

Comparison of Pre-Operative and Post-Operative Post Void Residual Urine Volume in Urogenital Prolapse

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ABSTRACT

Background: Post Void Residual Urine (PVR) is a key marker for the evaluation of the efficacy of bladder emptying particularly in women with pelvic organ prolapse and lower urinary tract dysfunction. Objectives of the present study were to compare pre and post-operative post void residual urine volume and to know the relation of PVR to urinary symptoms and prolapse. **Methods:** 65 patients admitted with urogenital prolapse. Detailed history, general physical examination was done as per predesigned and pretested proforma. Grading for prolapse was done by POP-Q, Baden walker halfway. PVR was measured before and after operation **Results:** Age has shown significant relation with the raised PVR > 50 ml (p=0.007). Out of 65 cases, 11 had second, 48 had third degree and 6 had procidentia according to Baden Walker system. Urge and stress incontinence were complained by 43% and 26% of patients respectively and increased frequency and nocturia was complained by 68% and 65% of patients. Storage symptoms were not significantly associated with degree of prolapse or raised PVR. Straining to void, incomplete emptying and has to reduce to void were present in 42, 46 and 47 patients respectively and showed significant association with degree of prolapse. Except incomplete emptying other two were associated with raised PVR. **Conclusion:** Vaginal hysterectomy with anterior colporrhaphy was effective procedure in reducing elevated PVR in prolapse patients.

Key words: Pelvic organ prolapse; Post void residual urine (PVR); Urinary symptoms; Vaginal hysterectomy, Anterior Colporrhaphy.

INTRODUCTION

The pelvic organ prolapse is the downward displacement of the structures that are normally located adjacent to vaginal vault. These conditions are commonly affecting a progressively large percentage of women as age advances. Though mortality is negligible, significantly morbidity is associated with prolapse. In areas of high parity and little or no access to health care, countless women suffer from problems associated with pelvic organ prolapse, with no real possibility of resolution. These conditions have a direct effect on urinary, gastrointestinal and sexual functions. And it can only be appreciated by those women burdened and living with these problems on a day today basis. Treatment of pelvic organ prolapse and the associated symptoms constitutes a major subject in gynaecology. Providing permanent relief from this classical malady, by restoring normal anatomy and maximum physiological functions always tests the ingenuity of gynaecologists.^[1] Prolapse is associated with voiding difficulty, bladder outlet obstruction, occult stress incontinence and lower urinary tract symptoms.^[2] Voiding difficulty in the female is a condition in which the bladder fails to empty completely and easily after micturition..

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The detection of voiding difficulties before pelvic operations gives a indication to the surgeon of a

delay in resumption of spontaneous voiding and the likely need for prolonged catheterization.^[3]

Urinary symptoms in voiding difficulties are frequency, stress incontinence, Urge incontinence, incomplete emptying, poor stream, straining to void. Post-void residual volume (PVR) is the urine volume left in bladder at the completion of micturition. It is a key marker for the efficacy of bladder emptying. PVR measurement is essential, particularly in women with the symptoms of pelvic floor dysfunction, including those with lower urinary tract and pelvic organ prolapse symptoms.^[4]

PVR Measurement techniques include: Transvaginal Ultrasonography^[5], Transabdominal Ultrasonography^[6], Bladder catheterization.^[7,8]

These different techniques might account for the differences in recommended upper limit of normal PVR. Another one key source of the possible variation is the delay in measuring PVR after micturition.^[4]

Post-void residual urine volume has been examined for its relationship to voiding dysfunction. Elevated PVR values are associated with poor detrusor muscle contractility or increased urethral resistance, as well as abnormal uroflowmetry.^[9]

Prolapse has a significant positive relationship with high PVR. The proposed mechanism of genital prolapse is the distortion or kinking effect of the prolapse on the urethra to create bladder overflow obstruction. And women with high grade prolapse have increased urethral closure pressure and pressure or transmission ratios that decrease after the prolapse is reduced. Hence there is need for studies which demonstrate that prolapse surgery can reduce or eliminate any elevated PVR.^[4]

The objectives of the present study were to compare preoperative and postoperative post void residual urine volume in urogenital prolapse patients undergoing anterior colporrhaphy with vaginal hysterectomy and to know the prevalence of urinary symptoms in prolapsed as well as to study the correlation between PVR, urinary symptoms and prolapse.

