

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20191211>

Original Research Article

## Post void residue in women with pelvic organ prolapse: a prospective observational study

Nanthini Saravanan<sup>1</sup>, Aruna N. Kekre<sup>1\*</sup>, Mahasampath Gowri S.<sup>2</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, Unit II, <sup>2</sup>Department of Biostatistics, Christian Medical College, Vellore, Tamil Nadu, India

**Received:** 18 February 2019

**Accepted:** 11 March 2019

**\*Correspondence:**

Dr. Aruna N. Kekre,

E-mail: [ankekre@gmail.com](mailto:ankekre@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** The objective of the present study was to observe the post void residual volume (PVRV) in women with pelvic organ prolapse (POP) pre and postoperatively and to correlate stage of prolapse with lower urinary tract symptoms and quality of life in women with pelvic organ prolapse.

**Methods:** This is a prospective observational cohort study of 100 women with symptomatic pelvic organ prolapse of stage II or greater. Patients were admitted for Vaginal hysterectomy with pelvic floor repair for pelvic organ prolapse in Gynaecology Department at Christian Medical College Hospital, Vellore, India over one year were recruited. This study was approved by the institutional review board and ethical committee of the hospital. Pre- and post-operative PVR were measured. The statistical analysis was done by using SPSS version 21 and P value < 0.05 was considered as statistically significant.

**Results:** In this study 100 patients were recruited and 11% of women had pre-operative high post void residual volume of more than 100 ml. Stages of POP did not correlate with severity of LUTS and QOL. Pre-operative elevated PVR resolved post operatively in 91%, the P value < 0.000 which was highly significant.

**Conclusions:** 11% of women had preoperative high PVR. Stages of POP did not correlate with severity of lower urinary tract symptoms (LUTS) and quality of life(QOL). Pre-operative elevated PVR resolved post operatively in 91%, the P value < 0.000 which was highly significant. Majority of the patient with severe pelvic organ prolapse had elevated pre-op PVR which resolved post- operatively after surgical correction.

**Keywords:** Lower urinary tract symptoms, Post void residue, Post-menopausal, Pelvic organ prolapse, Quality of life Voiding dysfunction

### INTRODUCTION

Post-void residue (PVR) is defined as the volume of urine remaining in the bladder at the completion of micturition.<sup>1,2</sup> The PVR is a key marker of bladder function in terms of emptying ability. The accurate measurement of PVR needs to advance as a clinical and academic priority. Ultrasound assessment has the greatest ability to eliminate the sources of error from urethral catheterization. The many advantages of such an ultrasonic PVR measurement should be added to the

benefits of the other applications of ultrasound in urogynecology.

Pelvic organ prolapses (POP), is defined by the international continence society as the symptomatic descent of the anterior vaginal wall, the posterior vaginal wall, the apex of the vagina or the vaginal vault.<sup>2</sup> Pelvic organ prolapse is associated with lower urinary tract dysfunction. Because of distortion of the lower urinary tract, severe pelvic organ prolapse (POP) may cause urethral obstruction, impede valsalva maneuver voiding,

and mask sphincteric urinary incontinence. Women with POP present with symptoms of voiding difficulty, reduced urine flow rate and elevated post void residual volume (PVRV) particularly in those with severe pelvic organ prolapse.

Prolonged elevated post void residual volume increases the risk of infection, detrusor over activity, and voiding difficulty. Although studies have shown that elevated PVR can be resolved post operatively after correcting pelvic organ prolapse, the risk factors associated with the Pelvic Organ prolapsed can hamper the resolution. The incidence of postsurgical elevated post void residual volume was 15.8% and 3.5 % was symptomatic. The Patient with severe post-surgical elevated post void residual volume had larger pre-operative post void residual volume ( $P=0.037$ ). However, in a majority of patient with severe Pelvic Organ Prolapse had their elevated post void residual volume resolved post operatively.<sup>3</sup> As a predictor of elevated post-operative post void residual volumes, the preoperative voiding study (performed with the prolapse reduced) had the sensitivity of 46%, a positive predictive value of 12% and a negative predictive value of 93%.<sup>4</sup>

