158

Mombelli G[1], Ranzoni S[2], Sandri S D[1]
1. *Magenta Hospital,* ***2.*** *Sacco Hospital*

NON-INVASIVE URODYNAMICS TO EVALUATE PROSTATIC OBSTRUCTION SURGERY OUTCOME

Hypothesis / aims of study

Urodynamic evaluation of men undergoing surgery for prostatic obstruction is usually limited to uroflowmetry but in order to improve 15-29% success rates following TURP (1) cystometry and pressure/flow study are added. The time consuming and invasiveness of the procedures, the need of experience to rule out artifacts and make proper interpretation of the urodynamic parameters and the presence of equivocal results limit the application of traditional urodynamics. In order to avoid such disadvantages different non-invasive urodynamic tests have been developed to detect bladder outlet obstruction (BOO). We adopted a non invasive urodynamic technique (2) before and after the surgical treatment of prostatic obstruction in order to check the feasibility of the procedure and to find a predictive value for the outcome of the surgery.

Study design, materials and methods

All patients waiting in our clinic for surgical intervention for Lower Urinary Tract Symptoms and prostatic enlargement were evaluated with a non-invasive pressure/flow measurement before and 3 months after the operation. We excluded from the study patients with indwelling catheter, bladder stones, high volume diverticula or reflux. We asked patients to fill in an International Prostatic Symptom Score (IPSS) questionnaire on the occasion of the examinations. We also took account of prostate volume before surgery (with abdominal or transrectal ultrasound) and the amount of tissue removed during surgery.

A cuff is placed around the penis and the subject is asked to void without straining into the uroflowmeter connected to the cuff machine. Once voiding commences the cuff is automatically inflated at 10 cm H2O/sec until flow is interrupted or a safety cutoff of 200 cmH2O is reached. The cuff pressure (Pcuff) at which flow is interrupted provides a valid and reproducible estimate of isovolumetric bladder pressure, that is a measure of detrusor contraction strength. The cuff then automatically rapidly deflated with resumption of flow, allowing the process to be repeated until voiding is complete. Maximum values of Pcuff and maximum urinary urine flow rate (Qmax) are read from the continuous plot of flow rate and cuff pressure obtained for each void. The test together with IPSS and postvoiding volume evaluations were repeated 3 months after surgery in order to determine whether preoperative and postoperative evaluations using the non-invasive pressure-flow nomogram could be related to the surgical outcome.

Results

We performed the test in 30 patients before surgery. 9 of 30 preliminary tests (30%) were not reliable because patients voided less than 150 ml of urine or because of bad positioning of the penile cuff. 18 patients completed the 3 months follow-up. 2 patients were lost and 1 has not yet reached 3 months after surgery. Before surgery average IPSS was 18, average prostatic volume was 79 ml and average post-voiding volume (PVV) was 141 ml. Surgery performed was TURP in 9 cases, RE-TURP in 1 case and retropubic prostatic adenomectomy (Millin) in the other 8: average removed tissue was 47 ml. After surgery average IPSS was 5 and average post-voiding volume was 53 ml.

Considering Pcuff and Qmax, average Pcuff and average Qmax before surgery were respectively 151 cmH2O 11 ml/sec; average Pcuff and average Qmax after surgery were respectively 141 cmH2O and 18 ml/sec.

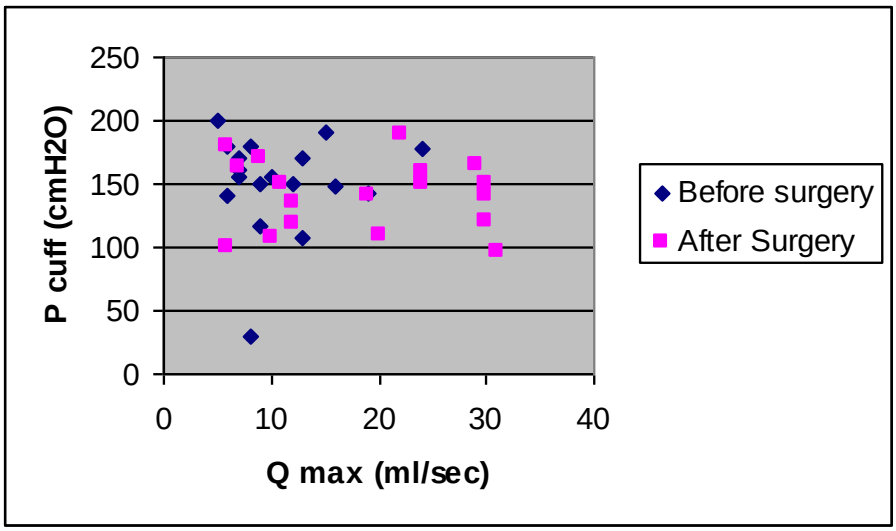
Detailed results appear in the following table.

