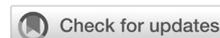


Incidence and characteristics of *de novo* stress urinary incontinence after pelvic organ prolapse vaginal repair

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ABSTRACT

BACKGROUND Some patients who undergo pelvic floor reconstruction for pelvic organ prolapse (POP) may experience a *de novo* stress urinary incontinence (SUI) postoperatively. We aimed to investigate the incidence and characteristics of *de novo* SUI in patients who underwent pelvic floor reconstruction at the national referral hospital in Indonesia.

METHODS This cross-sectional study evaluated 108 patients who underwent pelvic floor reconstruction due to POP between January 2016 and December 2017. Per the inclusion criteria, 75 women were enrolled using a consecutive sampling. The incidence of *de novo* SUI was determined 6–12 months postoperatively using the Indonesian version of the questionnaire for urinary incontinence diagnosis and objectively using the cough stress test during gynecologic examination after a negative preoperative prolapse reduction stress test.

RESULTS The average age, parity, body mass index, and years since menopause onset were 56.17 (4.67) years, 3.17 (1.07), 28.58 (5.18) kg/m², and 12.8 (7.0) years, respectively. *De novo* SUI was seen in 8.0% (6 of 75) patients at 6–7 months postoperatively, with 3 (50.0%) had severe POP and 3 (50.0%) had a mild POP. Most of these patients (4 of 6, 66.7%) had undergone procedures other than colpocleisis for POP reconstruction.

CONCLUSIONS The incidence of *de novo* SUI after gynecologic surgery for POP at a national referral hospital in Indonesia is 8%. Most patients were aged <60 years, had a parity of <4, were nonobese, were menopausal, and had diabetes.

KEYWORDS gynecologic surgery, pelvic organ prolapse, tertiary referral center, urinary stress incontinence

Urinary incontinence (UI) is characterized by the loss of voluntary control on urination. UI is considered as a significant health concern for women globally given its devastating social, economic, sexual, and psychological effects.¹ The prevalence of pelvic organ prolapse (POP) among women at menopause is >50% and increases with age.²

Postoperative UI or *de novo* stress UI (*de novo* SUI) has recently been identified as a postoperative complication of vaginal repair or correction for POP. *De novo* SUI persists for a prolonged period, causing

concern to the patients and surgeons. The incidence of *de novo* SUI in the general population is 16–51%, whereas it is occurred around 11–14% among patients who underwent surgical repair for POP.³ According to Alas et al,⁴ the overall incidence of *de novo* SUI in the USA was 9.9%, with that among patients without preoperative complaints of UI being 4.4%.

The prevalence of SUI among Indonesian women remains unclear given that it is assumed to be normal in postpartum women, with most of them unwilling to discuss it with their health care providers. Fakhri et

al⁵ in 2016 reported the prevalence of postpartum SUI was 8.8% among Indonesian women. The other study reported that the prevalence of UI was 32.32% among women with POP from Bali, Indonesia.⁶

Cipto Mangunkusumo National Public Hospital is a national referral center in Indonesia. Epidemiologic data for *de novo* SUI in Indonesia, particularly at this national referral center, remain limited. Therefore, we aimed to investigate the incidence and clinical characteristics of patients with *de novo* SUI at the national referral center in Indonesia.

METHODS

This cross-sectional study was conducted from January 2016 to December 2017 at the Department of Obstetrics and Gynecology, Division of Urogynecology and Reconstruction, Universitas Indonesia, Cipto Mangunkusumo Hospital, Jakarta, Indonesia. This study was approved by the Ethics Committee of the Faculty of Medicine, Universitas Indonesia (No: 268/UN2.F1/ETIK/2017).

We included patients who underwent a vaginal repair without a mesh use for POP. Patient data were collected from the medical records. Patients who met the inclusion criteria were recruited by phone. The inclusion criteria were vaginal repair without mesh use for POP until 6–12 months ago and availability of all required data. The results showed that there is no subjects rejected in inclusion criteria. The exclusion criteria were a history of pelvic surgery, urethral injury, radiotherapy in the pelvic region, and pelvic or spinal disorders. The identified patients filled in a consent form and visited the urogynecology outpatient clinic, wherein they were enrolled into the study using the consecutive sampling technique.

We used the guided interview method and asked the eligible patients to complete the Indonesian version of the Questionnaire for UI Diagnosis (QUID). The interview was conducted by trained physicians/research assistants or by on duty urogynecology trainees under the supervision of a urogynecology consultant. QUID consisted of six short questions, and the patients have to choose one out of five value options reflecting the severity of their symptoms. A score of ≥ 4 for questions 1, 2, and 3 indicates SUI.

The occurrence of *de novo* SUI was determined by calculating the positive results on the QUID questionnaire and objectively based a positive cough

stress test (CST) during the gynecologic examination after a negative preoperative prolapse reduction stress test (PPRST). The clinical characteristics of patients with *de novo* SUI were recorded, which included age, parity, BMI, years since menopause onset, degree of POP according to the POP-Q classification, type of vaginal surgery, and clinical results of DM.