MATERIALS AND METHODS

The present study was conducted in Department of Obstetrics and Gynaecology, MNR medical college, Sangareddy over a period of one year during October 2011 to September 2012. 65 patients admitted with urogenital prolapse were studied. Patients not willing to give informed consent and patients not available for follow up after operation were excluded.

Patients attending with genitourinary prolapse were explained about the nature of the study and written and informed consent was obtained. Detailed history, general physical examination was done as per predesigned and pretested Performa

and they were subjected to History taking and filling of the preformed questionnaire for urinary complaints, Menstrual and Obstetric history, Physical examination which included POP-Q, Determination of PVR preoperative and postoperative, Urine routine and microscopy, and Renal function test.

All subjects were examined for Cough stress test, Grading for prolapse by: POP-Q, Baden walker halfway, Presence or absence of: Vaginal rugosity, Decubitous ulcer, Cystocele, and Urethrocele.

Statistical analysis: The data obtained was tabulated and analysed using chi-square test and a p value of less than 0.05 was considered significant.

RESULTS

In this study, sixty five cases of different degrees of genitourinary prolapse were studied. The age of the patients varied from 25 years to 72 years with mean age of 50 years. 45 patients were postmenopausal and the mean menopausal age was 12 years.

Table 1: Demographic features in relation to prolapse

Parameters	Years
Mean age	50.0 ± 14
Mean duration of prolapsed	5.0 ± 6.5
Mean duration of menopause	12.0 ± 7.5

Table 2: Distribution of patients with degrees of prolapse

Degree of prolapse	Number of patients	Percentage
2 nd degree	06	10.83
3 rd degree	11	16.92
4 th degree	48	73.84

Duration of prolapse varied from 1 year to 30 years and degree of prolapse varied from 2nd degree prolapse to procedentia. Out of 65 cases, 11 were second degree, 48 were third degree and 6 were procedentia according to Baden Walker system

(Graph 1). According to the POP-Q system, there was one patient with stage 1 prolapse, nine patients with stage 2 prolapse, 28 patients with stage 3 prolapse and 27 patients were with stage 4 prolapse.

Table 3: Distribution of patients storage symptoms and its significance to degree of prolapse

Storage symptoms	Frequency	Percentage	p value
Stress incontinence	17	26	0.212
Urge incontinence	28	43	0.449
Increased frequency	44	68	0.153
Nocturia	42	65	0.250

Storage symptoms were present in a large percentage of patients but they were not significantly associated with the degree of prolapse. Urge incontinence was complained by 43% of patients and stress incontinence was complained in 26% patients. 17 patients had complaints of stress urinary incontinence, but it was observed in only 9 patients. Increased frequency of micturition and nocturia found in 68% and 65% patients, but they were not significantly associated with the degree of prolapse. Hesitancy was present in 18 patients and it was not significantly associated with the degree

of prolapse. Straining to void was reported by 42 patients, out of which 3 patients had second degree and 33 patients had third degree prolapse. All the six patients with procedentia had complaints of straining to void. P value was 0.006 which shows a significant relation with degree of prolapse. Incomplete emptying was complained by 46 patients. Out of them, 4 patients had 2nd degree, 37 patients had 3rd degree prolapse and 5 patients had procedentia. It was also significantly related with the degree of prolapse. P value was 0.022. Poor stream was present in 23 patients. Intermittent stream was present in 10 patients and 13 patients

had complaints about post micturition dribbling without significant relation with the degree of prolapse. 47 patients complained about 'has to reduce prolapse to void' and it was significantly associated with the degree of prolapse. P value was

<0.0001. Out of 33 patients with PVR >50 ml, only 1 patient had POPQ stage 2 prolapse, 14 patients had POPQ stage 3 prolapse and 18 patients had POPQ stage 4 prolapse. P value was 0.024..