	Before Surgery							After Surgery			
N	IPSS	Prostatic volume	PVV	Pcuff	Qmax	Surgery	Removed Tissue (g)	IPSS	PVV	Pcuff	Qmax
1	23	58	38	180	6	TURP	13	4	5	110	20
2	24	113	174	150	12	MILLIN	90	1	115	140	19
3	23	150	182	200	5	MILLIN	75	3	159	118	12
4	29	30	191	190	15	TURP	10	17	23	189	22
5	17	69	121	170	7	MILLIN	50	7	4	164	29
6	13	98	50	140	6	TURP	70	7	128	170	9
7	8	127	487	180	8	MILLIN	90	4	20	107	10
8	9	40	300	108	13	TURP	15	7	80	97	31
9	22	90	97	162	7	MILLIN	20	6	50	163	7
10	21	117	119	150	9	MILLIN	70	1	60	136	12
11	29	63	180	29	8	TURP	30	7	58	120	30
12	10	28	80	155	7	TURP	50	2	0	140	30
13	18	93	70	149	16	MILLIN	80	6	0	150	24
14	19	80	80	177	24	TURP	30	2	0	160	24
15	21	10	180	156	10	RE-TURP	5	9	100	180	6
16	15	65	60	143	19	TURP	30	4	0	150	30
17	13	70	40	117	9	TURP	20	5	160	150	11
18	15	120	80	170	13	MILLIN	90	6	0	100	6
M	18	79	141	151	11	9 TURP, 1 RE-TURP, 8 MILLIN	47	5	53	141	18

Interpretation of results

30% of the tests were initially unreliable because the amount of urine voided was not enough to allow an adequate elaboration of the results or because of bad positioning of the penile cuff. This problem should be taken into account before starting the test either excluding patients with voiding volumes less than 150 ml or making a bladder scan immediately before the test; moreover, it is important to correctly train the staff that perform the examination.

As we can see in the following graphic, Qmax improvement 3 months after surgery is greater than Pcuff decreasing. The improvement of Qmax is certainly due to the release of the obstruction while bladder hypercontractility seems to persist after surgery.



Concluding message

Non-invasive urodynamic evaluation of BOO has been shown to improve outcome prediction for men undergoing prostatic adenomectomy (3). Our limited study also shows that traditional outcome results of BOO surgery is in agreement with the changes of the non-invasive urodynamic evaluation. We observed an expected reduction of urethral resistance but with a major improvement of Qmax, while the mean bladder pressure reduced only a little after surgery. Longer follow up is necessary to investigate the irreversibility of this condition. Unfortunately, the test is reliable only for patients voiding more than 150 ml and this restricts the indication to 70% of our population with BOO.

References

1. 1. Homma Y. Pressure-flow studies in benign prostatic hyperplasia: to do or not to do for the patient? BJU Int. 2001, 87:19-23.
2. 2. McIntosh SL et al. Noninvasive assessment of bladder contractility in men. J Urol. 2004, 172:1394-8.
3. 3. Harding C et al. Predicting the outcome of prostatectomy using noninvasive bladder pressure and urine flow measurements. European Urology 2007, 52: 186-192.

Disclosures

Funding: Funding: This study was supported by Associazione Socio-Sanitaria Uroriabilitazione Clinical Trial: No Subjects: Human Helsinky: Yes Inform Consent: Yes Ethics not Req'd: Clinical study. **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** we used a non-invasive technique **Helsinki:** Yes **Informed Consent:** Yes