

MANAGEMENT OF VOIDING DISORDERS IN ADULT AND PAEDIATRIC PATIENTS

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SUMMARY

A total of 62 patients with vesico-urethral dysfunction were investigated at the Urodynamic Laboratory (Universiti Kebangsaan Malaysia) at the Institute of Urology and Nephrology over a period of eleven months in 1985. In most instances the results significantly influenced a change in patient management strategy. These results are analysed and the usefulness and limitations of this modality of investigations are critically alluded to.

INTRODUCTION

Urodynamic investigations have fascinated physicians even at the turn of the century; the 'U' tube manometer and an infusion set-up was a common site in surgical units for measurement of bladder function. With the refinement of technique and advancement in the field of medical engineering, the procedure has now advanced to a sophisticated level (Fig. 1). The examination has become standard due to an initial enthusiasm in this modality of investigation, and the norms of bladder and the sphincter have been well documented.¹

Terms and definitions have been well scrutinised by the International Continence Society and most aspects of urodynamics have been standardised.²

The Urodynamic Unit was first established in 1981 at the Orthopaedic Institute, Universiti Kebangsaan Malaysia primarily as a research tool in the evaluation of paraplegic bladders. Since then, the unit has been transferred

to the Institute of Urology and Nephrology, and has primarily a clinical rather than a research role. The transfer of the unit was achieved in 1985, and is housed in the experimental laboratory of the Institute.

MATERIALS AND METHODS

The basic equipment, a Disa 21 F16, consists of a micturition flowmeter, a six-channel recorder and digital display unit. Two membrane pressure transducers by Statham, a mechanical device to pull the urethral pressure profile catheter and an electromyogram recorder are included in the basic set (Fig. 1). A commode sits above a urine collecting device which in turn leads to a pressure volume transducer for the urinary flow rate (Fig. 2). Due to a heavy schedule of urological surgery and very little interest shown by the urology trainees these investigations were performed infrequently, by the author with the assistance of an assistant nurse.

The patients who were seen in the Urodynamic Laboratory had been investigated routinely prior to urodynamics. Patients with persistent symptoms in spite of empirical treatment were given preference — gynaecological patients with urological problems were referred to the unit to exclude detrusor problems. Females with stress incontinence were investigated urodynamically prior to proceeding to a chain cystogram and cystoscopic assessment.

The adult patients were usually well advised as to the extent of the procedure and what would be expected of them during the examination. Being an invasive procedure, on many occasions there was a need to postpone the examination when the patient was found to be anxious or uncooperative. Absolute silence and privacy is a prerequisite for these examinations.

The Institute's Experimental Laboratory was ideal as it has only one entrance, no windows, and is suitably air-conditioned. Flow rates were usually recorded with the

