ICS 2017 FLORENCE
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RETROSPECTIVE ANALYSIS OF URODYNAMIC RESULTS IN FEMALE PATIENTS WITH STRESS URINARY INCONTINENCE, LARGE POST VOID RESIDUAL URINE AND ABNORMAL NON-INVASIVE FLOMETRY

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Hypothesis / Aim of the Study

A large post void residual urine (PVR<100ml) and an abnormal uroflowmetry has been described in 15-20% of female patients complaining Stress or Mixed Urinary Incontinence (SUI, MUI) (1). Despite little evidence in literature that complete urodynamic studies can be considered predictive of surgery outcome, they are still recommended in the preoperative assessment, particularly when a voiding dysfunction is suspected. (2). According to the ICS statement, the non-invasive uroflowmetry (NIF) reports do not permit a urodynamic diagnosis. The aim of our study was to evaluate the correspondence of the non-invasive flowmetry (NIF) diagnosis versus the diagnosis based on the results of the pressure-flow study (PFS) and to detect a relationship between the uroflowmetric parameters obtained with NIF, the same parameters obtained with invasive PFS and a large post void residual.

Study design, Materials and Methods

We carried out an accurate retrospective analysis of urodynamic data, collected from January 2015 to December 2016 and regarding 525 examination performed in our centre on a female population clinically diagnosed with Stress or Mixed Urinary Incontinence. The 20% (105/525) of these women had a large post void residual, NIF reports of "obstructed micturition" according to the Liverpool Nomogram and underwent a Pressure/Flow study. We tried to determinate how many of the non-invasive diagnosis of obstructed micturition were confirmed by the Pressure Flow Study (PFS). Out of the 105 women that were diagnosed with voiding dysfunction in our centre, 49 patients were selected. Exclusion criteria were: Neurogenic Disorders, Diabetes, Radium or Chemotherapy for Pelvic Cancer, High Grade Pelvic Organ Prolapse (POP III, IV). Inclusion criteria were: a non-invasive Maximum Urinary Flow Rate (NIF Q max) around or under the 10th percentile of the Liverpool nomogram, Pressure Flow relationship plotting in the zones 1, 2 or 3 of the Groutz Blaivas nomogram (GB), Projected Isometric Pressure (PIP) values <30, Post Void Residual volume (PVR) >100ml. Moreover, three patients with recurrence of Urinary Incontinence after previous surgical repair of SUI were enrolled. Table1 shows the criteria used in the Urodynamic Diagnosis (UDS). We used Microsoft Office Excel and SPSS Statistics in order to analyse our data.

Results

The mean age of the entire population was 61.7 yrs while the mean age in the subgroups resulted as follows: DU 63.5 ± 14.4 yrs, BOO 56.63 ± 15.2 yrs and DU+BOO 63.6 ± 13.1 yrs. According to the UDS, the sample distribution resulted as following: 26/49 (53%) had an UDS of Detrusor Underactivity (DU), 11/49 (22.4%) had Bladder Outlet Obstruction (BOO) and 12/49 (24.5%) had both the diagnosis (DU and BOO). These results showed that only 46.9% (23/49) of the patients with a diagnosis of obstructed micturition according to the NIF results processed with the Liverpool Nomogram had a PFS that confirmed a BOO. Table 2 summarizes the comparison between NIF and PFS uroflowmetric parameters. The paired t-test, the Pearson correlation coefficient and Spearman's rank correlation coefficient, all showed significant difference ($p<0,05$) between NIF and PFS Q max, Q ave (Average Flow Rate), Voided Volumes and PVR. The T-Q max (Time to Maximum Flow Rate) is the only parameter that didn't show statistically significant differences between the NIF and PFS tests ($p=0,294$). Analysing this value in the DU, BOO and DU+BOO subgroups, this finding is confirmed and the correlation is particularly strong when the BOO component is present (BOO and DU+BOO subgroups). The t-test analysis of Q max, Q ave, T-Q max, Voided Volumes and PVR (performed both on the total data and on the DU, BOO and DU+BOO subgroups) is showed in Table 2. The correlation between Q max and T-Q max versus Voided Volumes is shown in Graphic 1 and 2, respectively.

