | 320 | 60 | 13 | 11 | 21 |
| 86 | Angamuthu | 75 | 21 | 310 | 70 | 6 | 10 | 10 |
| 87 | Govindaraj | 54 | 17 | 340 | 65 | 22 | 10 | 26 |
| 88 | Thirupurakandan | 57 | 22 | 360 | 85 | 23 | 7 | 28 |
| 89 | Govindaraj | 68 | 19 | 310 | 70 | 5 | 9 | 10 |
| 90 | Vasudevan | 64 | 22 | 280 | 65 | 10 | 11 | 10 |
| 91 | Venkatesan | 66 | 21 | 300 | 70 | 32 | 10 | 34 |
| 92 | Muthukrishnan | 73 | 23 | 305 | 56 | 16 | 17 | 23 |
| 93 | Saravanan | 57 | 18 | 290 | 66 | 25 | 14 | 29 |
| 94 | Ganesan Irulappan | 71 | 22 | 330 | 80 | 18 | 7 | 11 |
| 95 | Ramamoothy | 68 | 20 | 320 | 74 | 26 | 8 | 30 |
| 96 | Sakthivel | 66 | 21 | 300 | 67 | 51 | 10 | 36 |
| 97 | Jagan | 56 | 18 | 270 | 55 | 23 | 15 | 21 |
| 98 | Dhinesh | 52 | 17 | 370 | 70 | 41 | 9 | 38 |
| 99 | Kothandapan | 76 | 21 | 300 | 80 | 15 | 6 | 21 |
| 100 | Rajendran | 75 | 22 | 356 | 76 | 14 | 11 | 23 |

# PROFORMA

Name Age Sex IP/OP No

Address:

## Complaints

Poor urinary stream /Abdominal straining /Hesitancy/Intermittency/ Incomplete bladder emptying/Terminal and post-micturition dribble

Dysuria /Frequency/ Nocturia/Urgency/Incontinence

Duration:

Haematuria, strangury and loin pain

Comorbid illness: DM/HT/TB

Surgical history.:

Trauma/spinal injury, vertebral degenerative conditions, parkinsonism,stroke:

Drug history:

## Frequency Volume Chart

| Day | Time/Volume | Day time | Night time | No of pads/24 hrs |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## Examination

General Examination:

Vitals

Per Abdomen

Neurological Examination

External Genitalia

Digital Rectal Examination

## INVESTIGATIONS

Urine Alb Sugar Deposits

Urine : Culture & Sensitivity

Blood: RFT Urea Sugar Creatinine Na K

USG KUB

Other Investigations:

## URODYNAMICS

**Cystometry(**Pressure flow study)

Max Pdet Max P vesc Max Pabd

**Uroflowmetry:.**

# APPENDIX

## Normal Urodynamic Values

### UROFLOWMETRY

- Men under 40 years = Qmax > 25ml/sec
- Men over 60 years = Qmax > 15mls/sec
- Females = Qmax >30-35ml/sec

### PRESSURE/FLOW STUDIES

- Maximum cystometric capacity (MCC) = 350-600ml
- Volume at first sensation = approx 50% of MCC
- Volume at normal desire = approx 75% of MCC
- Volume at strong desire = approx 90% of MCC
- Normal compliance = >30ml/cmH2O
- Normal detrusor pressure during filling < 10 cm H2O

### VOIDING

- Maximum detrusor pressure = 25-60 cmH2O
- Pdet@Qmax in men = 40-60 cmH2O
- Pdet@Qmax in females = 20-40 cmH2O
- Post void residual = <25ml