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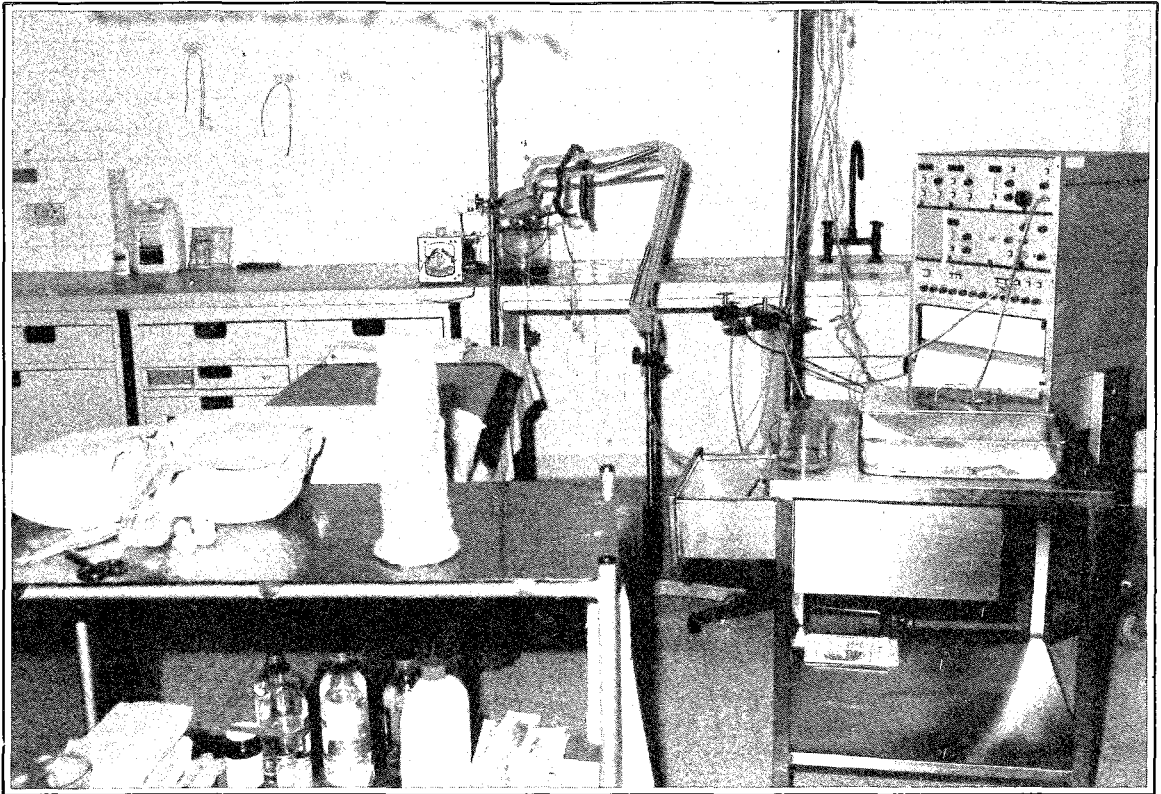


Fig. 1 Urodynamic laboratory with armementarium.

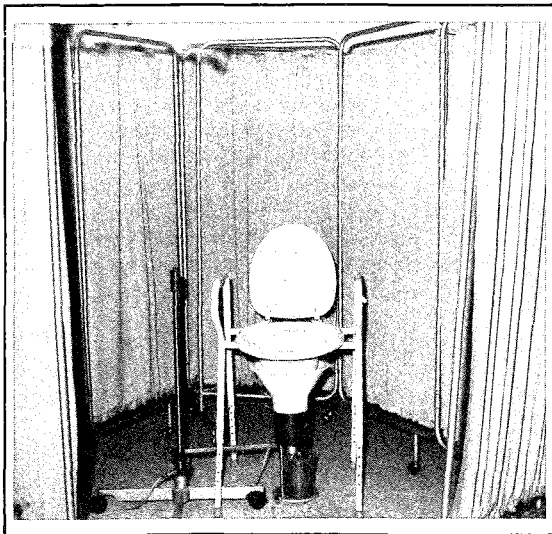


Fig. 2 Mictometer: For voiding and simultaneous recording of flow rate and volume of urine.

patient seated on top of a commode with a collecting device attached to a pressure volume transducer. Cystometry was performed in the supine position and sometimes in the sitting position. This would sometimes be performed in paraplegics to determine the differences in sphincter pressures in these two positions. Simultaneous sphincter electromyogram would be attempted in patients with suspected detrusor-sphincter dys-synergia. This would necessitate an anal plug electrode to be introduced into the anus prior to the cystometry.

Urethral pressure profiles were recorded by introducing a special profile catheter into the urethra. A mechanical puller is available for this purpose. In paediatric patients, the special Millar Tip pressure transducer (Fig. 3) would be introduced to prevent trauma by the adult profilometry catheters. The details of all the above investigations are well established and adequately described elsewhere.³

RESULTS

During the period of this study, a total of 78 urodynamic studies were performed on 62 patients — 52

