

Research Article

Risk Factors of Postpartum Urinary Retention

Faktor Risiko Retensio Urine Pascasalin

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Abstract

Objective: To determine the correlation between risk factors and the incidence of postpartum urinary retention (PUR) at RSUP Dr. Mohammad Hoesin Palembang.

Methods: Analytical observational study with cross sectional design to find out the correlation between risk factors and incidence of PUR at emergency room, delivery room and ward at dr. Mohammad Hoesin General Hospital Palembang since October 2018 to April 2019. There were 82 samples that met inclusion criteria. The correlation between risk factors and the incidence of urinary retention was analyzed using Chi Square test/ Fisher Exact test, and the most important risk factor was determined using the Logistic Regression test. Data analysis used SPSS version 22.0.

Result: In this study, it was found that there was a significant relationship between prolonged second stage of labor (PR=40.75, p=0.000), type of labor (PR=9.028 CI 95% 2.114–38.558; p=0.004) and perineal laceration (PR=12.938 CI95% 1.872–89.414; p=0.016) with PUR. However, there was no significant relationship between age, parity, neonatal birth weight, episiotomy, vulvar edema and urinary retention (p>0.05). It was concluded that instrumental delivery had a significant effect on the incidence of urinary retention (PR=13,541 CI95% 2.381–77.018, p value=0.003) by using logistic regression test.

Conclusions: The most important risk factor of urinary retention was instrumental delivery.

Keywords: instrumental delivery, perineal laceration, postpartum urinary retention, type of labor.

Abstrak

Tujuan: Untuk mengetahui hubungan antara faktor risiko dan kejadian retensio urin pascasalin di RSUP Dr. Mohammad Hoesin Palembang.

Metode: Penelitian observasional analitik dengan desain potong lintang untuk mengetahui hubungan antara faktor risiko dan kejadian retensio urin pascasalin di IGD, kamar bersalin dan bangsal perawatan RSUP Dr. Mohammad Hoesin Palembang sejak Oktober 2018 sampai April 2019. Didapatkan 82 sampel yang memenuhi kriteria inklusi. Hubungan antara faktor risiko dan kejadian retensio urine dianalisis menggunakan uji Chi Square/Fisher Exact, sedangkan untuk mengetahui faktor risiko yang paling berperan menggunakan uji regresi logistik. Analisis data menggunakan SPSS versi 22.0.

Hasil: Pada penelitian ini, didapatkan hubungan yang signifikan antara lama kala II (PR=40,75, p=0,000), jenis persalinan (PR=9,028 IK95% 2,114–38,558; p=0,004), laserasi perineum (PR=12,938 CI95% 1,872–89,414; p=0,016), dan retensio urine pascasalin. Namun, didapatkan hubungan yang tidak signifikan antara usia, paritas, BBL bayi, episiotomi, edema vulva, dan kejadian retensio urin (p>0,05). Dengan uji regresi logistik, didapatkan kesimpulan bahwa jenis persalinan dengan instrumen berpengaruh secara signifikan terhadap kejadian retensio urin (PR = 13,541 IK95% 2,381–77,018, p value = 0,003).

Kesimpulan: Faktor risiko yang paling berperan terhadap kejadian retensio urin pascasalin adalah persalinan dengan instrumen.

Kata kunci: jenis persalinan, instrumen, laserasi perineum, retensio urin pascasalin.

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INTRODUCTION

Postpartum urinary retention (PUR) is a common condition that is often complained by postpartum women during fourth stage of labor.¹ It is the inability of the bladder to empty urine spontaneously within 6 hours postpartum or 6 hours after the release of the bladder catheter after cesarean section.² The prevalence of PUR varies depending on the risk factors that might cause urinary retention, including instrumentation used during the delivery process, duration of labor, epidural analgesia agent, episiotomy, neonatal birth weight and nulliparity. The pathophysiology of PUR is due to the influence of elasticity of the entire urinary tract seems to increase during pregnancy, especially the hormonal effects that can reduce detrusor muscle tone.³

The prevalence of PUR varied, ranging from 1.5–45% of postpartum mothers.⁴ Approximately 3.38–24.1% of them are mothers who were in labor.⁵ The rate of urinary retention after the cesarean section at RSMH Palembang in 2012 was 3.6% with the length of comparison more than 24 hours and primiparity was an influential risk factor.⁶ At RSCM, the prevalence of PUR was as much as 14.8% and the incidence of PUR was 26.7%. The incidence of PUR in Ulin Hospital Banjarmasin in 2002–2003 by 0.38% in which 11 PUR cases from 2850 labors such as 737 cesarean sections (25.85%), 1,891 spontaneous deliveries (66.35%) and 222 vacuum extractions (7.78%).⁷⁻⁹

Chronic PUR was a serious condition that required integrated management to prevent maternal morbidity such as urosepsis. Because catheter placement persisted in postpartum mothers could increase the risk of urinary tract infection, it was necessary to identify the factors that affected urinary retention. It was useful to help pregnant women get normal urination postpartum by early intervention and appropriate postpartum management.¹⁰

Postpartum urinary retention was often diagnosed late and was found 3–5 days postpartum. This happened because birth attendants, both doctors and midwives, did not know about PUR even though there were risk factors for these patients. Therefore, early detection of PUR was needed to prevent complications and delayed in handling.

