

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20171397>

## Original Research Article

# Study of occult stress urinary incontinence in pelvic organ prolapse

Nemakallu Sarala Reddy, Seetesh Ghose\*

Department of Obstetrics and Gynecology, Mahatma Gandhi Medical College and Research Institute, Pondicherry, Tamil Nadu, India

**Received:** 18 January 2017

**Accepted:** 06 March 2017

### \*Correspondence:

Dr. Seetesh Ghose

E-mail: [seetesh@mgmcri.ac.in](mailto:seetesh@mgmcri.ac.in)

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## ABSTRACT

**Background:** Pelvic organ prolapse and stress urinary incontinence are two common health-related conditions. If a woman with pelvic organ prolapse leaks only when the prolapse is reduced, it is called occult stress urinary incontinence (OSUI). The prevalence of OSUI in women with severe genitourinary prolapse varies from 27-68% in literature. In this study we want to find out the relationship between OSUI and stress urinary incontinence (SUI) following corrective surgery. The objectives of the study are to determine the number of women with urinary leak following reduction of prolapse before surgery; to determine the number women with occult stress urinary incontinence developing stress urinary incontinence following surgery and to determine the risk of developing stress urinary incontinence after vaginal hysterectomy and pelvic floor repair in these women.

**Methods:** This is a longitudinal observational study. All women with pelvic organ prolapse (POP) of grade II or higher requiring corrective surgery were initially evaluated for OSUI using vaginal pack and followed up post operatively at 6 weeks and 12 weeks using QUID to look for post-operative stress urinary incontinence (POSUI).

**Results:** The overall incidence of OSUI in our study was 7.5%. OSUI was significantly associated with factors like older age, higher BMI, high parity, short inter pregnancy interval and higher grade of prolapse and not significantly associated with factors like place of delivery, delivery events and mode of delivery.

**Conclusions:** It is important to test all women with POP for OSUI and patients with OSUI need long term follow up to detect POSUI

**Keywords:** Occult stress urinary incontinence, Pelvic organ prolapse, Post-operative stress urinary incontinence

## INTRODUCTION

Pelvic organ prolapse (POP) and stress urinary incontinence (SUI) are two common health-related conditions. They affect up to 50% women worldwide individually.<sup>1</sup> Stress urinary incontinence is a condition of involuntary loss of urine on effort, physical exertion, sneezing, or coughing that is often bothersome to the patient and frequently affects the quality of life. It is estimated to affect 15.7% of adult women.<sup>2</sup> Many times this urinary incontinence is detected following corrective prolapse surgery. If a woman with pelvic organ prolapse leaks only when the prolapse is reduced, it is called occult stress urinary incontinence (OSUI).<sup>3</sup> The

prevalence of OSUI in women with severe genitourinary prolapse varies from 27-68% in literature.<sup>4,5</sup> If any previously continent woman develops urinary incontinence after vaginal hysterectomy and pelvic floor repair, it is a frustrating condition for both the patient and the physician.

So it is important to counsel symptomatically continent women with POP for developing post-operative SUI (POSUI). Bump RC et al and Fianu et al have showed that POP, may mask SUI.<sup>6,7</sup> The colpexy and urinary reduction efforts(CARE) study, the largest randomized trial, showed that 45% of women with POP developed POSUI subjectively and objectively as well.<sup>8-10</sup> In a study

of continent women with severe pelvic organ prolapse done by Chaikin DC et al, 58% of cases revealed occult incontinence after reduction of the prolapse with pessary.<sup>11</sup> So we have taken up this study as not much work is being done on OSUI associated with prolapse in indian context. We would also like to study the associated risk factors for OSUI.

## METHODS

This was a longitudinal observational study, conducted at the Mahatma Gandhi Medical College and Research Institute, a tertiary care hospital with the approval of the Institutional Human Ethics Committee. Women with pelvic organ prolapse (grade II or higher) admitted as inpatient in Mahatma Gandhi Medical College and Research Institute from April 2015 to March 2016 with a follow up till June 2016 were included in the study.