## International Prostate Symptom Score (I-PSS)

**Patient Name: _____ Date of birth: _____ Date completed _____**

| In the past month: | Not at All | Less than 1 in 5 Times | Less than Half the Time | About Half the Time | More than Half the Time | Almost Always | Your score |
|---|---|---|---|---|---|---|---|
| **1. Incomplete Emptying** How often have you had the sensation of not emptying your bladder? | 0 | 1 | 2 | 3 | 4 | 5 | |
| **2. Frequency** How often have you had to urinate less than every two hours? | 0 | 1 | 2 | 3 | 4 | 5 | |
| **3. Intermittency** How often have you found you stopped and started again several times when you urinated? | 0 | 1 | 2 | 3 | 4 | 5 | |
| **4. Urgency** How often have you found it difficult to postpone urination? | 0 | 1 | 2 | 3 | 4 | 5 | |
| **5. Weak Stream** How often have you had a weak urinary stream? | 0 | 1 | 2 | 3 | 4 | 5 | |
| **6. Straining** How often have you had to strain to start urination? | 0 | 1 | 2 | 3 | 4 | 5 | |
| | **None** | **1 Time** | **2 Times** | **3 Times** | **4 Times** | **5 Times** | |
| **7. Nocturia** How many times did you typically get up at night to urinate? | 0 | 1 | 2 | 3 | 4 | 5 | |
| **Total I-PSS Score** | | | | | | | |

**Score:** 1-7: *Mild* 8-19: *Moderate* 20-35: *Severe*

| Quality of Life Due to Urinary Symptoms | Delighted | Pleased | Mostly Satisfied | Mixed | Mostly Dissatisfied | Unhappy | Terrible |
|---|---|---|---|---|---|---|---|
| If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |

# ABBREVIATIONS

AUDS-Ambulatory Urodynamic Studies

BOO -Bladder Outlet Obstruction

BPE -Benign Prostatic Enlargement

BPH -Benign Prostatic Hyperplasia

BPO Benign Prostatic Obstruction

DSD Detrusor Sphincter Dyssynergia

DU- Detrusor Underactivity

ICS International Continence Society

IDO Idiopathic Detrusor Overactivity

LUTS- Lower Urinary Tract Symptoms

p abd -Abdominal pressure

p det Detrusor pressure

PFS Pressure-flow studies

p ves Intravesical pressure

PVR Post-void residual

Q ave Average flow rate

Q max Maximum flow rate

TURP Trans Urethral Resection of the Prostate

UDS Urodynamic studies

UPP Urethral pressure profile

VUDS Videourodynamic studies

# PATIENT CONSENT FORM

**Title of the Project**

## URODYNAMIC ANALYSIS OF MEN WITH LOWER URINARY TRACT SYMPTOMS

Institution : **Department of Urology,**
Madras Medical College,
Chennai-600 003.

| | | | |
|---|---|---|---|
| Name | : | Date | : |
| Age | : | IP No | : |
| Sex | : | Project Patient No | : |

The details of the study have been provided to me in writing and explained to me in my own language.

I confirm that I have understood the above study and had the opportunity to ask questions.

I understood that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without the medical care that will normally be provided by the hospital being affected.

I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s).

I have been given an information sheet giving details of the study.

I fully consent to participate in the above study regarding prostate biopsy and drug intake before and after surgery.

| _____ | _____ | _____ |
|---|---|---|
| Name of the Subject | Signature | Date |

| _____ | _____ | _____ |
|---|---|---|
| Name of the Investigator | Signature | Date |

# INFORMATION SHEET

**Title of the Project**

**URODYNAMIC ANALYSIS OF MEN WITH LOWER URINARY TRACT SYMPTOMS**

- We are conducting a study on "**Urodynamic analysis of men with lower urinary tract symptoms**" among patients attending Rajiv Gandhi Government General Hospital, Chennai and for that your co-operation may be valuable to su.

- The privacy of the patients in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

- Taking part in this study is voluntary. You are free to decide whether to participate in this study or to withdraw at any time; your decision will not result in any loss of benefits to which you are otherwise entitled.