We classified the type of vaginal surgery. Colpocleisis is a type of vaginal obliterative surgery which entails sewing together the anterior and posterior vaginal walls to shorten the vaginal canal and prevent their inward prolapse and facilitate support for the uterus. Noncolpocleisis procedures included colporrhaphy, sacrocolpopexy, sacrohysteropexy, surgery using vaginal mesh, and fixation or suspension using the patient's own ligament.⁷ For the objective and site-specific assessment, we used the POP-Q classification. Stage I was characterized by the most distal portion of the prolapse being >1 cm above the level of the hymen. Stage II was characterized by the most distal portion of the prolapse being ≤ 1 cm proximal or distal to the hymenal plane. Stage III was considered as the most distal part of the prolapse protruding >1 cm below the hymen but no farther than 2 cm less than the total vaginal length (not all of the vagina has prolapsed). Stage IV was considered in cases of complete vaginal eversion.⁸

Statistical analyses with the collected data were conducted using the SPSS software version 20 (IBM Corp., USA). The incidence of *de novo* SUI was presented as a percentage (n, %) by the time period, and clinical characteristics were presented as means (mean [standard deviation]) for numerical data and percentages (n, %) for categorical data.

RESULTS

Of the 75 included patients, 6 (8.0%) developed *de novo* SUI within 18 months postoperatively, with most of these patients aged <60 years (4 of 6, 66.7%). The average age, parity, BMI, and time since menopause onset were 56.17 (4.67) years, 3.17 (1.07), 28.58 (5.18) kg/m², and 12.8 (7.0) years, respectively. Table 1 summarizes the clinical characteristics of each group (*de novo* SUI positive or negative).

The patient characteristics did not differ by the degree of prolapse. However, the differences were observed by age, parity, type of procedure, existence of DM, and time since menopause onset. Of the 6 patients

Table 1. Clinical characteristics of patients with and without de novo SUI

Clinical characteristic	De novo SUI	
	Present, n (%)	Not present, n (%)
Age (years), mean (SD)	57.00 (9.95)	61.90 (7.99)
<60	4 (44.4)	45 (40.9)
≥60	5 (55.6)	65 (59.1)
Parity, mean (SD)	3.56 (1.42)	3.95 (1.75)
<4	5 (55.6)	48 (43.6)
≥4	4 (44.4)	62 (56.4)
BMI (kg/m ²), mean (SD)	24.69 (6.06)	25.80 (5.27)
Nonobese	8 (88.9)	91 (82.7)
Obese	1 (11.1)	19 (17.3)
Baby's birth weight (g), mean (SD)	3,855.5 (579.03)	3,463.6 (479.15)
<4,000	6 (66.7)	93 (84.5)
≥4,000	3 (33.3)	17 (15.5)
Preoperative degree of POP		
I	2 (22.2)	8 (7.3)
II	1 (11.1)	20 (18.2)
III	6 (66.7)	40 (36.4)
IV	0 (0)	42 (38.2)
Type of procedure		
TVH colporrhaphy	5 (55.6)	52 (47.3)
TVH CA CPR SSF	0 (0)	23 (20.9)
TVH CA CPR	2 (22.2)	10 (9.1)
CA CPR SSH	0 (0)	13 (11.8)
LeFort colporrhaphy	0 (0)	5 (4.5)
CA CPR mesh augmentation	1 (11.1)	0 (0)
CA CPR TVH SSF	0 (0)	1 (0.9)
Colporrhaphy	0 (0)	5 (4.5)
CPR	1 (11.1)	1 (0.9)
DM	7 (77.8)	21 (19.1)
Preoperative menopause state	8 (88.9)	101 (91.8)
Method of delivery		
Spontaneous	9 (100.0)	100 (90.9)
Vacuum extraction	0 (0)	5 (4.5)
Cesarean section	0 (0)	5 (4.5)

BMI=body mass index; CA=colporrhaphy anterior; CPR=colpoperineorrhaphy; DM=diabetes mellitus; POP=pelvic organ prolapse; SD=standard deviation; SSF=sacrospinous fixation; SSH=sacrospinous hysteropexy; SUI=stress urinary incontinence; TVH=transvaginal hysterectomy

with de novo SUI, 3 (50.0%) had severe POP (stage III–IV) and 3 (50.0%) had mild POP (stage I–II); most of these patients (4 of 6, 66.7%) had undergone noncolporrhaphy procedures for pelvic floor reconstruction. Five of six patients (83.3%) had DM per clinical history and laboratory findings and were menopausal.

DISCUSSION

The incidence of de novo SUI was 8% in this study. The incidence of de novo SUI ranged from 16% to 51% among the population in several published reports.^{3,4,19} In contrast, the published literature ranged the incidence of de novo SUI from 11% to 44% among women who had undergone a surgical repair for POP.^{3,4} Alas et al⁴ had studied 274 patients who had undergone surgical POP correction between 2003 and 2013 in the USA. They reported an overall incidence of de novo SUI of 9.9%; the incidence among those who had no preoperative UI was 4.4%.⁴ Table 2 shows the lists of published reports on the incidence of de novo SUI by study design.