### Inclusion criteria

Genital prolapse grade II or higher according to ICS criteria with no evidence of stress urinary incontinence

### Exclusion criteria

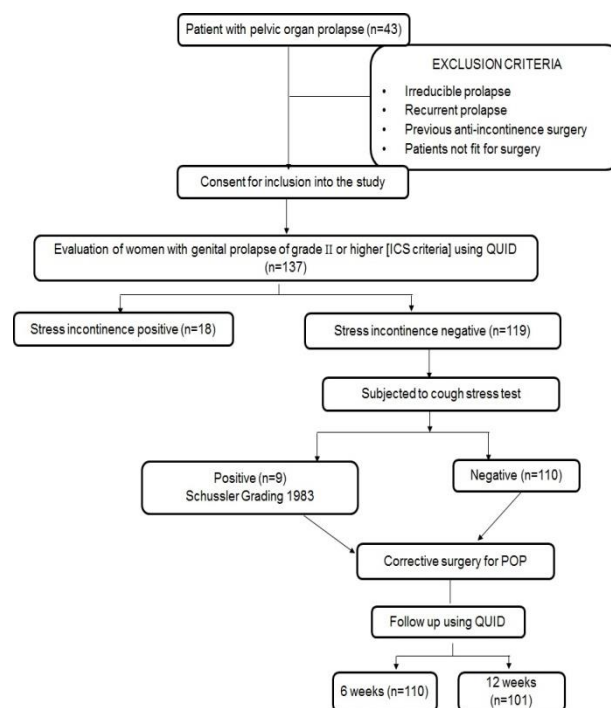
- Irreducible, Prolapse
- Recurrent prolapse
- Previous anti-incontinence surgery
- Patients not fit for surgery

### Procedure

All the inpatient women with genital prolapse of grade II or higher according to international continence society (ICS) criteria were evaluated with validated questionnaire on urinary incontinence. Those women who did not show the evidence of incontinence were considered for the study purpose. After explaining the nature of study, consent was obtained from these women. They were subjected to cough stress test after reducing prolapse, with full bladder, by standard vaginal packing.

Women with leak following this test were considered to have occult stress urinary incontinence. The patients who were detected to have OSUI were given the option of undergoing one step management using TVT. Parameters like age, parity, inter pregnancy interval, place of deliveries (hospital/home), delivery events (prolonged labour/fundal pressure during child birth), mode of delivery (spontaneous/assisted vaginal/instrumental delivery), body mass index, evidence of COPD, grade of prolapse, grade of leak were obtained from them.

These women were followed up twice at 6 weeks and 12 weeks post operatively and were evaluated using same validated questionnaire on urinary incontinence to see if any of them had developed stress urinary incontinence.



**Figure 1: Procedure.**

### Statistical analysis

Statistical analysis was carried out using SPSS version 19.0 (IBM SPSS, US) software. Continuous data like age, BMI and inter pregnancy interval was presented as mean+SD. Chi-square test was used to compare the association between 2 variables. The significant value was taken as  $p \leq 0.05$ .

## RESULTS

A total of 143 patients with POP of grade II or more were admitted as inpatient for surgical management. Of them 6 were excluded from the study as they had cardiac disease and were not fit for surgery. Of the remaining 137, 18 of them had urinary incontinence after evaluating with a valid questionnaire and were excluded from the study. Remaining 119 patients underwent cough stress test following reduction of the prolapse using vaginal pack to demonstrate OSUI.

Of 119 patients, 9 patients demonstrated urinary incontinence on reduction of prolapse and remaining 110 patients remained continent. 9 patients were lost to follow up at 12 weeks. The overall incidence of OSUI in our study was 7.5%.