The post void residual volume obtained by bladder ultrasound correlated significantly with catheterized volume ( $r=0.625$ ,  $P=0.001$ ) and offered a sensitivity of 64.7% and Specificity of 94.3% in detecting post void residual volume greater than 100ml.<sup>5</sup> The post void residual volume largely increased immediately after surgery but recovered within one month. Poor detrusor contractility was the best predictor of large post void residual volume occurrence. Pre-operative urodynamic evaluation of stress urinary incontinence and detrusor function was useful for predicting post-operative urinary conditions in pelvic organ prolapse patient.<sup>6</sup> This study aims to understand the post void residual pre operatively and Post operatively in women with pelvic organ prolapse. And to correlate stage of prolapse with lower urinary tract symptoms and quality of life in women with pelvic organ prolapse. The available outcome of these measures can be used by clinicians and researchers to assess the functional outcomes of prolapse and its treatment on patients with an emphasis on symptom and quality-of-life assessment.

## METHODS

This is a prospective observational cohort study of 100 women with symptomatic pelvic organ prolapse of stage II or greater. patients were admitted for surgery in Gynaecology department at Christian Medical College Hospital, Vellore, India over one year. This study was approved by the institutional review board and ethical committee of the hospital. All women had informed written consent and were examined with POP-Q system to categorize the stages of prolapse. The pelvic organ prolapses Quantification (POP-Q) classification system involves the description of dimension of the vagina and

perineum and of the topography of the anterior and posterior vaginal walls. POP-Q measurements correspond to stages (0-4) of prolapse in each compartment (anterior, apical, and posterior) of vagina.

All women were interviewed with international prostate symptom score (IPSS) questionnaire to evaluate LUTS and QOL. The International Prostate Symptom Score (IPSS) is based on the answers to eight questions in which 7 questions are regarding to urinary symptoms and 1 question about quality of life. Each question related to urinary symptoms were allowed to choose by the patients, one out of six answers indicating increasing severity of the concern symptom. The answers are assigned points from 0 to 5. The total score ranges from 0 to 35 (asymptomatic to very symptomatic). 8<sup>th</sup> Question refers to the patient's quality of life. The answers to this question range from 0 to 6 implies "delighted" to "terrible".<sup>7</sup> In present study authors defined quality of life as "satisfied" if the score is less than 3 and the quality of life as "unsatisfied" if the score is 3 and above.

Pre- and post-operative PVR were measured. Three orthogonal diameters of the bladder will be measured using the formula for ellipsoid. Elevated PVRV is defined as PVRV was  $\geq 100$ ml. Voiding Dysfunction Was defined as the presence PVR  $\geq 100$ ml. A sample size of 84 was calculated using a prevalence of 2-30%, and a precision of 10% and 95% CI. All Categorical data were expressed as frequency and percentage. Continuous data were summarized as mean and SD/ median and IQR depending on the normality. The percentage of pre-operative post void residual and post-operative post void residual were presented with 95% CI. The association between categorical variables with post void residual was analyzed using the chi-square test. The continuous variables of pre-operative post void residual have been compared using independent-t-test/ Mann-Whitney U test depending on normality. SPSS version 21 was used for analysis and p value  $< 0.05$  was considered as statistically significant.

## RESULTS

A total of 100 women were recruited in this prospective observational cohort study. The elevated pre-operative PVR was diagnosed in 11%. The mean age, BMI and Parity were 52yrs, 22.kg/m<sup>2</sup> and 3 children respectively. The mean duration of prolapse was 86 months. Women with co-morbidities were studied 14% (n=14) of women had diabetes, 17% (n=17) had hypertension and 7% (n=7) had chronic cough.