- The results of the special study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

**Signature of Investigator** **Signature of Participant**

Date : Date :

# <u>ஆராய்ச்சி ஒப்புதல் படிவம்</u>

ஆராய்ச்சி தலைப்பு

**"கீழ்சிறுநீர் பாதையின் நோய் அறிகுறிகளுடைய ஆண் நோயாளிகளுக்கான சிறுநீர் இயக்க பரிசோதனை பற்றிய ஓர் ஆய்வு"**

ஆராய்ச்சி நிலையம் : சிறுநீரியல் துறை,
சென்னை மருத்துவக் கல்லூரி மற்றும்
ராஜீவ் காந்தி அரசு பொது மருத்துவமனை, சென்னை.

பங்கு பெறுவரின் பெயர் :

பாலினம் :

பங்குபெறபவரின் எண் :

பங்கு பெறுபவர் இதனை (✓) குறிக்கவும்

மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது. என்னுடைய சந்தேகங்களை கேட்கவும், அதற்கான தகுந்த விளக்கங்களை பெறவும் வாய்ப்பளிக்கப்பட்டது. ☐

நான் இவ்வாய்வில் தன்னிச்சையாகதான் பங்கேற்கிறேன். எந்த காரணத்தினாலோ எந்த கட்டத்திலும் எந்த சட்ட சிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகி கொள்ளலாம் என்றும் அறிந்து கொண்டேன். ☐

இந்த ஆய்வு சம்பந்தமாகவோ, இதை சார்ந்த மேலும் ஆய்வு மேற்கொள்ளும் போதும் இந்த ஆய்வில் பங்குபெறும் மருத்துவர் என்னுடைய மருத்துவ அறிக்கைகளை பார்ப்பதற்கு என் அனுமதி தேவையில்லை என அறிந்து கொள்கிறேன். நான் ஆய்வில் இருந்து விலகிக் கொண்டாலும் இது பொருந்தும் என அறிகிறேன். ☐

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும், பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை தொடர்பான தகவல்களையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக்கொள்ளவும் அதை பிரசுரிக்கவும் என் முழு மனதுடன் சம்மதிக்கின்றேன். ☐

இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக்கொள்கிறேன். எனக்கு கொடுக்கப்பட்ட அறிவுரைகளின்படி நடந்து கொள்வதுடன் இந்த ஆய்வை மேற்கொள்ளும் மருத்துவ அணிக்கு உண்மையுடன் இருப்பேன் என்று உறுதியளிகிறேன். எனது உடல் நலம்பாதிக்கப்பட்டாலோ அல்லது எதிர்பாராத வழக்கதிற்கு மாறான நோய்க்குறி தென்பட்டாலோ உடனே அதை மருத்து அணியிடம் தெரிவிப்பேன் என உறுதி அளிக்கிறேன். ☐

இந்த ஆய்வில் எனக்கு இரத்தம், சிறுநீர், எக்ஸ்ரே, ஸ்கேன் மற்றும் தசை பரிசோதனை செய்துகொள்ள நான் முழு மனதுடன் சம்மதிக்கிறேன். ☐

பங்கேற்பவரின் கையொப்பம் ..... இடம்..... தேதி.....

கட்டைவிரல் ரேகை

பங்கேற்பவரின் பெயர் மற்றும் விலாசம் .....

ஆய்வாளரின் கையொப்பம் ..... இடம்..... தேதி.....

ஆய்வாளரின் பெயர் .....

# தகவல் படிவம்

ஆய்வு செய்யப்படும் தலைப்பு

**"கீழ்சிறுநீர் பாதையின் நோய் அறிகுறிகளுடைய ஆண் நோயாளிகளுக்கான சிறுநீர் இயக்க பரிசோதனை பற்றிய ஓர் ஆய்வு"**

ஆய்வாளரின் பெயர் :
பங்கேற்பாளரின் பெயர் :
ஆராய்ச்சி நிலையம் : சிறுநீரியல் துறை,
சென்னை மருத்துவக் கல்லூரி மற்றும்
ராஜீவ் காந்தி அரசு பொது மருத்துவமனை, சென்னை.