### Age

The mean age of the patients having OSUI in our study was found to be 70.44 years and that of without OSUI was 46.18 years. The results show that with advancing age the risk of developing OSUI is more and it is highly significant as the  $p$  value is  $\leq 0.05$  (Table 1).

**BMI**

The result revealed the women with OSUI to have a mean BMI of 26.74, whereas the mean BMI in patients without OSUI was found to be 22.55. The difference in BMI between two groups is significant as p value is  $\leq 0.05$ . The result derived from our study shows that with increasing BMI patients are at a higher risk of developing OSUI (Table 1).

**Parity**

The result revealed that OSUI was more prevalent in women with a parity index of 5, followed by women with parity index 4 and 3. In our study women with parity index 2 did not demonstrate any OSUI. The p value is 0.0001, which is significant. The difference in each parity of both the groups is significant as p value is  $\leq 0.05$ . Thus we conclude that women with a higher parity are at an increased risk of developing OSUI (Table 1).

**Table 1: patient profile.**

Age (years)			P Value
	With OSUI	Without OSUI	
36-45	0	59(100%)	0.000
46-55	0	50(100%)	
56-65	2 (66.7%)	1(33.3%)	
66-75	3 (100%)	0	
>75	4 (100%)	0	
Mean age	70.44	46.18	
Standard deviation	7.6	5.7	
<b>BMI</b>			
18.5-24.9	1 (1.1%)	92 (98.9%)	0.000
25-29.9	6 (27.3%)	16 (72.7%)	
30-34.9	2 (50%)	2 (50%)	
Mean	26.7	22.5	
Standard deviation	3.1	2.45	
<b>Parity</b>			
2	0	2 (100%)	0.0001
3	1 (2.6%)	37 (97.4%)	
4	2 (5.7%)	33 (94.3%)	
5	6 (13.6%)	38 (86.4%)	

**Table 2: Delivery events.**

Pregnancy interval			P value
	With OSUI	Without OSUI	0.05
N	9	110	
Mean	1.4	2.6	
Standard deviation	0.173	1.99	
Place of delivery			
Home	6 (66.7%)	47 (42.7%)	0.165
Hospital	3 (33.3%)	63 (57.3%)	
Mode of delivery			
Instrumental	1 (11.1%)	3 (2.7%)	0.180
Spontaneous	8 (88.9%)	107 (97.3%)	

**Pregnancy interval**

The mean inter pregnancy interval of patients with OSUI in our study was found to be 1.4 years and that of without OSUI was 2.6 years. The difference between the inter pregnancy interval in both groups was significant as p value was 0.05. Hence it is conclusive that women with a

lower inter pregnancy interval are at a higher risk of developing OSUI (Table 2).

**Place of delivery**

The incidence of OSUI was found to be more in women who delivered in the home (66.7%) when compared to

those who delivered at hospital (33.3%), but the difference in both the groups is not significant as p value is 0.165 (Table 2).

### **Delivery events**

OSUI was found to be more prevalent in women who delivered with fundal pressure. 6 patients (66.7%) with OSUI had fundal pressure whereas 60 patients (54.5%) had fundal pressure in patients without OSUI. But the difference between these two groups is not significant as the p value is 0.763. This may be due to the recall about the delivery events.

### **Mode of delivery**

8 (88.9%) patients with spontaneous delivery had OSUI whereas 107 (97.3%) patients without OSUI had spontaneous delivery. The difference between both the groups was not significant as the p value is 0.180 (Table 2).

### **Grade of prolapse**

OSUI was found to be more prevalent in women with grade 4 prolapse when compared to grade 2 and grade 3 prolapse. The p value was significant (Table 8).

**Table 3: Grade of Prolapse**

GRADE OF PROLAPSE	WITH OSUI	WITHOUT OSUI	P VALUE
2	0	11(10%)	0.000
3	3(33.3%)	93(84.5%)	
4	6(66.7%)	6(5.5%)	

This result gives us a conclusion that the risk of patient developing OSUI is more with higher grade of prolapse (Table 3).