The pre and post-operative operative PVR were 60.61 and 38.91ml respectively. The prevalence of stage II, III and IV POP were 10% (n=10), 58% (n=58), 32% (n=32) respectively. 66.6%(n=66) of women had risk factors of prolonged labour, 61.7% (n=58) of women had inter delivery interval less than 1 year, 83% (n=83) of women delivered their first child under 20 yrs of age. 66% (n=66)

of the study population belongs to low socioeconomic status (class III) (Table 1).

**Table 1. Demographic and clinical Data (n=100).**

Patient characteristics	Description <sup>a</sup> (Mean±SD)/n (%)
Age (years)	52±11.7
BMI <sup>b</sup>	22±3.55
Parity	3±0.46
Duration of prolapse (months)	86.2±80
Pre-menopausal	30 (30)
Post-menopausal	70 (70)
Vaginal birth	100 (100)
Pre op PVR (ml)	60.61±35.7
Post OP PVR (ml)	38.91±24.08
Voiding dysfunction	11 (11)
Stage II POP	10 (10)
Stage III POP	58 (58)
Stage IV POP	32 (32)
Prolonged labour	66 (66.6)
IDI (<1 year)	58 (61.7)
Manual labourer	59 (59)
Age at first child birth (<20 year)	83 (83)
DM	14 (14)
HT	17 (17)
Chronic cough	7 (7)

Voiding Dysfunction Was defined as the presence PVR  $\geq$ 100ml, <sup>a</sup>Values are given as Mean±SD. or numbers (percentage), unless indicated otherwise, <sup>b</sup>Calculated as weight in kilograms divided by the square of height in meters.

Voiding dysfunction was defined as presence of PVR  $\geq$  100ml. The prevalence of voiding dysfunction in stage II, Stage III and stage IV prolapse were 9.09% (n=1), 45.5%(n=5) and 45.5% (n=5) respectively with P value not significant (p= 0.593) (Table 2).

**Table 2: Correlation of stage of prolapse with voiding dysfunction (PVR $\geq$ 100ml).**

Stage of prolapse	VD <sup>a</sup> Present	VD <sup>a</sup> Absent	P value
Stage II	1 (9.09)	9 (10.11)	0.593
Stage III	5 (45.45)	53 (59.55)	
Stage IV	5 (45.45)	30.34 (27)	
Total	11 (100)	89 (100)	

Voiding dysfunction was defined as presence of PVR  $\geq$  100ml. <sup>a</sup>Values are given as Mean±SD. or numbers (percentage), unless indicated otherwise

In this study a total of 60%(n=6) of stage II, 84.2% (n=48) of stage III and 78.13% (n=25) of stage IV POP showed 8-19 International Prostate Symptom Score (moderate LUTS).

One women in stage III Pop had severe LUTS and hence not included in the analysis. However, the P value was not significant (p= 0.204) (Table 3).

The International Prostate Symptom Score (IPSS) -Mild (symptom score less than equal to 7), Moderate (symptom score range 8-19), Severe (symptom score range 20-35).

**Table 3: Correlation of stage of POP with LUTS using I-PSS score.**

Stage of prolapse	IPSS score <sup>a</sup> mild	Moderate	Severe	P value
Stage II (n=10)	4 (40)	6 (60)	0	0.204
Stage III (n=58)	9 (15.5)	48 (82.7)	1 (1.7)	
Stage IV (n=32)	7 (21.8)	25 (78.1)	0	

The International Prostate Symptom Score (IPSS) -Mild (symptom score less than equal to 7), Moderate (symptom score range 8-19), Severe (symptom score range 20-35). <sup>a</sup>Values are given as Mean±SD. or numbers (percentage), unless indicated otherwise

Authors observed that 30% (3) of women in stage II POP had unsatisfied quality of life compared to 50% (16) in stage IV and 41.3% (24) in stage III POP. However, the P value was not significant (P= 0.130) (Table 4).