Such varying reports could possibly be explained by the differences in research methodology such as study design, instrumentation, diagnostic criteria, study parameters, the postoperative observation window, and type of repair or reconstruction procedure, particularly the use of mesh augmentation. Furthermore, exclusion or comparison of patients with occult SUI varied across studies, which can also explain

Table 2. Studies reporting the incidence of de novo SUI

First author, year	Study design	Incidence of de novo SUI (%)
Borstad, ⁹ 1989	Descriptive-prospective	22
Colombo, ¹⁰ 1996	Randomized clinical trial	8
Aungst, ¹¹ 2009	Retrospective review	24
Kasturi, ¹² 2011	Retrospective cohort with nested case control	25
Al-Mandeel, ¹³ 2011	Descriptive-retrospective	24
Hafidh, ¹⁴ 2013	Retrospective cohort	2
Leruth, ¹⁵ 2013	Retrospective cohort	23.6
Lo, ¹⁶ 2015	Retrospective observational	11
Kanasaki, ¹⁷ 2014	Retrospective cohort	47.3
Alas, ⁴ 2016	Descriptive-retrospective	9.9
Wang, ¹⁸ 2017	Retrospective cohort	25

SUI=stress urinary incontinence

Table 3. Comparison of demographic characteristics of patients with *de novo* SUI across studies

Characteristic	This study	Wang, ¹⁸ 2014	Al-Mandeel, ¹³ 2011	Lo, ¹⁶ 2015	Wang, ³ 2017
Age, mean (SD)	61.2 (8.8)	58.5 (11.0)	61.0 (12.0)	66.18 (9.65)	64.3 (11.0)
Parity, mean (SD)	3.71 (1.67)	<3 children: 89.8% ≥3 children: 10.2%	3.0 (0.0)	3.48 (1.56)	2.4 (1.2)
BMI, mean (SD)	25.8 (5.42)	-	27.0 (5.0)	26.03 (3.05)	24.7 (3.6)

BMI=body mass index; SD=standard deviation; SUI=stress urinary incontinence

the differences in the results.^{3,4,8,9} The reliability of this study is still limited due to the small sample size.

Per the aforementioned data, the incidence of *de novo* SUI varied widely from 2% to 47.3%. These differences across studies were possibly due to nonexclusion of occult SUI objectively and subjectively using CST or PPRST assessment or even by using urodynamic examination preoperatively. For example, Kanasaki et al¹⁷ in their retrospective study included 105 patients who had undergone tension-free vaginal mesh repair for POP between 2009 and 2012; they found that the incidence of *de novo* SUI was 47.3% (26 of 55) among patients without SUI preoperatively. They did not exclude patients with preoperative occult SUI, and preoperative SUI was only established intraoperatively. Furthermore, the diagnosis of *de novo* SUI was only determined based on subjective symptoms 1–3 months postoperatively. The presence of occult SUI was an important factor given that a high proportion of patients had occult SUI, which may affect the incidence of *de novo* SUI. The incidence of occult SUI has been reported by several studies: Jundt et al,²⁰ 7.7%; Wei et al,²¹ 36%; and Wang et al,¹⁸ 51.3% (251/489).

The increased use of mesh augmentation in the current decade has led to an increased incidence of *de novo* SUI, compared to that in the early 1990s when the conventional anterior vaginal wall repair techniques, such as anterior colporrhaphy, were commonly used.^{22,23} Several recent studies have shown that mesh augmentation for POP reconstruction surgery is a significant risk factor for *de novo* SUI.^{3,4,8} Demographic factors could also contribute to the observed differences in the incidences of *de novo* SUI, such as an average age of the patients, country or region, and ethnicity.^{3,4,8,24} The basic clinical characteristics of our patients such as an average age, parity, and BMI did not differ notably from those reported in others Asian studies (Japan, Taiwan, China, and Saudi Arabia).

Comparison of the demographic characteristics of subjects with *de novo* SUI in other countries were is shown in Table 3.

The limitation of this study includes the limited sample used in this study. However, the results will form the basis for further studies. In conclusion, our results shows that the incidence of *de novo* SUI at our national referral center in Indonesia is 8% (6 of 75) within 18 months after reconstructive repair for POP. Our results are in line with those reported by previous methodologically similar studies (without mesh augmentation). Most patients were aged <60 years, had a parity of <4, were nonobese, were menopausal, had diabetes, and had undergone procedures other than colpocleisis for POP reconstruction. Further prospective and multicenter studies are needed to validate our findings, determine significant risk factors of the occurrence of *de novo* SUI at Cipto Mangunkusumo Hospital, Jakarta, and determine the associations among those factors and *de novo* SUI development.

Conflict of Interest

The authors affirm no conflict interest in this study.

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