### **Posui at 6 weeks and 12 weeks**

At follow up after 6 weeks of prolapse surgery, none of the women in both groups i.e with or without OSUI had POSUI when evaluated using questionnaire (QUID). At 12 weeks post operatively 9 patients without OSUI were lost to follow up. Out of the remaining 110 patients none of them developed POSUI when evaluated again with the same questionnaire (QUID).

## **DISCUSSION**

The potential for an incontinence disorder may exist in a considerable number of women with pelvic organ prolapse. Asymptomatic women with severe pelvic organ prolapse maybe at increased risk of manifesting stress urinary incontinence after the prolapse has been reduced.<sup>6,7,12</sup> Women with prolapse maintain continence despite poor urethral sphincteric function due to either urethral kinking or increased urethral resistance.<sup>13</sup>

Many studies have shown that patient symptomatology is unreliable for a proper diagnosis. Groutz et al, after assessment of 587 consecutive females undergoing urodynamics, concluded that symptoms in women with obstruction are nonspecific and urodynamic evaluation is required to make a specific diagnosis.<sup>14</sup> Stress urinary incontinence frequently coexists with pelvic organ prolapse and there is a significant risk of developing SUI when prolapse is reduced or repaired.<sup>13</sup> According to literature, 36% to 80% of women with advanced prolapse

are at risk for SUI after corrective surgery.<sup>6,11,12,15,16</sup> In a study by Chaikin et al, when urodynamic studies were used following reduction of prolapse with a pessary 14 out of 24 (58%) women demonstrated sphincteric incontinence.<sup>11</sup> In a study by Blaivas et al, the incidence of stress incontinence after prolapse reduction with pessary was 32%.<sup>17</sup> In one indian study by Reena et al the incidence of OSUI was found to be 67.9%.<sup>13</sup> According to a study done by Gallentine et al, 50% of women with severe POP developed OSUI.<sup>18</sup> Similarly in a study by Sinha et al who examined 32 women with severe POP using a ring pessary to reduce the prolapse, 10(31.3%) developed symptoms of SUI.<sup>19</sup>

However, in our study the incidence of OSUI was only 7.5%. The low incidence may be due to the generalised pressure effect of the vaginal pack when compared to pessary, used for the reduction of prolapse.

In a study by Ingrid Nygaard et al in US, in 1961 women with symptomatic pelvic floor disorders, 49.7% were of age 80 years or older and 36.8% were between 60 to 79 years.<sup>2</sup> In a study by Jundt et al the mean age of patients was 62.8 years.<sup>3</sup>

Whereas in a study by Reena et al women of 50 years or older were found to have twice the risk of women younger than 50 years to develop OSUI.<sup>13</sup> Brubaker et al observed that the mean age was 62±10 years.<sup>9</sup> But in our study the mean age of women with OSUI was found to be 70.4 years. Although different studies mentioned about different mean age groups for developing OSUI, in general it is observed higher the age group, higher is the incidence of OSUI.

In a study by Foldspang et al the relation between higher parity and development of urinary incontinence was found to be significant, which is similar to the result of our study. This supports the hypothesis that pregnancy and childbirth are potent causes of female urinary incontinence.<sup>20</sup> In a study by Ingrid et al they found that higher parity had a higher prevalence for UI, 32.4% for  $\geq 3$  deliveries.<sup>2</sup> In a study by Rune Svenningsen et al the mean BMI was found to be 25.5.21 Ingrid et al observed the prevalence of OSUI was 30.4% for obese women, 26.3% for overweight and 15.1% for normal weight women.<sup>2</sup> Persson et al and Lensen et al also observed that increased BMI was a positively associated risk factor for the development of OSUI.<sup>22,23</sup> The same was observed in our study.

