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IS THERE A ROLE FOR CUFF NON-INVASIVE PRESSURE FLOW STUDY PRIOR PROSTATECTOMY IN MEN WITH BLADDER OUTLET OBSTRUCION?

Hypothesis / aims of study

Pressure-flow study is the gold standard to evaluate male BOO and to determine the degree of obstruction. However, the American and European Urological Association guidelines determine the pressure flow studies as optional test to selected patients due to the invasiveness. The uroflowmetry has been used to evaluate men prior prostatectomy with a cutoff value of 10 to 12 ml/s. However, there is low sensibility and specificity (70% and 47%, respectively) using free flow cutoff value of 10 ml/s. In order to increase the sensitivity, specificity and accuracy without increasing invasiveness, non-invasive urodynamic tests can be performed. In the present study, we evaluate the non-invasive pressure flow test to predict BOO before prostatectomy.

Study design, materials and methods

Between January 2008 and February 2009, we prospectively evaluated men with moderate-severe lower urinary tract symptoms (IPSS $\geq$ 8 and QoL > 3) scheduled for complete urodynamic study (UDS). Patients with urinary infection, neurological problems, bladder stones and indwelling catheters were excluded. All patients were underwent non-invasive pressure flow test (Medplus CT 3000 – Dynamed – Sao Paulo- Brazil), just before initiate the UDS. Cuff non-invasive pressure-flow test (CNIPF) was performed with a cuff around penile body that allowed registering the pressure necessary to stop urinary flow (MCCP - maximum closure cuff pressure). The MCCP and maximum flow rate were plotted in the NewCastle´s Nomogram and patients were classified as obstructed or non-obstructed. The UDS was performed following the International Continence Society good urodynamic practice. The pressure-flow study was performed with a 4 F catheter in stand position. Based on invasive pressure-flow study, we determine the bladder outlet obstruction index (BOOI = Pdet@Qmax-2Qmax) and classified the patients as obstructed (BOOI > 40) and non-obstructed (BOOI < 40, including those patients in the equivocal zone).
We determine the sensitivity and specificity of CNIPF evaluation in diagnosing obstruction based on convetional pressure flow study. The variables Correlation were tested by Pearson's correlation test. To investigate the correlation between IPSS and patients obstruction, it was performed analysis of variance (ANOVA). The statistical analysis was performed using Minitab, version 15.1 and SPSS, version 16.0.

Results

We evaluated 107 men with IPSS ranging from 24 to 35 and Quality of life score was higher than 4 in all patients. Despite of a very simptomatic population, we found only 65 men (60.8%) had BOO confirmed in Pressure/flow study. There was no correlation between IPSS and BOOI (p = 0.073).
Patients with detrusor overactivity were older (67.7 ± 9.0 y.o.) than their counterparts (59.9 ± 11.0 y.o.) (p = 0.001); Patients with detrusor overactiviy presented higher IPSS than their counterparts (p = 0.031) (Table 3).
Table 1 shows the patient's characteristics and table 2 shows the results form NIPF and invasive pressure-flow study.

Table 1. Patient's characteristics and data description

	Mean	SD	Minimum	Maximum
Age(years)	65.2	10.4	32.0	87.0
IPSS	16.9	4.8	8.0	28.0
Voided volume non invasive (ml)	261.9	109.7	150.0	600.0
MCCP(cm H2O)	122.5	36.3	50.0	190.0
Post void Residual non invasive (ml)	42.6	102.7	0.0	600.0
Qmax non invasive (ml/s)	10.4	5.4	2.0	25.0
Pdet@Qmax(cm H2O)	71.1	28.0	18.0	145.0
Qmax invasive (ml/s)	9.9	6.0	2.0	30.0
Post void residual (ml)	42.3	78.7	0.0	350.0

Table 2. Cross tabulation of invasive and non-invasive pressure-flow study identification of BOO.

		UDS		
		BOO	Non Obstructed	total
NIPF	BOO	51	9	60
	Non Obstructed	14	33	47
	total	65	42	107

The sensitivity and specificity of CNIPF evaluation to determine BOO was 78.5% and 78.6%, respectively. The positive predictive value = 85.0% and negative predictive value = 70.2%, with an accuracy of 78.5% and kappa test of 0.56.
There was a significant correlation between the Qmax obtained during the pressure/flow study and CNIPF (p <0.001; r = 0.641). The Qmax ≤ 10 (free flow) sensitivity and specificity to determine BOO, based BOOI > 40, was 78.3% and 57.4%, respectively.

Table 4. Data distribution according to BOO.

	Non Obstructed BOOI < 40 N= 65	Obstructed BOOI > 40 N = 42	p
Age(years)	63.07	66.93	0.1032
IPSS	15	18	0.0138

Voided volume non invasive (ml)	240,8	289,4	0,0672
MCCP(cm H2O)	107,9	125,8	0,0336
Post void Residual non invasive (ml)	40,0	13,7	0,1104
Qmax non invasive (ml/s)	8,47	13,5	<0,0001
Pdet@Qmax(cm H2O)	47.19	83.79	<0.0001
Qmax invasive (ml/s)	14.02	7.45	<0.0001
Post void residual (ml)	14.3	44.2	0.0673

Interpretation of results

CNIPF is as simple as uroflowmetry. In the present study, we demonstrate that CNIPF evaluation can increase the specificity of uroflowmetry in diagnosing BOO, which is very important in those men elected for prostatectomy. Since symptoms are not strong correlated with BOO and uroflowmetry has a low specificity, we believe that CNIPF should be a recommended investigation in assessment of men with symptomatic BPH.

Concluding message

The non-invasive pressure flow has better specificity than uroflowmetry to determine BOO. Performing CNIPF improves the chance of an accurate BOO diagnosis without increase the invasiveness. The CNIPF should be considered as an important tool in the diagnosis, treatment and follow up of men with voiding symptoms

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