**Table 4: Correlation of stage of prolapse with QOL using I-PSS score.**

Stage of POP	Satisfied <sup>a</sup>	Unsatisfied <sup>a</sup>	P value
Stage II (n=10)	7(70)	3(30)	0.499
Stage III (n=58)	34 (58.6)	24 (41.3)	
Stage IV (n=32)	16 (50)	16 (50)	

I-PSS - Question eight refers to the patient's perceived quality of life. The answers to this question range from "delighted" to "terrible" or score 0 to 6. <sup>a</sup>Values are given as Mean±SD or numbers(percentage), unless indicated otherwise

Total of 11 % (n=11) of women in present study had pre-operative voiding dysfunction, in 90.91% (n= 10) of women voiding dysfunction resolved after vaginal hysterectomy with pelvic floor repair. The P value is highly significant (p value < 0.001) (Table 5).

**Table 5: Change from pre-operative voiding dysfunction to post-operative voiding dysfunction.**

Pre-op VD	Post op VD <sup>a</sup> Yes n (%)	Post op VD <sup>a</sup> No n (%)	P value
Yes (n=11)	1 (9.09)	10 (90.91)	< 0.001
No (n=89)	0 (0)	89 (100)	

<sup>a</sup>Values are given as Mean±SD. or numbers (percentage), unless indicated otherwise

## DISCUSSION

According to a study done by Miller et al, post-void residual urine volume predicted delayed return to normal voiding.<sup>8</sup>

After pelvic reconstructive surgery, most patients with elevated post-void residual volume had normalization of the post-void residual volume.<sup>9</sup> Similarly, in present study 11 % (n=11) of women in had pre-operative voiding dysfunction, in which 90.91% (n= 10) of women voiding dysfunction resolved after vaginal hysterectomy with pelvic floor repair. The P value is highly significant (p value < 0.001). According to multicentre, prospective, cohort study of women undergoing pelvic reconstructive and/or incontinence surgery done by Komesu et al, vaginal apex suspension or the preoperative presence of grade III and IV vaginal apex descent are associated with prolonged postoperative catheterization.<sup>10</sup>

The International prostate symptom score was validated in postmenopausal women for evaluating lower urinary tract symptoms.<sup>11</sup> A study done by Obinata et al. showed the severity of IPSS total scores significantly correlated with preoperative POP-Q stage and the total of 37% of stage 4 showed  $\geq 20$  IPSS.<sup>12</sup> In this study a total of 60% (n=6) of stage II ,84.2% (n=48) of stage III and 78.13% (n=25) of stage IV POP showed 8-19 International Prostate Symptom Score (moderate LUTS ). One women in stage III Pop had severe LUTS and hence not included in the analysis. However, the P value was not significant (p= 0.204). Advanced POP adversely affects QOL in women. Therefore, the treatment for POP is not just based on restoration of anatomy but aimed at improvement in the patient quality of life.<sup>13</sup> Various studies in the literature supports that the advanced stage of prolapse have negative impact on QOL.<sup>14</sup> Similarly in this study showed that 30% (3) of women in stage II POP had unsatisfactory quality of life compared to 50%(16) in stage IV and 41.3% (24) in stage III POP. However, the P value was not significant (P= 0.130) (Table 4). Nguyen et. al. studied the resolution of motor urge incontinence after surgical repair of pelvic organ prolapse, and reported the detrusor instability resolved after vaginal reconstructive surgery in 63%.<sup>15</sup>

In present study a total of 11% (n=11) of women had pre-operative voiding dysfunction, of which 90.91% (n= 10) of women had resolution of voiding dysfunction after vaginal hysterectomy with pelvic floor repair. The P value is highly significant (p value <0.000). To summaries this study has shown that the overall prevalence of elevated pre-operative PVR in this study was 11%.

The stage of the prolapse did not correlate with elevated pre-operative PVR. (P value 0.593 was not significant). Stage of POP did not correlate with severity of LUTS, (P value 0.204 was not significant). Stage of prolapse did not correlate with QOL, (P value 0.499 was not significant). Preoperative voiding dysfunction resolved post operatively in 90.91%. (P value < 0.000 was highly significant).

