POST VOID RESIDUAL URINE RATIO COMPARED TO POST VOID RESIDUAL URINE IN MALES WITH LUTS

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INTRODUCTION AND AIM OF THE STUDY

Post-Void Residual (PVR) urine is a routine part of the clinical assessment in males with lower urinary tract symptoms (LUTS) according to European Urological Guidelines.[1] In the literature high baseline PVRs are associated with an increased risk of LUTS progression.[2] However, no PVR threshold for treatment decision has yet been established. Most of the studies do not consider PVR as a ratio of PVR to bladder volume (BV). In this study we evaluated the PVR ratio (R-PVR), considered as the ratio of PVR to BV. The aim of the study was to assess the role of R-PVR, compared to PVR, in the evaluation of male with LUTS.

MATERIALS AND METHODS

An observational, prospective study was performed involving two Urological Departments. All male patients who underwent uroflowmetry (UFM) for LUTS from September 2016 to January 2017 were recruited. The following data were recorded: demographic characteristics, urological history, and IPSS. After each UFM a PVR was measured by an ultrasound bladder scan. BV was calculated as VV (voided volume) + PVR. R-PVR resulted from the ratio of PVR to BV. Both R-PVR and PVR were correlated to parameters of male LUTS and voiding dysfunction as: peak-flow (Qmax) at the UFM, Liverpool nomograms and IPSS. Moreover, further analyses were performed considering: i) peak-flow threshold 10 mL/s, ii) Liverpool nomograms, as usual, normal over 25th percentile and abnormal under 25th percentile, iii) IPSS stratified in three classes of LUTS severity: 0-7 moderate urinary symptoms, 8-19 fair urinary symptoms, 20-35 severe urinary symptoms. For the statistical analysis we used Mann-Whitney test, Kruskal-Wallis test, and Bravais-Pearson correlation test.

Table 1. Bravais-Pearson correlation coefficients (r) between Qmax, Liverpool nomograms, IPSS and R-PVR, PVR

	R-PVR	PVR
Qmax	-0.39	-0.24
Liverpool percentile	-0.20	-0.23
IPSS	+0.11	+0.08

Table 2. Median Qmax according to R-PVR and PVR increasing groups

R-PVR	N° pts.	Qmax (median)	PVR	N° pts.	Qmax (median)
0-20 %	180	15	0-50 mL	168	15
>20 to 40 %	72	11.8	51-100 mL	61	11.5
>40 to 60 %	19	9.0	101-150 mL	25	12.5
>60 to 80 %	7	6.9	151-200 mL	14	8.2
>80 to 100 %	1	4.4	>200 mL	11	12.8

Table 3. Comparison of median R-PVR and PVR according to Qmax, Liverpool nomograms and IPSS. Statistical tests: * Mann-Whitney test, ** Kruskal-Wallis test

Qmax (280 pts)	Group 1 (≤10 mL/sec)	Group 2 (>10 mL/sec)	*p*
N° pts.	76	204	
R-PVR (%)	24.59	10.14	<0.001*
PVR (mL)	73.0	30.0	<0.001*
Liverpool (280 pts)	**Group 1 (≤25°)**	**Group 2 (>25°)**	***p***
N° pts.	213	67	
R-PVR (%)	14.21	11.04	0.13*
PVR (mL)	43.00	29.50	0.0094*

IPSS (256 pts)	Gr. 1 (0-7)	Gr.2 (8-19)	Gr. 3 (20-39)	*p*
N° pts	91	124	41	
R-PVR (%)	10.46	14.93	19.46	1**
PVR (mL)	30.0	43.5	60.0	0.089**

Results

Data were collected on 280 UFM and 256 IPSS questionnaires. The mean age of the patients was 68.6 years (+/- 10.3). Table 1 shows the strength of correlation (Bravais-Pearson's r) of R-PVR and PVR to Qmax, Liverpool nomograms and IPSS. Statistical test showed a moderate negative correlation between R-PVR and Qmax, while analyzing PVR we found only a weak negative correlation. Additionally, increasing R-PVR volumes corresponded to decreasing Qmax values. This finding did not occur when increasing PVR volumes were considered (Table 2). Table 3 shows median R-PVR and PVR according to Qmax, Liverpool nomograms and IPSS with related p values. We found higher median R-PVR and PVR volumes when Qmax was ≤ 10 ml/sec ($p<0.001$). Concerning Liverpool nomograms, a higher median PVR was observed when the percentile was ≤ 25th ($p<0.01$), while we didn't find any difference in R-PVR. Both R-PVR and PVR had a weak negative correlation to Liverpool nomograms. R-PVR and PVR median values neither were different in the three IPSS classes nor correlated to IPSS.

INTERPRETATION OF RESULTS

Our data suggested that R-PVR was better correlated to Qmax than PVR. Indeed, a decrease in Qmax values corresponded to an increase of R-PVR, but not of PVR. Regarding Liverpool nomograms, both the residual measurements showed a similar weak correlation. No association was observed between IPSS and both R-PVR and PVR: therefore, these parameters seem poorly correlated to severity of urinary symptoms.

CONCLUSIONS

In the present study, both parameters of bladder emptying evaluation (R-PVR and PVR) did not correlate to IPSS, indicating a weak correlation to LUTS reported by patients. R-PVR showed a higher correlation with Qmax, than PVR. Therefore, the combination of Qmax and R-PVR could be one of the most non-invasive urodynamic parameters for male LUTS.

REFERENCES

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