This study aims to determine the parameters of PUR risk factors in pregnant women who underwent vaginal delivery at Dr. RSUP. Mohammad Hoesin Palembang. Besides that,

there was information about the risk factors of PUR in vaginal delivery and appropriate management that can reduce the number of deaths and complications. Moreover, this research had not been performed before at our hospital.

METHODS

The observational analytical study with a cross sectional design was conducted to determine the relationship between the risk factors and postpartum urinary retention at emergency room, delivery room and ward at Dr. Mohammad Hoesin General Hospital Palembang since October 2018 to April 2019. There were 82 samples that met the inclusion criteria. The relationship between risk factors and the incidence of urinary retention was analyzed using Chi Square test / Fisher Exact. Besides that, we used Logistic Regression test to determine the most important risk factors. Data analysis used SPSS version 22.0.

RESULTS

There were 11 patients with urinary retention (13.4%) and 71 patients without urinary retention (86.6%). The mean age of respondents with urinary retention was 29.36 ± 4.05 years, while the average age of respondents without urinary retention was 28.69 ± 6.31 years. The statistical test showed that there was no difference in age ($p=0.737$) between respondents with and without urinary retention.

Most patients were multigravid in both groups. Moreover, there was no difference in the number of pregnancies between respondents with and without urinary retention ($p=0.736$). In this study, there was no patient with urinary tract infection during pregnancy in either urinary retention group or without urinary retention.

The average score of respondents with urinary retention was 37.36 ± 8.36 while the mean score respondents without urinary retention was 13.09 ± 13.58 . By using statistical tests, there were differences in age ($p=0.000$) between both groups. The score of respondents with urinary retention was greater than the score of respondents without urinary retention.

Based on scoring, patients with a possibility of urinary retention were 72.7% in the urinary retention group and only 22.5% in the group without urinary retention. From the Fisher Exact test, it was concluded that there was a significant correlation between the possibility of urinary

retention based on scoring and the incidence of urinary retention. Mother with the possibility of urinary retention was 9.167 times more prone to have significant PUR (OR = 9.167 CI95% 2.174–38.649; p=0.000).

In this study, there were 18,2% patients with age ≥ 35 years in the urinary retention group and 16.9% in the group without urinary retention. From the Fisher Exact test, it was concluded that there was no significant correlation between age and PUR, mothers with age ≥ 35 years were 1.093 times more prone to have urinary retention but it was not significant (OR = 1.093 CI95% 0.209–5.707; p=1.000).

Besides that, multiparity was 45.5% in the urinary retention and 31% in the group without urinary retention. By using Chi Square test, there was no significant correlation between parity and PUR. Multiparity was 1.856 times more prone to experience urinary retention but it was not significant (OR=1.856 CI95% 0.511–6.736; p=0.545).

There were 9% of patients with macrosomia infants in the PUR group and 1.4% in the group without urinary retention. Moreover, there was no significant correlation between neonatal birth weight and PUR. Women with macrosomia babies were 7 times more risky towards PUR but it was not significant (OR=7.000 CI95% 0.405–121.003; p=0.252).

Patients with prolonged second stage of labor were 36.4% in the urinary retention group and were not found in the group without urinary retention. By using Fisher Exact test, there was a significant correlation between the length of the second stage and PUR. Mothers with prolonged second stage were 40.57 times experiencing PUR (OR=40.57; p=0.000).

In addition, patients with episiotomy were 63.6% in the urinary retention group and 49.3% in the group without urinary retention. There was no significant correlation between episiotomy and PUR, mothers with episiotomy were 1.8 times more prone to urinary retention but it was not significant (OR=1.800 CI95% 0.484–6,695; p=0.520). In this study, the instrumental labors were as much as 45.5% in urinary retention group and 8.5% in the group without urinary retention. There was a significant correlation between the type of labor and PUR, the instrumental labors contributed nine times experiencing urinary retention (OR=9.028 CI95% 2.114–38,558; p=0.004) (Table 1).

