

Research Article

## Comparison of Postpartum Urinary Retention Healing between Groups with Methods of Residual Urine Measurement Four Hours versus Six Hours Post-Delivery

### *Perbandingan Lama Pemulihan Retensio Urin Pascapersalinan Pervaginam antara Pengukuran Residu Urin Empat dan Enam Jam*

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#### Abstract

**Objective :** To investigate the difference of recovery time and the urinary residual volume between group of subject with different time of urinary residual collecting.

**Methods :** A randomized controlled trial was conducted at Dr. Cipto Mangunkusumo Hospital and Karawang Hospital between March and December 2017. Postpartum women with urinary retention risks, willing to contribute to the trial, and diagnosed as postpartum urinary retention were divided into two groups. Urinary residual volume was measured in 4<sup>th</sup> hour and 6<sup>th</sup> hour in each group. Subjects were then treated according to RSCM guideline, and the time of recovery was documented.

**Results :** Both groups have similar characteristic. The median length of recovery in the group which the urinary residual was measured in 4<sup>th</sup> hour was 30 hours, 21 hours shorter than 6<sup>th</sup>-hour group, 51 hours ( $p < 0.001$ ). The median of urinary residual volume of the 4<sup>th</sup>-hour group was 600 ml, 400 ml lesser than the 6<sup>th</sup> hour group, 1000 ml ( $p < 0.001$ )

**Conclusions :** Time of recovery are shorter in the 4<sup>th</sup>-hour group and the urinary residual volume are less in the 4<sup>th</sup>-hour group compared to the 6<sup>th</sup>-hour group.

**Keywords :** postpartum urinary retention, urine residual, urinary residual collecting time

#### Abstrak

**Tujuan :** Untuk mengetahui lama pemulihan dan volume residu urin pada kelompok pasien dengan retensio urin pascapersalinan dengan beda waktu pengukuran,

**Metode :** Penelitian ini menggunakan desain uji klinis acak di RSUPN Dr. Cipto Mangunkusumo dan RSUD Karawang bulan Maret-Desember 2017. Perempuan pascasalin dengan risiko retensio urin pasca persalinan, bersedia mengikuti penelitian, dan terdiagnosis retensio urin dibagi menjadi dua kelompok. Kelompok pertama diukur residu urinnnya dalam 4 jam, kelompok kedua dalam 6 jam. Pasien lalu diberikan tatalaksana retensio urin sesuai protokol RSUPNCM dan dicatat waktu pulihnya.

**Hasil :** Karakteristik pasien pada kedua kelompok dianggap setara. Median lama pemulihan pasien retensio urin yang diukur residu urin 4 jam adalah 30 jam, berbeda 21 jam dengan pasien yang diukur residunya 6 jam, yaitu 51 jam ( $p < 0.001$ ). Median jumlah residu urin pada kelompok pengukuran residu urin 4 jam adalah 600 ml, berbeda 400 ml dengan kelompok pengukuran 6 jam, yaitu 1.000 ml ( $p < 0.001$ ).

**Kesimpulan :** Lama pemulihan lebih singkat pada kelompok pasien dengan waktu pengukuran residu urin 4 jam dibandingkan dengan 6 jam. Jumlah residu urin lebih sedikit pada pengukuran residu 4 jam dibanding 6 jam

**Kata kunci :** retensio urin pasca persalinan, residu urin, waktu pengukuran residu urin.

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#### INTRODUCTION

Postpartum urinary retention (PPUR) is the inability to void spontaneously, with pain and over-distended bladder after delivery.<sup>1-3</sup>

According to Stanton, PPUR is the inability to void after 24 hours needed to be catheterized, with urine volume left in the bladder over 50%.<sup>4</sup> Bladder capacity after delivery is 479,5 mL.<sup>5</sup> In Indonesia, the incidence of PPUR was 14.8% in