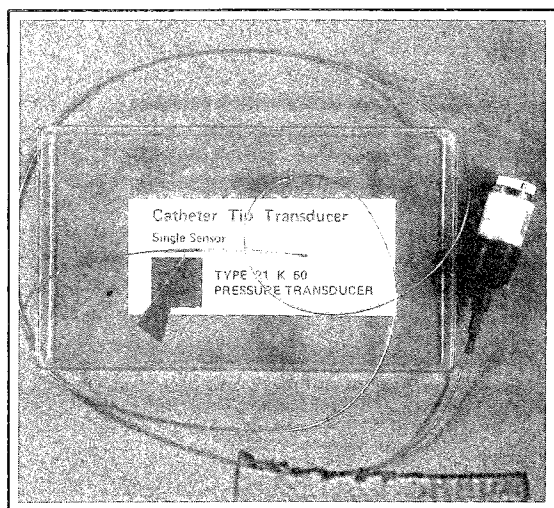


Fig. 3 Tip transducer for urethral pressure measurement in paediatric patients.

males and ten females. Six were below 15 years, the rest of them were between 15 – 75 years.

Table I refers to the main complaint or problem on presentation. Seventeen patients had features of prostatism. Rectal and cystoscopy had not revealed obstructive benign prostate hypertrophy. (In the main they were below 55 years of age. Some of them were older). Many had episodes of acute retention. They are designated as dysfunctional bladder neck (Table I).

Should they have consented, a trans-urethral incision of bladder neck would have been performed. Some of them were treated with phenoxybenzamine. Sixteen patients were paraplegics or quadriplegics. Their management has been discussed in detail.^{4,5}

Nine females with a questionable diagnosis of detrusor instability and/or stress incontinence were seen in the urodynamic clinic during the period. The urodynamic studies would only be performed after a detailed history is elicited. Detrusor instability was diagnosed only in one of these patients. She also had evidence of detrusor sphincter dys-synergia and exhibited a trabeculated bladder as well. The rest were evaluated for genuine stress incontinence. Three of these patients have since undergone surgical correction of their anatomical abnormalities. Two had Marshall-Marchetti-Krantz⁶ operation and the third underwent modified Pereyra procedure.^{7,8}

One of the patients who underwent the first operation did not improve due to the dense pelvic adhesions of a previous hysterectomy and poor ventral suspension at operation. One patient had incontinence post-trans-urethral resection of prostate which persisted. His exter-

TABLE I
SYMPTOMS OR PROBLEMS OF PATIENTS
ON PRESENTATION

Symptom	Number of patients
Prostatism	17
Paraplegia/Quadriplegia	16
Post TURP incontinence	1
Eneuresis (male and female)	2
Spina bifida with neurogenic bladder	3
Paediatric neurogenic non-neurogenic bladder	4
Male incontinence (post trauma)	2
Adult neurogenic bladder	2
Female stress incontinence	9
Frequency dysuria problems	1
Parkinson's disease	4
Spinal stenosis	1
Total	62

nal sphincter pressure was only 15 cms of H₂O. He refused an open operation for correction of this. He is scheduled for teflon paste injection when the apparatus is available.

Paediatric patients usually posed a problem as their cooperation is never forthcoming during investigations. Oral sedatives are resorted to at all times. One patient underwent the procedure under I/V ketalar. The procedure was however abandoned when the patient developed transient apnoea. This latter procedure has since been discontinued due to the paucity of anaesthetic apparatus in the laboratory.

Most of the patients who had no neurological deficit had post investigative diagnoses such as paediatric uninhibited bladder, detrusor-sphincter dys-synergia and neurogenic bladder. Pharmacological manipulation was always resorted to. Patients with detrusor sphincter dys-synergia have been tried on a combination of phenoxybenzamine and diazepam. Those who are unable to comply and with attendant progressive upper tract dilatation and/or obstruction have since then been advised operation to prevent deterioration of renal function.

The current policy of the Department of Urology is to augment the bladder with the large gut or ileo-caecum and reimplant the dilated ureters by an antireflux procedure. Due to disappointing results with paediatric self/parental intermittent clean catheterization we now resort to a technique of a continent abdominal neourethra.⁹ Four patients have been operated with satisfactory overall short-term results. They include some patients outside this series as well.