Table 4: Percentage of emptying dysfunction symptoms in study population

Emptying dysfunction symptoms	Number	Percentage
Hesitancy	18	27.96
Straining to void	42	64.62
Incomplete emptying	46	71.77
Poor stream	23	35.38
Intermittent stream	10	15.38
Post micturition	13	20
Has to reduce void	47	72.31

Table 5: Distribution and significance of 'emptying dysfunction symptoms' to degree of prolapse

Emptying dys-function symptoms	Frequency	Degree of prolapse		Procedentia	p value
		2 nd	3 rd		
Hesitancy	18	2	13	3	0.368
Straining to void	42	3	33	6	0.0006
Incomplete emptying	46	4	37	5	0.022
Poor stream	23	1	20	2	0.125
Intermittent stream	10	2	8	0	0.544
Post micturition	13	1	10	2	0.471
Has to reduce void	47	2	39	6	0.0001

Table 6: POP-Q grades of prolapse in relation to PVR

POP Q Grade	PVR	
	≤ 50 ml	> 50 ml
I	01	00
II	08	01
III	14	14
IV	09	18

The number of patients with PVR >50 ml had increased with increase in the grade of Baden Walker prolapse, Out of six patients of procedentia, five patients had raised PVR. P value is 0.005. In

this study, increasing degree of prolapse by both the classifications has shown a statistically significant relation with Raised PVR.

Table 7: Association of age and raised PVR

Age groups	PVR		Total
	≤ 50 ml	> 50 ml	
25 – 34	06	00	06
35 – 44	08	05	13
45 – 54	08	08	16
55 – 64	09	10	19
65 – 74	01	10	11

Age has shown significant relation with the raised PVR > 50 ml. P value is 0.007. Increasing parity was not associated with an increased PVR, or with the degree of prolapse. P value was 0.757. The storage dysfunction symptoms were not associated

with the raised PVR. But the emptying dysfunction symptoms like straining to void and has to reduce the prolapse to void, have shown significant association with raised PVR. The P values were 0.047 and 0.004 respectively.

Table 8: Association of urinary symptoms with raised PVR

Symptoms	Total	PVR		p value
		≤ 50 ml	> 50 ml	
Stress incontinence	17	09	08	0.722
Urge incontinence	28	13	15	0.694
Increased frequency	44	24	20	0.215
Nocturia	42	20	22	0.725
Hesitancy	18	09	09	0.939
Straining to voiding	42	18	24	0.047
Incomplete emptying	46	20	26	0.165
Poor stream	23	11	12	0.867
Intermittent stream	10	03	07	0.186
Post micturition	13	05	08	0.385
Has to reduce prolapse	47	18	29	0.004

Seven patients had abnormal urine microscopy and on routine examination, Out of them, six patients had PVR > 50 ml. But association between UTI and elevated PVR was not statistically significant. P value was 0.050. Among four patients with deranged renal function, three patients had PVR > 50 ml. P value was 0.37 showing no significance. 33 patients had raised PVR before operation. After vaginal hysterectomy and anterior colporrhaphy, 32 patients had PVR within normal range. P value was 0.001 which is statistically significant. It shows that the procedure was effective in reducing the elevated PVR. Two patients had post-operative urinary retention and only one patient had stress urinary continence.

DISCUSSION

In the present study, the voiding dysfunction was analysed in relation with the genitourinary prolapse by measurement of post void residual urine volume. The effectiveness of vaginal hysterectomy with anterior colporrhaphy in reducing raised PVR is also discussed. Other studies have used various reference values for defining elevated PVR ranging from 30 ml to 100 ml.^[4,10] In this study upper limit of normal PVR was 50 ml.

Catheterization is used for determination of PVR as it is a gold standard and gives most accurate readings.^[10, 11]

The prevalence of elevated PVR more than 100 ml was 10%. The elevated PVR was associated with increasing age and greater degrees of prolapse. [Table 4, 5] This finding is consistent with the study done by Lukacz and Fitzgerald et al.^[10,12]

The diagnosis of the prolapse has a significant positive relationship with high PVR. The proposed mechanism of genital prolapse is the distortional or kinking effect on the urethra to create bladder outflow obstruction.^[4]

In the present study, mean age of the patients admitted with prolapse was 50 years. In the studies done by Bradley and Haylen, the mean age of prolapse patients was 68 and 58 years respectively.^[4,13] Compared to these studies, the present study had a young study population [Table 1,7].