1996.<sup>5</sup> In Indonesia, as delivery rate in 2010 was 4.5 million, assumed the cesarean section rate was 30%, the vaginal delivery rate was 3 million in one year. Given the incidence of 10 to 20%, there would be 300.000-600.000 case of PPUR annually. Five percent or PPUR will continues if undetected early, will cause bladder overdilatation, refractory urinary tract infection, and chronic voiding disturbances.<sup>6-8</sup> This eventually will take more recovery time, thus lengthen the length of stay, and will make big cost. The hypothesis were the recovery time would be shorter in the group of PPUR subject with urinary residual collecting time at the 4<sup>th</sup> hour compared to the 6<sup>th</sup>-hour group and the urine volume would be lesser in the 4<sup>th</sup>-hour group. Study comparing recovery time in the two urinary collecting time was never been done before. The purpose of this study was to compare the difference of recovery time of PURR and urinary residual volume between two groups.

## METHODS

This study was a randomized control trial with total 61 subjects in two groups, held in Dr. Cipto Mangunkusumo Hospital and Karawang Hospital from March to December 2017.

Sampling was conducted with random sampling. Research team gave the information to the subject. Patients at risk to develop PPUR were included in the study. This study was using female catheter number 14 to collect the urine, which measured in the same measuring cup in 50 cc scale. Urinary residual volume was measured 5 to 10 minutes after maximal voiding, after asepsis and anesthetic procedures. Subjects who required special attention, those with severe complication, and those who ended having cesarean section were excluded. All subjects would have their bladder emptied after second phase of labor was ended. After the placenta was delivered, the subject were divided into 2 groups according the number the nurses had after. To achieve the postpartum bladder capacity, the 4<sup>th</sup>-hour group got 150 cc of fluid intake per hour, while the 6<sup>th</sup>-hour group got 100 cc per hour. Urinary residual volume were collected at 4<sup>th</sup> and 6<sup>th</sup> hour, despite the voluntary void. Subject with no PPUR were excluded. Subject with PPUR were treated using

modified Dr. Cipto Mangunkusumo Hospital's protocol. Those with urinary residual volume 500-999 cc were catheterized for 1 x 24 hours; 1000-2000 cc for 2 x 24 hours.

## Statistical Analysis

Statistical analysis was performed using SPSS 20® software for the Windows. Data were analyzed with comparative numeric 2 independents.

## RESULTS

The research flowchart was presented in picture 1. We included 141 subject, 6 of them were excluded due to their refusal to participate. Then 135 subjects were randomized. Total 74 subjects were dropped out because they did not have PPUR. We analysed 31 subjects in the 4<sup>th</sup>-hour group and 29 subjects in the 6<sup>th</sup>-hour group.

Characteristics of the subjects are presented in table 1. Total delivery were 4.552 deliveries in the period of March until December 2017, 46.9% were vaginal deliveries. The mean age of the two groups were 26.48 in 4<sup>th</sup>-hour group and 27.9 in 6<sup>th</sup>-hour group. All of the subjects were having deliveries less than 12 hours. Most of the subject were nullipara in the first group (54.8%) and only 43.35 in the second group. Seven subjects (22.6%) were having vacuum extraction, and two subjects (6.4%) were having forceps extraction in the first group. In the second group, 11 subjects (37.9%) were having vacuum extraction, while one subject (3.4%) was having forceps extraction. Most of subjects in both groups were having intact perineum, perineal rupture grade 1 or two ( 83.9% in the first group and 90% in the second group). The duration of the second stage of labour was similar in both group, most of them were less than 60 minutes (87.1% in the first group and 90% in second group). Twenty-seven subjects (87.1%) in the first group and 24 subjects (80%) in the second group were less than 80 kilograms.

The results were shown in Table 3 and 4. The median recovery time was 30 hours in the 4<sup>th</sup>-hour group, and 51.5 hours in the 6<sup>th</sup>-hour group ( $p < 0.001$ ). The urinary residual volume was 600 cc in the 4<sup>th</sup>-hour group and 1000 cc in the 6<sup>th</sup>-hour group ( $p < 0.001$ ).