In a study by Romanzi et al they found that the prevalence of OSUI increases with the degree of POP.<sup>5</sup> S.W Bai et al observed that the greater the preoperative stage of prolapse, the higher the recurrence rate of SUI. The coexisting rates of pelvic organ prolapse in patients having stress urinary incontinence, and stress urinary incontinence in patients having a pelvic organ prolapse, were both high.<sup>24</sup> In a study by Reena et al they found that out of 78 women, 68 (87.2%) had stage III prolapse whereas only 3 (3.8%) had stage II and 7 (9%) had stage IV prolapse.<sup>13</sup> Rune Svenningsen et al found that 59% of the women belonged to stage III of prolapse.<sup>21</sup> In a study done by Persson et al they observed that mode of delivery i.e instrumental or spontaneous didn't play a significant role in the development of OSUI, which is similar in our study.<sup>22</sup> However in a study by Handa et al they observed that patients with a history of instrumental delivery and prolonged second stage of labour are more prone to develop OSUI.<sup>25</sup> This however could not be proven in our study, which may be due to the small sample size or due to the recollection bias. Katherine et al, in their study observed that the length of second stage of labor was not associated with stress urinary incontinence. However, the odds of having a later diagnosis of stress urinary incontinence was 10 times higher for women who underwent forceps delivery.<sup>26</sup>

In a study by Lensen et al, they observed that COPD was an important risk factor for developing OSUI.<sup>23</sup> However we did not have any such patient with COPD. In a study by Jundt et al, they found that 19 (35.8%) of 53 patients had OSUI after reducing the prolapse. Of them only 5 (26.3%) developed POSUI. In their study none of the women without OSUI developed POSUI.<sup>3</sup> A study done by Haessler et al has shown that 11% to 22% of continent women with POP develop postoperative SUI. However, according to that study, there is no evidence to perform a prophylactic anti-incontinence procedure on women with OSUI.<sup>27</sup> Liang et al reported that none of their 30 patients who did not have OSUI during pessary-reduced urodynamic trial, developed POSUI. They concluded that concomitant anti-incontinence surgery is not necessary in this group.<sup>28</sup> Klutke and Ramos et al found the same results and arrived at a similar conclusion

in a retrospective review of 70 patients.<sup>29</sup> A study by Ennemoser et al in a study of 113 patients with OSUI concluded that despite the preoperative evidence of OSUI, the manifestation of SUI rarely occurred, with 28.1% of patients experiencing SUI over long-term follow-up of 5.7 years (2-8years range) after vaginal prolapse surgery. Anti-incontinence surgery was necessary in only three cases (5.3%). These results indicated that with the one-step approach, 54 of 57 patients (94.7%) would have received prophylactic anti-incontinence surgery unnecessarily. Hence they recommended the two-step approach in the management of vaginal prolapse surgery in patients with OSUI.<sup>30</sup>

In a study by Klutke and Ramos et al, the prophylactic Burch colposuspension increased the incidence of UI. Hence they had suggested the requirement of preoperative testing to identify the women who require an anti-incontinence procedure.<sup>29</sup> Alternatively, patients who demonstrate OSUI during prolapse-reduced urodynamics, are prone to develop POSUI and are candidates for concomitant anti-incontinence procedures. As noted by Ennemoser et al, 28.1% of patients with OSUI developed POSUI after a period of 5.7 years.<sup>30</sup> But in our study none of the patients developed POSUI. This difference may be due to short term follow up. The limitations of our study are small proportion of patients who demonstrated OSUI, use of vaginal pack (commonly used method for reduction of prolapse in our institution) for reduction of the prolapse than ring pessary, which was used in other studies and short term follow up. We suggest studies comparing OSUI by various methods of prolapse reduction i.e vaginal packing, ring pessary, split speculum and long term follow up of the patients undergoing corrective surgery for pelvic organ prolapse who had OSUI pre operatively.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Ghose S, Reddy N. Study of occult stress urinary incontinence in pelvic organ prolapse. *Int J Reprod Contracept Obstet Gynecol* 2017;6: 1392-7.