Table 1. The Correlation between Type of Labor and PUR

Characteristics	Urinary Retention		Total	PR * (95% CI)	P-value*
	Yes	No			
Type of Labor					
Instrumental	5	6	11	9.028	0.004
Spontaneous	6	65	71	(2.114–38.558)	
Total	11	71	82		

* Chi Square test, p = 0.05

In this study, there were 9.1% of patients with vulvar oedema in the urinary retention group and were not found in the group without urinary retention. By using Fisher Exact test, there was no significant relationship between vulvar oedema and PUR. Women with vulvar oedema were 7.1 times more risky towards urinary retention but it was not significant (OR=7.100; p=0.134). There were 27.3% patients with perineal lacerations in the urinary retention group and 2.8% in the group without urinary retention.

Table 2. The Correlation between Perineal Lacerations and PUR

Characteristics	Urinary Retention		Total	PR * (95% CI)	P-value*
	Yes	No			
Perineal lacerations					
Yes	3	2	5	12.938	0.016
Not	8	69	77	(1.872–89.414)	
Total	11	71	82		

* Fisher Exact Test, p = 0.05

It was concluded that there was a significant relationship between perineal lacerations and PUR, women with perineal lacerations were 12.9 times more significantly risky towards urinary retention (OR = 12.938 CI95% 1.872–89.414; p=0.016) (Table 2).

From table 3, type of labor had a significant effect on the incidence of urinary retention. Labor using instrument affected women more prone to urinary retention 13.541 times compared with spontaneous labor significantly (PR=13.541 CI95% 2.381–77.018, p value=0.003).

Table 3. Bivariate and Multivariate Analysis of Urinary Retention Risk

Variable	Bivariate *		Multivariate *	
	PR	P-value	PR	P-value
Types of labor	9.028	0.004	13.541	0.003
Perineal laceration	12.938	0.016	4.089	0.361
Duration of second stage of labor	40.57	0.000	1.465	0.999
Vulvar oedema	7.100	0.134	0.632	1.000

* Logistic Regression Test

DISCUSSION

Postpartum urinary retention is defined as the inability of the bladder to void spontaneously within 6 hours after vaginal delivery or 6 hours after the release of the bladder catheter after cesarean section.² The prevalence of PUR varied, ranging from 1.5–45% postpartum mothers.⁴ In this study, the prevalence of PUR in postpartum mothers were 13.4%. The results of this study was similar with the research at RSCM where the prevalence of PUR was 14.8%.⁷ However, this result was greater than the research at RSMH Palembang which was 3.6%.⁶ Meanwhile, the rate of PUR was greater than this study which was 26.7%.⁸ In this study, the mean age of patients with PUR was 29.36 ± 4.05 years of age. This result was similar, which found that the average age of PUR patients was 27.79 ± 7.18 years of age. In addition, we found that the average age of patients with PUR was 27.90 ± 6.69 years of age.

Increasing age caused the decreased ability and function of the muscles of the urinary system due to degeneration followed by decreased renal function. Structural or functional abnormalities due to aging can block bladder emptying and the increased risk of urinary tract infection. In this study, the average age of respondents ranged from 20–35 years of age. In this age, the urinary muscles are still well-functioned. Even though labor trauma occurs, the mass and strength can return to normal immediately with exercise. Trauma in labor will reduce bladder muscle strength, but muscle tone will soon be restored in healthy young women. However, those in the group without urinary retention are at the same mean age. By using bivariate analysis, it showed that no association between age and of urinary retention in this study.

In this study, most patients with PUR were nulliparity (54.5%). This result is slightly different, where most of parity in patients with PUR were multiparity (59.7%). We found that most patients with PUR were multiparity 56.9%. During labor, there was trauma to the urethra and bladder due to suppression of the fetal head. Not only the bladder wall, but also urethra, and external meatus were also hyperemia and edema. Trauma in urinary muscles causes interference with reflexes and urge urination. In this study, although the percentage of PUR in nulliparity was higher, from bivariate analysis, there was no relationship between parity and PUR. In the non-PUR group,

we also found a greater percentage of nulliparity (69.0%).

In the PUR group, there was 9.1% macrosomia infants (birth weight ≥ 4000 g), while in the group without PUR, we obtained 1.4% macrosomia infant. The statistical analysis showed that patients with macrosomia infants were 7 times more likely to undergo PUR compared with mothers with non-macrosomia infants (birth weight $< 4,000$ g). This result was in line, which found that patients with macrosomia infants were 13.99 times more likely to undergo PUR compared with mothers with non-macrosomia infants ($p < 0.001$). The larger the infant's birth weight was, the greater the urinary tract and urethral pressure were when the head went down. This would cause bladder trauma which increased the risk of urinary retention. Excessive stretching of the bladder or prolonged fetal head pressure could cause a reduction in bladder stimulation because the nerves and motor impulses could be disrupted.