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Blue Research and Ethics Committee, Christian Medical College, Vellore, India (IRB No.7448)*

## REFERENCES

1. Lowder JL, Ghetti C, Nikolajski C, Oliphant SS, Zyczynski HM. Body image perceptions in women with pelvic organ prolapse: a qualitative study. *Am J Obstet Gynecol.* 2011;204(5):441-e1.
2. Jackson SL, Weber AM, Hull TL, Mitchinson AR, Walters MD. Fecal incontinence in women with urinary incontinence and pelvic organ prolapse. *Obstet Gynecol.* 1997;89(3):423-7.
3. Swift S, Woodman P, O'boyle A, Kahn M, Valley M, Bland D. et al. Pelvic Organ Support Study (POSST): the distribution, clinical definition, and epidemiologic condition of pelvic organ support defects. *Am J Obstet Gynecol.* 2005;192(3):795-806.
4. Fitzgerald MP, Kulkarni N, Fenner D. Postoperative resolution of urinary retention in patients with advanced pelvic organ prolapse. *Am J Obstet Gynecol.* 2000;183(6):1361-4.
5. Tseng LH, Liang CC, Chang YL, Lee SJ, Lloyd LK, Chen CK. Postvoid residual urine in women with stress incontinence. *Neurourol Urodyn* 2008;27(1):48-51.
6. Araki I, Haneda Y, Mikami Y, Takeda M. Incontinence and detrusor dysfunction associated with pelvic organ prolapse: clinical value of preoperative urodynamic evaluation. *Int Urogynecol J.* 2009;20(11):1301.
7. Okamura K, Nojiri Y, Osuga Y, Tange C. Psychometric analysis of international prostate symptom score for female lower urinary tract symptoms. *Urol.* 2009;73(6):1199-202.
8. Miller EA, Amundsen CL, Toh KL, Flynn BJ, Webster GD. Preoperative urodynamic evaluation may predict voiding dysfunction in women undergoing pubovaginal sling. *J Urol.* 2003;169(6):2234-7.
9. Fitzgerald MP, Kulkarni N, Fenner D. Postoperative resolution of urinary retention in patients with advanced pelvic organ prolapse. *Am J Obstet and Gynecol.* 2000;183(6):1361-4.
10. Komesu YM, Rogers RG, Kammerer-Doak DN, Olsen AL, Thompson PK, Walters MD. Clinical predictors of urinary retention after pelvic reconstructive and stress urinary incontinence surgery. *J Reproduct Med.* 2007;52(7):611-5.
11. Pott-Grinstein E, Newcomer JR. Gynecologists' patterns of prescribing pessaries. *J Reproduct Med.* 2001;46(3):205-8.
12. Obinata D, Yamaguchi K, Ito A, Murata Y, Ashikari D, Igarashi T, Sato K, Mochida J, Yamanaka Y, Takahashi S. Lower urinary tract symptoms in female patients with pelvic organ prolapse: Efficacy of pelvic floor reconstruction. *Int J Urol.* 2014;21(3):301-7.

13. Weber AM, Walters MD, Piedmonte MR. Sexual function and vaginal anatomy in women before and after surgery for pelvic organ prolapse and urinary incontinence. *American journal of obstetrics and gynecology.* 2000;182(6):1610-5.
14. Scarpero HM, Fiske J, Xue X, Nitti VW. American Urological Association Symptom Index for lower urinary tract symptoms in women: correlation with degree of bother and impact on quality of life. *Urol.* 2003;61(6):1118-22.
15. Nguyen JK, Bhatia NN. Resolution of motor urge incontinence after surgical repair of pelvic organ prolapse. *J Urol.* 2001;166(6):2263-6.

**Cite this article as:** Saravanan N, Kekre AN, Gowri MS. Post void residue in women with pelvic organ prolapse: a prospective observational study. *Int J Reprod Contracept Obstet Gynecol* 2019;8:1520-4.