

## POST VOID RESIDUAL URINE RATIO AND POST VOID RESIDUAL URINE ASSESSED BY PRESSURE-FLOW STUDIES IN MALES WITH LOWER URINARY TRACT SYMPTOMS.

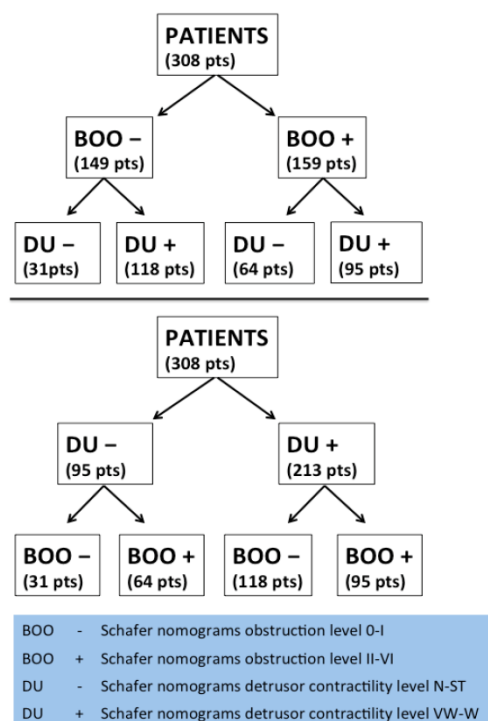
### Hypothesis / aims of study

Pressure-flow studies (PFS) are the most accurate invasive urodynamic technique to investigate functional mechanism of male lower urinary tract symptoms (LUTS) (1). PFS allow diagnosing bladder outlet obstruction (BOO) or detrusor underactivity (DU). As post void residual (PVR) urine is still a parameter under investigation in men with LUTS, in order to assess a more accurate PVR, we consider the ratio of PVR to bladder volume (BV) called PVR ratio (R-PVR). Aim of the study was to evaluate the role of R-PVR in men with LUTS and R-PVR association with the urodynamic diagnosis.

### Study design, materials and methods

We analyzed from our urodynamic database all male patients with LUTS that performed PFS from January 2012 to December 2016. All urodynamic tests were performed according to The Good Urodynamic Practices (2). Using Schäfer nomograms we subdivided males according to detrusor contractility, considering detrusor underactivity as "very weak" and "weak" classes. BOO was defined as class of obstruction II-VI according to Schäfer nomograms. Figure 1 shows how the cohort was subdivided and analyzed. BV was calculated as VV (voided volume) + PVR. R-PVR was calculated as the ratio of PVR to BV. We investigated R-PVR and PVR in all the described classes. BOO was also assessed using the International Continence Society (ICS) nomograms, considering only the classes "unobstructed" and "obstructed". Statistical analysis was obtained by Mann-Whitney test.

Figure 1. Division of the patients groups according to Schäfer nomograms.



### Results

We analyzed 308 consecutive male pressure-flow studies. Patients mean age was 61.6 years (+/- 14.6). Table 1 reports median R-PVR and PVR of obstructed and unobstructed patients stratified for detrusor contractility, according to Schäfer nomograms. In Table 2 median R-PVR and PVR of underactive and non-underactive patients have been stratified according to Schäfer's obstruction nomograms. Our data showed that both R-PVR and PVR were different in all compared groups ( $p < 0.001$ ). According to ICS nomograms, median R-PVR and PVR have been compared between obstructed and unobstructed patients, and a statistically significant difference was found (Table 3).

Table 1. Comparison between median R-PVR and PVR of unobstructed and obstructed patients according to detrusor contractility (Schäfer nomograms)

	BOO +		BOO -		P
DU +	R-PVR	50 %	R-PVR	16.67 %	< 0.001
	PVR	225 mL	PVR	70 mL	< 0.001
DU -	R-PVR	24 %	R-PVR	0 %	< 0.001
	PVR	75 mL	PVR	0 mL	< 0.001

Table 2. Comparison between median R-PVR and PVR of underactive and non-underactive patients according to obstruction (Schäfer nomograms)

	DU +		DU -		P
BOO +	R-PVR	50 %	R-PVR	24 %	< 0.001
	PVR	225 mL	PVR	70 mL	< 0.001
BOO -	R-PVR	16.67 %	R-PVR	0 %	< 0.001
	PVR	70 mL	PVR	0 mL	< 0.001

Table 3. Comparison between median R-PVR and PVR of unobstructed and obstructed patients according to ICS nomograms

	unobstructed	obstructed	P
N. patients (tot=205)	118	87	
R-PVR (%)	6	45.45	< 0.001
PVR (mL)	20	190	< 0.001

#### Interpretation of results

Our analysis showed that both R-PVR and PVR were higher when detrusor underactivity and obstruction were associated. Currently, we have not been able to state a R-PVR threshold to define a specific clinical condition. However, our data showed that in patients with both underactivity and obstruction the median R-PVR was 50%. Instead, in patients with obstruction and normal detrusor contractility the R-PVR was only 24%. In patients without pathological condition of BOO and DU, both median R-PVR and PVR were "0" because of their complete bladder emptying. According to ICS nomograms, considering only the classes of clear obstruction or non-obstruction, both median R-PVR and PVR were different in the two groups ( $p < 0.001$ ).

#### Concluding message

Post-void residual urine is one of the parameters used in the evaluation of male LUTS and correlate with R-PVR. Even if a threshold of R-PVR associated to specific clinic conditions was not yet found, our data showed a significant increase of R-PVR when a condition of detrusor underactivity was associated to BOO. Therefore, in males with LUTS and suspected BOO, R-PVR is useful to suggest an underlying condition of detrusor underactivity that may request a better evaluation with PFS.

#### References

1. <https://uroweb.org/guideline/treatment-of-non-neurogenic-male-luts/#4>
2. Schäfer W et al. Good Urodynamic Practices: uroflowmetry, filling cystometry, and pressure-flow studies. *Neurourol Urodyn.* 2002; 21 (3): 261-74

#### Disclosures

**Funding:** No source of funding or grant were obtained **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** It is a retrospective evaluation and for this reason our committee didnt required approval evaluation **Helsinki:** Yes **Informed Consent:** Yes