The pressure of the fetal lower part at the pelvic floor could affect the nerve plexus in the pelvic soft tissue. This caused tissue edema or detrusor muscle dysfunction due to neuropraxia, resulting in PUR.¹¹ Prolonged labor was considered to have a significant relationship with the incidence of PUR. This was caused by the suppression of the fetal head on the pelvic floor, especially during labor with prolonged second stage of labor.¹² In this study, patients with prolonged second stage (> 2 hours) risked 40 times to undergo PUR compared with labor less than 2 hours. This result is in line where patients with prolonged second stage of labor were found to be 16 times more likely to undergo PUR.

The results of this study showed that patients with episiotomy had a risk of 1.8 times having PUR compared with patients without episiotomy, but these results were not statistically significant. In addition, patients with episiotomy were 2.468 times more likely to have PUR compared with patients without episiotomy, but the difference in the Emilia study was statistically significant ($p = 0.013$). The results of patients with an episiotomy was 5.250 times more likely to have PUR compared with patients without episiotomy ($p = 0.022$). Episiotomy suturing was associated with pain which caused disruption of bladder sensitivity and central inhibition of bladder function.¹³

Labor with instruments was a significant risk factor of PUR (PR=3.44). It could affect the ability of the urethral sphincter and surrounding

areas for relaxation, so the detrusor contraction strength could increase to exceed the urethral lumen pressure. In addition, labor with the instrument caused perineal oedema or vesical trauma.¹⁴ Patients with instrumental labor were 9 times more likely to have PUR compared with patients undergoing spontaneous labor without instruments. Labor with instrument was a risk factor for overt type of PUR which was statistically significant (PR=4.5).¹⁴

In this study, women with vulvar oedema were 7.1 times more risky towards having urinary retention but it was not statistically significant. Moreover, vulvar edema was 1.015 times more likely to undergo urinary retention but it was not statistically significant ($p=0.943$). Urethral and perineal edema can increase the risk of PUR due to increased urinary flow resistance due to obstruction and damage to the pudendal nerve. Vaginal delivery can directly cause damage to the pudendal nerve and / or cause changes in the connective tissue around the nerve. The pudendal nerve supplies the external urethral sphincter. Axon regeneration can improve nerve conduction, so that injuries occurred are not permanent.

In vaginal delivery, there is direct trauma to the pelvic floor muscles and nerve innervation found in the birth canal resulting in a decreased bladder sensibility. In further cases, peri-urethral and vulvar oedema occur causing obstruction-type PUR. Another hypothesis is that hormonal changes could also change bladder function during pregnancy and puerperium. In patients with PUR, there was an increase in progesterone level. The progesterone hormone has an inhibitory effect on the smooth muscle of the bladder. This results in shortening of the interval between contraction of the bladder muscle cells, decreased emptying of the average volume and increasing residual volume. In the vaginal delivery, there was a decrease in bladder muscle sensation and smooth tone that can increase the risk of PUR. After vaginal delivery, bladder becomes less sensitive towards the effect that becomes increasingly distended bladder.¹⁵

There are several risk factors of PUR including perineal lacerations, prolonged second stage of labor, instrumental labor, and the use of narcotic analgetics.¹⁶ Urethral and perineal edema can increase the risk of PUR due to increased urine flow resistance due to obstruction and damage

to the pudendal nerve. Vaginal labor can directly cause damage to the pudendal nerve and/or cause changes in the connective tissue around the nerve. The pudendal nerve supplied the external urethral sphincter. Axon regeneration can improve nerve conduction, so that injuries were not permanent.

In this study, mothers with perineal lacerations were 12.9 times more likely to urinary retention than mothers without perineal lacerations. These results are in line which showed that patients with perineal lacerations had a risk of 3,766 PUR compared with patients without perineal lacerations ($p = 0,007$). It was found that patients with perineal lacerations had 12.8 times risk of PUR compared with patients without perineal lacerations ($p<0.001$).¹³ The PUR prediction scoring system can reduce morbidity and mortality due to urinary retention and reduce the risk of postpartum bleeding. In this study, there were differences in scores between patients with PUR and patients without PUR. The scoring system of patients with urinary retention was greater than patients without urinary retention, and the possibility of urinary retention based on predictive urinary retention scores associated with urinary retention. Based on scoring, patients with possible urinary retention is 9 times the risk of having PUR, so this scoring system can predict the occurrence of PUR.

With multivariate analysis, the most important risk factors of PUR were the type of labor, the instrumental labor patients was 13.5 times more risky to have PUR significantly compared with patients undergoing spontaneous labor without instruments ($p=0.033$). In addition, the results of perineal lacerations and length of second stage of labor more than 2 hours were found to be at risk of PUR but it was not statistically significant ($p>0.05$).

CONCLUSION

The incidence of PUR were 13.4 %. There are several risk factors of PUR, namely instrumental labor, severe perineal laceration, and length of second stage of labor more than 2 hours. Based on scoring, patients with possible urinary retention are 9 times more likely to have PUR, so this scoring system can predict the occurrence of urinary retention.

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