**Table 1.** Characteristics of the subjects

Variable	Urinary residual measured in 4 <sup>th</sup> hour (n=31)	Urinary residual measured in 6 <sup>th</sup> hour (n=30)
Age	26.48± 6.31	27.9± 6.98
<b>Length of delivery</b>		
< 12 hours	31	30
> 12 hours	0	0
<b>Parity</b>		
Nulliparity	17 (54.8%)	13 (43.3%)
Multiparity	14 (45.2%)	17 (56.7%)
<b>Assisted delivery</b>		
Vacuum extraction	7 (22.6%)	11 (37.9%)
Forceps extraction	2 (6.4%)	1 (3.4%)
<b>Grade of perineal rupture</b>		
Intact, 1, 2	26 (83.9%)	27 (90%)
3 and 4	5 (16.1%)	3 (10%)
<b>Duration of the second stage</b>		
≤ 60 minutes	27 (87.1%)	27 (90%)
61-120 minutes	4 (12.9%)	3 (10%)
≥ 120 minutes	0	0
<b>Body weight</b>		
< 80 kg	27 (87.1%)	24 (80%)
≥ 80 kg	4 (12.9%)	6 (20%)

**Table 2.** Healing Time (hour)

Collecting hour	median	range	p
4 <sup>th</sup> hour	30.00	25.00-53.00	< 0.001
6 <sup>th</sup> hour	51.50	26.00-67.00	

**Table 3.** Urine Volume (cc)

Collecting hour	median	range	p
4 <sup>th</sup> hour	600.00	300.00-1300.00	< 0.001
6 <sup>th</sup> hour	1000.00	500.00-1300.00	

## DISCUSSION

In this study, the confounding factors were controlled by using random sampling. In general, the groups were considered equal. The base data of age were similar with the previous study held in Canada by Fedorkow et al., the mean age was 28.7.<sup>9</sup> One multiple regression study to determine significant obstetric parameters in Hong Kong showed a significant difference of duration of first and second stage between the PPUR and healthy subject. In delivery process, the presentation of the fetus could add significant pressure to the pelvic floor and tissue, included the nerve fibres within. This could lead to urethral obstruction due to oedema or detrusor dysfunction due to nerve damages. The longer the delivery takes place, the longer pelvic absorbs the big pressure.<sup>10</sup>

From the previous studies<sup>9,11,12</sup> PPUR were

related to parity. In one study, the relative risk for nulliparity was 1.31 (CI 95% 0.77-2.23)<sup>9</sup>. In this study, the parity status was not equal in both group, but we do not think this would affect the recovery time since parity was considered as one of the risk factors for having PPUR.<sup>9,11,12</sup>

Episiotomy procedure and perineal rupture were equal in both group, and the perineal rupture will cause spasm reflex of the urethral muscle. In a case-control study, mediolateral episiotomy was more frequent in PPUR subject.<sup>13</sup>

Assisted delivery was equal in both groups. In one study, assisted delivery was an independent risk factor with OR 3.44.<sup>14</sup> In one study, the risk for having PPUR in forceps delivery was 8.42 times.<sup>15</sup>

Median recovery time in the first group was 22 hours faster than the second group, and the result was statistically significant (p< 0.001). This might be due to in the first group the bladder was not too much distended. In one study, the distended bladder will interfere with the parasympathetic nerve conduction and detrusor activity so that the recovery will be slower.<sup>16</sup> Another study showed that after vaginal delivery, the bladder would become more rigid and hypotonic, the bladder will be less sensitive to the filling effect so that it can hold more tension. One animal study showed that acute over distended of the bladder would increase intra bladder pressure and decreasing

tissue perfusion.<sup>17</sup> This ischemia will lead to nerve damages, worsen the sensation and contractility. Although overdistended only happen for a short period, the perfusion interference can lead to bladder damage due to apoptosis and oxidative damages. There was no previous study comparing different recovery time between two different urinary residual collecting time. Median urinary residual volume was 400 cc more in the second group (600 cc and 1000 cc).

Although this is a randomised controlled trial, there were limitations. More than one examiner did the measurement, and the confounding factors were not controlled with statistical analysis.

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