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HYPOTHESIS / AIMS OF STUDY

Post-void residual (PVR) of urine is a debated part in the assessment of patients with lower urinary tract symptoms (LUTS) due to its not standardized threshold.

Aim of this study was to measure post void residual of urine in young and healthy males and females.

STUDY DESIGN, MATERIALS AND METHODS

- Observational prospective multicenter study (January 2018-ongoing)
- Young healthy male and female volunteers (18-35 y.o.) with medical history recorded
- Exclusion criteria:
 - Urological and neurological diseases , surgery of the urinary tract, pelvis, genitalia, pharmacological therapies, radiation of the pelvis
- Uroflowmetry and Liverpool nomogram analysis
- PVR (bladder scan) and PVR-ratio (ratio of PVR to bladder volume)
- Questionnaires:
 - Males: International Prostate Symptoms Score (IPSS)
 - Females: W-IPSS, International Continence Index Questionnaire Urinary Female LUTS (ICIQ-FLUTS)
- Analysis according to LUTS severity at IPSS/W-IPSS scores:
 - i) 0-7 low grade; ii) 8-19 moderate grade; iii) severe grade 20-39
- VAS scale: subjective micturion evaluation
- Statistical analysis: T test and Mann-Whitney test

RESULTS

A total amount of 114 volunteers were enrolled in the study, 45.6% (n 52) males and 54.4% (n 62) females. Mean age was 26 years old (18-35). Table 1 reports data on Qmax, PVR, PVR-ratio IPSS/WIPSS of the population. Mean ICIQ-FLUTS score was 2.8 ± 3.9, and the median 2 (1-3). According to IPSS-WIPSS scores 98.2% (n 110/112) of the volunteers reported a score <8, and 2 males (1.8%) referred an IPSS score between 8 and 19. VAS scale of the subjective evaluation of voiding was <6 in 5.3% (n 6/114) of the population. Table 2 reports outcomes according to Liverpool nomograms. Table 3 reports data according to PVR and PVR-ratio thresholds.

Table 1. Data on Qmax, PVR, PVR-ratio IPSS/WIPSS of the population (T-test and Mann-Whitney test).

	All the volunteers	Males	Females	P
Voided Volume, ml				
Mean	274.4 (± 169.7)	273 (± 157)	276 (± 181)	0.46
Median	235 (142.5-424)	230 (139-433)	235 (157-367)	1
Q-max, ml/sec				
Mean	23.1 (± 10.4)	20.6 (± 8.6)	25.3 (± 11.3)	0.056
Median	21.3 (16.6-28.1)	19.2 (14.5-23.3)	23.4 (18.9-30.3)	0.23
PVR, ml				
Mean	21.7 (± 42.5)	16.3 (± 36.4)	26.4 (± 46.9)	0.12
Median	0 (0-21)	0 (0-18)	0 (0-28)	0.23
PVR-ratio, %				
Mean	14% (± 35%)	5.6 (± 10)	10.5 (± 17.1)	0.066
Median	0% (0-12.5)	0 (0-5.9)	0 (0-12.8)	0.34
IPSS/WIPSS, score				
Mean	2.49 (± 3.16)	2.9 (± 3.5)	2.2 (± 2.9)	0.14
Median	2 (0-3.5)	2 (0-5)	1 (0-3)	0.17

Table 2. Data according to Liverpool nomograms

Liverpool	Abnormal	Normal	P
n° volunteers, n (%)	20 (17.5)	94 (82.5)	
Voided Volume, ml			
Mean	314.9 ± 154.1	267.4 ± 160	0.11*
Median	285.0 [187.8-466.3]	238.0 [152-322]	0.19**
Qmax, ml/sec			
Mean	15.8 ± 4.7	25.4 ± 9.6	<0.01*
Median	16.8 [10.9-19.8]	24.0 [19-29.9]	<0.01**
PVR ml			
Mean	19.5 ± 30.6	17.7 ± 40.8	0.42*
Median	6 [0-20.3]	0 [0-20]	0.45**
PVR/VV %			
Mean	6.1 ± 8.6	7.0 ± 14.1	0.72*
Median	1.5 [0-11.2]	0 [0-7.8]	0.75**

* T test; ** Mann-Whitney test

Table 3: data according to PVR and PVR-ratio thresholds.

	Population	Males	Females
PVR 0ml	60.5% (69/114)	63% (34/54)	56.4% (35/62)
PVR > 50ml	12.3% (14/114)	7.7% (4/52)	16.1% (10/62)
PVR-ratio > 10%	21% (24/114)	12.3% (9/52)	24.2% (15/62)

INTERPRETATION OF RESULTS

Only 60% of the volunteers had no PVR, while 1/10 subjects showed a PVR >50ml, with a double ratio in the female volunteers. PVR-ratio was two times higher in the female population. The PVR-ratio >10% was present in 1/5 volunteer, and more common in females. Although our population reported no LUTS, with normal urinary symptom scores, surprisingly 17% of the volunteers showed an abnormal score at the Liverpool nomograms. Volunteers of this subgroup showed significantly lower Qmax without significant difference in PVR volumes. This data may indicate that PVR could be a poor reliable parameter of pathological bladder emptying.

CONCLUDING MESSAGE

In a non-negligible part of young and healthy population a post void residual of urine was documented. In females PVR was a more frequent finding with volumes two times higher. Liverpool nomograms evaluation recognized a significant part of the volunteers as pathological. This group had a significant lower Qmax, but no significant higher PVR. This data may confirm the controversial role of PVR in the evaluation of patients with voiding dysfunction.