Four patients with Parkinson's disease on treatment

were studied urodynamically to exclude outlet obstruction. Transurethral resection of the prostate was only advised if the maximum flow rate was 10 ml/sec, and there was clinical and cystoscopic evidence of prostate hypertrophy. In this series only one patient underwent resection of prostate and his post-operative result was satisfactory.

DISCUSSION

Urodynamic investigation in Malaysia at this level of sophistication can only be found at the Institute of Urology. The astronomical costs of the machinery will obviously preclude the district hospitals from obtaining this facility now. An equally likely factor that discourages its presence is that very few urologists or even gynaecologists have time for such prolonged investigations in the face of their tight service schedule of routine urological and gynaecological problems. Taking the Institute as an example, the author finds it exceedingly difficult to find time to fit in cases for investigation. Presently, however, the author has made it mandatory for trainee urologists to perform the investigations on their own, problem cases first under supervision and then on their own. Hopefully the need for urodynamic investigation in functional bladder disorders would be seen in better perspective.

In the main, lack of personnel and time curtailed the author from doing more investigations. The investigations had therefore to be reserved for patients in whom there was a failure to respond to the accepted modes of therapy based on the initial diagnosis.

The results of the 62 urodynamic investigations had important therapeutic implications. Prostatism in younger patients needs to be carefully evaluated. A surgeon who performs a resection on such a prostate runs the risk of causing retrograde ejaculation. Incontinence could occur if the prostate is small and fibrotic, and an open prostatectomy is performed. Such complications can be prevented by extensive urodynamic investigation and micturating cysto-urethrograms. This approach affords for a rational manner for selecting patients with dysfunctional bladder neck for endoscopic diathermy incision (TUIBN). TUIBN is a simple procedure void of the attendant complications mentioned above.¹⁰ These have been well documented and the morbidity of TUIBN is low. The urodynamic and radiological criteria for making a diagnosis of dysfunctional bladder neck are now well established.¹¹

Stress incontinence and unstable bladders have always been confusing to both urologists and gynaecologists alike. Each condition needs to be managed by divergently differing modalities. The history and physical examination are usually never rewarding in making an accurate preoperative diagnosis. To treat detrusor instability with an operation to cure stress incontinence is often unsuccessful.

ful.¹² The only patient with evidence of detrusor-spincter-dys-synergia and detrusor instability had a trabeculated bladder. She was treated with imipramine and clean intermittent self catheterization. The latter procedure has been found to be much more effective than continuous bladder drainage to control infection in any condition that requires a catheter.¹³

Parkinson's disease associated with outflow obstruction needs exact urodynamic studies. Ninety-three per cent of patients with this disease investigated urodynamically elsewhere had associated detrusor hyper-reflexia.¹⁴ Male patients with Parkinson's disease and concomitant BPH can develop detrusor hyperactivity due to either disorder.¹⁴ Resection in such instances must be supplemented with anticholinergic drugs if irritating symptoms persist. Prostatectomy can result in incontinence if based entirely on symptoms without documented impaired flow rates. Only one of our patients had demonstrable impaired flow rates and clinical and cystoscopic evidence of prostate enlargement. He did well following resection.

Paediatric patients with functional disorders of the bladder were difficult to evaluate. Firstly, they are usually uncooperative unless well sedated, and secondly the average urodynamic catheters are too large for their small urethrae. We have got over this latter problem with the use of the Millar tip pressure transducer catheter which is small in size and easily manipulated into the urethra.