தங்களுக்கு சிறுநீகரப்பையின் செயல்பாட்டில் நோய் ஏற்பட்டு உள்ளது. அதற்கு சிகிச்சை அளிக்கும் முன் உங்களின் நோய்க்குறிய கட்டத்தை அறிய வேண்டி உள்ளது. அதன் பொருட்டு தங்களுக்கு சிறுநீர் இயக்க பரிசோதனை செய்து நோய்குறி கட்டத்தை அறியலாம். எனவே அதற்காக சிறுநீர் இயக்க பரிசோதனை ஆய்விற்கு சம்மதம் தருமாறு தெரிவித்துக் கொள்கிறேன்.

இந்த பரிசோதனை உடல்நலக்கேட்டை ஏற்படுத்தாது. மாறாக நிவாரணம் பெறுவதற்கு மிகவும் உதவியாக அமையும்.

முடிவுகளை அல்லது கருத்துகளை வெளியிடும்போதோ அல்லது ஆராய்ச்சியின் போதோ தங்களது பெயரையோ அல்லது அடையாளங்களையோ வெளியிடமாட்டோம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆய்வில் பங்குபெறுவது நோயாளிகளின் சொந்த விருப்பத்திலேயே ஆகும். இந்த ஆய்வையொட்டி எந்தவிதமான சந்தேகங்களுக்கும் விளக்கம் பெற நோயாளிகளுக்கு உரிமை உள்ளது. இந்த ஆய்வின் முடிவுகள் இறுதியில் பிரசுரிக்கப்படும்.

பங்கேற்பவரின் கையொப்பம் ..... இடம்..... தேதி.....

கட்டைவிரல் ரேகை

பங்கேற்பவரின் பெயர் மற்றும் விலாசம் .....

ஆய்வாளரின் கையொப்பம் ..... இடம்..... தேதி.....

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## INTRODUCTION

The life span of the present generation is increasing considerably so we are encountering many elderly male patients,seeking treatment for age related urological problems. The complaints of lower urinary tract related pathology also increases with age. They need proper evaluation and management and most important is to differentiate between the various etiology so that the management should be specific, ease for the patient, noninvasive and minimally invasive.

Lower urinary tract symptoms (LUTS) is the urological manifestation which increases with age significantly affecting the quality of life. 22–90% of patients presents with urinary incontinence (UI) which is the most troublesome one.

Other significant urological morbidities related to aging are the manifestation because of involuntary bladder contractions and increased residual (PVR) volume.

Bladder storage and voiding is due to a specialized physiological

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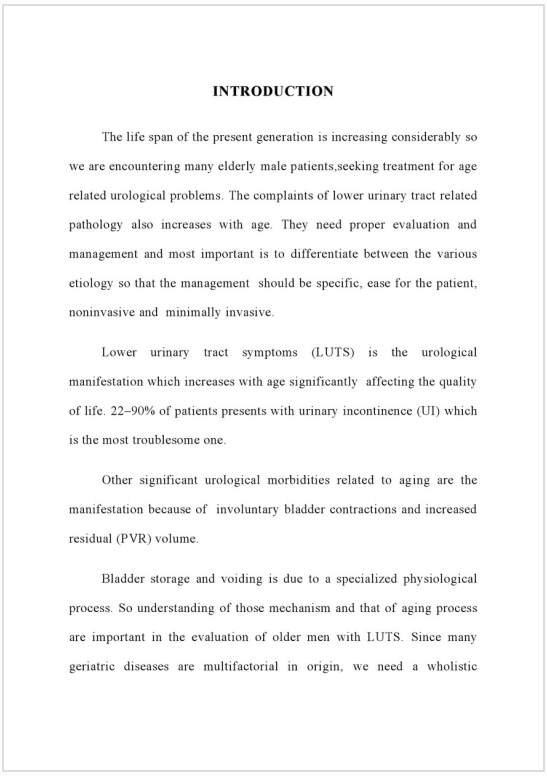

**INTRODUCTION**

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Bladder storage and voiding is due to a specialized physiological process. So understanding of those mechanism and that of aging process are important in the evaluation of older men with LUTS. Since many geriatric diseases are multifactorial in origin, we need a wholistic