This study shows that increasing parity is not associated with urinary retention and elevated PVR. Similar results were found in study done by Lukacz and Lowenstein.^[10, 14]

In this study, stress urinary incontinence and overactive bladder symptoms like urge incontinence, frequency, nocturia were not associated with the increasing grades of prolapse [Table 3].

Various obstructive urinary symptoms like straining to void ($p=0.006$), incomplete emptying ($p=0.022$) and has to reduce prolapse to void ($p=0.0001$) were associated with the increasing

grades of prolapse or vaginal descent [Graph 2, 4; Table 3, 5].

G Alessandro Digesu et al also found a poor correlation between prolapse and storage urinary symptoms. But symptoms like 'feeling of incomplete bladder emptying' and the 'need of straining during micturition' were associated with prolapse.^[15] In contrast to these findings other study has shown that occult stress incontinence, detrusor instability and urethral hypermobility were associated with prolapse.^[2] These conditions are storage disorders.

In this study, PVR was used for the determination of voiding dysfunction. Elevated PVR cannot be predicted based on symptoms alone; however, prolapse beyond the hymen may help identify women with incomplete bladder emptying.^[10]

The present study supports the lack of association between raised PVR and storage disorder symptoms; however the emptying dysfunction symptoms like 'straining to void' and 'has to reduce prolapse to void' have shown significant association with raised PVR [$p=0.047$ and 0.004 respectively; Table 6]. In study done by Fitzgerald et al, symptoms of voiding difficulty were found significantly related with elevated PVR.^[12]

The poor predictive value of obstructive voiding symptoms in diagnosis of raised PVR was reported by Al -Shahrani M and Lovatsis in 2005. They have shown that the poor relationship between raised PVR and the symptoms of incomplete emptying, poor flow and straining to void.^[16]

The present study shows significant reduction in elevated PVR by the anterior colporrhaphy and vaginal hysterectomy ($p < 0.0001$). This suggests that the anterior colporrhaphy with vaginal hysterectomy is an effective procedure for the reduction of elevated PVR. In the study done by Stanton et al also shown that symptoms of urge incontinence, stress incontinence and prolapse were significantly reduced after anterior colporrhaphy and vaginal hysterectomy. The surgery has improved the urodynamic findings by correcting a large cystocele and cystourethrocele which impede the urinary flow.^[17]

It is commonly considered that retention of urine will be associated with an increase in risk of urinary tract infection.^[6,18] In this study, 11% of patients were diagnosed to have an abnormal urine microscopic examination. But it was not significantly related to elevated PVR or increase in degree of prolapse ($p=0.050$). The levels of blood urea and creatinine were evaluated for assessing the renal function. In cases of major degree of prolapse, because of the kinks in the ureter, back pressure would cause hydronephrosis and hydronephrosis.^[19,20] In the present study, only 4% of patients had elevated levels of blood urea or serum creatinine.

Strengths of this study include its prospective design and use of direct catheterization to determine PVR which is the most reliable method.

Although the study assessed the symptoms associated with progression of vaginal descent, it has not measured the level of discomfort and level of patient satisfaction after the surgery.

CONCLUSION

Post void residual urine output was measured for the detection of bladder dysfunction in prolapse patients. Raised PVR has shown significant association with increasing degree of prolapse. Obstructive urinary symptoms like straining to void, incomplete emptying and has to reduce prolapse to void were associated with raised PVR. Storage symptoms like stress urinary incontinence, urge incontinence, frequency and nocturia were commonly present in study population. But there was no association of these storage symptoms with increasing degree of prolapse and raised PVR. Emptying dysfunction symptoms like 'straining to void' and 'has to reduce prolapse to void' were associated with raised PVR and increasing degree of prolapse.

Vaginal hysterectomy with anterior colporrhaphy was found to be an effective procedure for the reduction of raised PVR in prolapse patients. PVR evaluation and detailed history about urinary tract symptoms is necessary for the preoperative and postoperative care of patient.

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