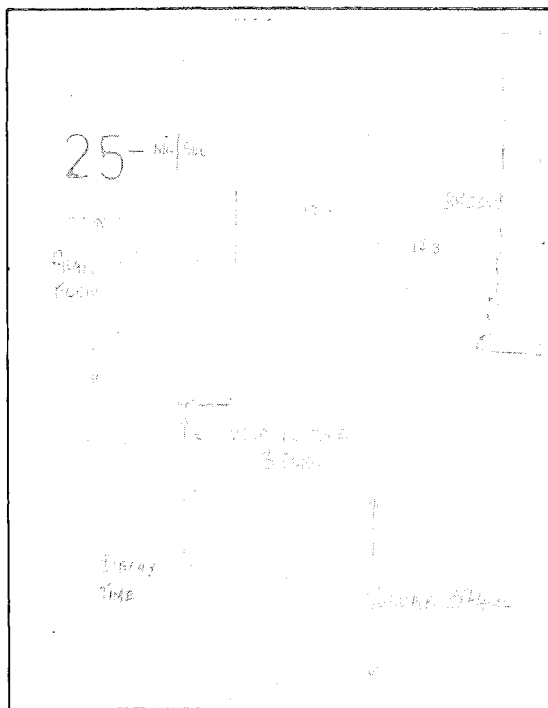


Fig. 4 Flow rate curve and volume recording.

Mictiometry – Flow Rates

The Mictiometer of the Disa 21 is capable of recording a trace of maximum flow (ml/sec). The interpretation of the tracing is made not only on the maximum flow rate but on the shape of the tracing (Fig. 4). It has been well documented that the flow rate varies significantly with the voided volume.¹⁵ A flow rate of voided volume 200ml should be interpreted with caution. Whilst informing that there is impaired voiding, it does not permit the exact location of the suspected dysfunction. As it can be performed as an outpatient procedure, it has become an excellent screening and first-line investigation for voiding disorders.

Cystometry

This is performed with CO₂ gas or with water. During this test the bladder is filled at a constant rate and the bladder pressure simultaneously recorded. The patient micturates prior to the test and he is then catheterized to note the residual urine. In patients with complex neurological problems, the cystometry is performed by slow fill rate, i.e. 10 ml/min. Rates above this are unphysiological hence the subsequent bladder reactions may not be representative of the true nature of events that occur normally.

True detrusor contractions can be only determined if simultaneous intraabdominal pressures are subtracted. This is provided for in the DISA 21 F. Patients with detrusor instability need provocative cystometry to provoke a contraction either on coughing or laughing. In detrusor sphincter dys-synergia, a concomitant use of the anal plug electrode helps to detect electrical activity of the external sphincter at evacuation (Fig. 5).

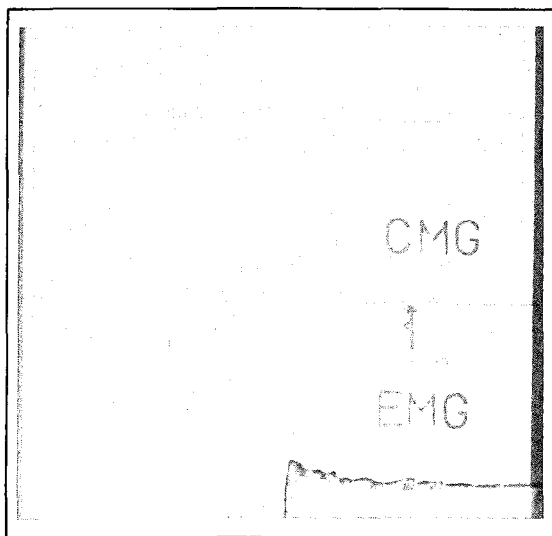


Fig. 5 CO₂ gas cystometrogram (top) with simultaneous ext sphincter electromyogram showing a patient with detrusor sphincter dys-synergia.

Profilometry

This gives the static pressures of the urethra. With the newer multiple transducers in a single catheter, pressures can be recorded on voiding as well. Profilometry is now of greater use in the assay of the efficacy of therapeutic modalities such as sympathetic blockade and stimulation and relaxation at the external sphincter and internal sphincters by pharmacological agents.

CONCLUSION

The pathophysiology of vesico urethral dysfunction is usually best appreciated by careful urodynamic evaluation. However a word of caution in that it is wise to remember that patients with bladder tumours, interstitial cystitis and infections may present as hyper-reflexic bladders. Hence careful cysto-urethroscopy is all the more mandatory.

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