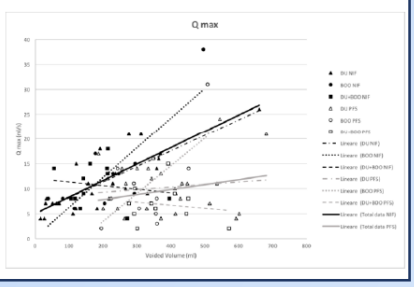
Table 1 Criteria for Urodynamic PFS Diagnosis (UDS)

	PIP	Grout-Blaivas
DU	<30	zone 0 (no obstruction)
BOO	>30	zone 1 (mild) 2 (moderate) 3(severe)
DU+BOO	<30	zone 1 (borderline zone 0)

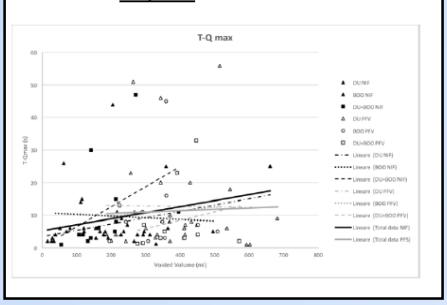
Table 2 Comparison of mean uroflowmetric values between NIF and PFS

		Qmax (ml/s)		Qave (ml/s)		T-Qmax (s)		Voided Volume (ml)		PVR (ml)	
		NIF	PFS	NIF	PFS	NIF	PFS	NIF	PFS	NIF	PFS
Total data (49 patients)	Mean ± Standard deviation	11,43 ± 6,29	9,51 ± 5,74	5,84 ± 2,81	4,80 ± 2,35	8,80 ± 10,15	11,23 ± 13,85	194,96 ± 128,57	370,29 ± 114,79	111,02 ± 131,75	160,61 ± 128,85
	p	***0,009***		***0,006***		*0,287*		***0,000***		***0,007***	
DU (26 patients)	Mean ± Standard deviation	11,19 ± 5,79	10,23 ± 5,15	6 ± 2,91	5,04 ± 2,18	7,24 ± 7,23	12,74 ± 15,42	196,38 ± 146,75	385,65 ± 132,41	108,85 ± 147,25	169,46 ± 138
	p	*0,359*		*0,065*		*0,083*		***0,000***		***0,017***	
BOO (11 patients)	Mean ± Standard deviation	12,73 ± 9,19	10,73 ± 8,16	5,82 ± 3,22	5,36 ± 3,2	9,73 ± 11, 83	10,91 ± 12,17	208 ± 127,28	330,55 ± 94,23	115,45 ± 124,93	99,18 ± 97,35
	p	*0,159*		*0,554*		*0,790*		***0,002***		*0,805*	
DU+BOO (12 patients)	Mean ± Standard deviation	10,75 ± 4,18	6,83 ± 3,54	5,5 ± 2,35	3,75 ± 1,54	11, 33 ± 13,77	7,98 ± 10,29	179,92 ± 89,63	373,42 ± 86,22	111,67 ± 110,69	197,75 ± 122,84
	p	***0,013***		***0,037***		*0,260*		***0,000***		***0,034***	

Graphic 1



Graphic 2



Interpretation of Results

Only less than half of the women with a diagnosis of obstructed micturition according to the NIF data processed with the Liverpool Nomogram had this finding confirmed by the PFS. The analysis of the distribution of the parameters showed a wide dispersion, as observed in literature (3). In accordance with Mueller's study (3), the difference between NIF Q max and PFS Q max in our sample is strictly linked to the Voided Volume and the NIF Q max values result meanly higher than PFS Q max ones observed for the same Voided Volume. The only parameter that doesn't show any statistically significant difference between NIF and PFS records is the T-Q max. The T-Q max could be therefore proposed and further investigated as a predictor of the PFS result when performing the NIF study. However, the limit of our paired t-tests and correlation indicators is that they compare the records of the two subgroups (NIF and PFS values for the same parameter on the same person) without considering the voided volumes that are generally different and higher in the PFS records.

Concluding Message

Our data confirmed the role of the Liverpool Nomogram and of the Post Void Residual Urine as indicators of Voiding Dysfunction in women with clinical diagnosis of uncomplicated Stress Urinary Incontinence. However, the Liverpool Nomogram alone results not sufficiently reliable in characterising voiding dysfunction and should therefore be paired to an invasive urodynamic study. For this purpose, Pressure Flow Studies remain the principal diagnostic instrument even in female patients. The statistical analysis performed on the T-Q max values is suggestive of a correlation between NIF and PFS records in the voiding dysfunction, and could be therefore more extensively studied.

References
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Disclosures
Funding: None **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** It is a retrospective analysis **Helsinki:** Yes **Informed Consent:** Yes