

Protracted postpartum urinary retention: risk factors, treatment, and effect on pelvic floor dysfunction

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Abstract

Aim

Postpartum urinary retention occurs in the first twenty-four hours following delivery, though protracted cases—where retention does not resolve following an initial 24 hour in-dwelling catheter—are less well defined, and their incidence is unclear. This study aimed to examine the risk factors, treatment, and effect on pelvic floor dysfunction of protracted postnatal urinary retention.

Methods

This was a case control study. Cases of protracted postpartum retention where women required intermittent self-catheterisation from 2015 – 2023 were identified from a hospital database and a matching number of non-protracted cases were randomly selected from the same database as controls. Symptoms were assessed using the ICIQ-FLUTs questionnaire. Variables were analysed using the Chi-squared test, Fisher's Exact Test, Student's t-test, or Mann-Whitney U Test, as appropriate.

Results

There were 71482 deliveries during the study period, thus incidence of postpartum urinary retention was 6.9/1000 (491/71,482) and the incidence of protracted retention was 0.6/1000 (40/71,482). One woman was included twice, while a further five cases of protracted retention were identified from written records from 2014 giving a total of 44 cases for analysis. The hospital database did not exist prior to 2015. A total of 20 (22.7%) responses were received. The median follow-up was six years. Operative delivery appears to be a risk factor. Questionnaire responders reported urgency in 13 (65%) of women but bother scores were low. Stress urinary incontinence was denied by 7 (35%) of women while urge incontinence was described by 4 (20%).

Discussion

Women can be counselled that protracted postpartum urinary retention is rare and in the medium-term this retention appears to have a minimal effect on bladder function.

Introduction

Postpartum urinary retention (PUR) is an underdiagnosed condition occurring in the first twenty-four hours following delivery. Incidence rates vary considerably, ranging from 1.7 to 14.6% depending on the source^{1,2}, though poor recognition of this condition makes estimation of the true incidence difficult. The incidence of protracted PUR (PPUR) is less well reported and while definitions vary, PPUR typically refers to retention which does not respond to an initial course of an in-dwelling catheter³. Unfortunately, the definitions of both PUR and PPUR remain varied between studies, and between national guidelines^{3,4}. Indeed, this lack of consensus has been highlighted as a limitation to current research⁵.

Management of PUR and PPUR differs considerably internationally, despite the existence of standardised protocols^{3,4}. Irish guidance suggests initial management using an indwelling catheter⁴ (IDC), though the first-line use of intermittent self-catheterisation (ISC) has also been proposed and seems well-tolerated by women⁶. Like its definition, standardisation of management, or at the very least clear reporting, could be beneficial to both women and our understanding of PUR and PPUR.

Generally, women with PUR have minimal long-term sequelae⁷, however, the effect of PPUR is unclear and could potentially cause more severe voiding dysfunction. Thus, this study aimed to examine the risk factors, treatment, and effect on pelvic floor dysfunction of protracted postnatal urinary retention.

Methods

This was a case-control study. Women diagnosed with postpartum urinary retention (PUR) from January 2015 to December 2023 in our institution were identified from a hospital database. Women were included in this database if they required urinary catheterisation within six weeks of delivery.

Postpartum urinary retention (PUR) was defined in line with the National Clinical Practice Guideline. This defines PUR if a woman has not passed urine within six hours of delivery or removal of a catheter following surgery, with a residual of >150ml. Additionally, postpartum urinary retention can be diagnosed if a woman is passing <200ml of urine at a time or has

symptoms of voiding dysfunction with a residual of >150ml. Protracted postpartum urinary retention (PPUR) was defined as any woman who required intermittent self-catheterisation (ISC) following the removal of their IDC. All women with PPUR were included in this study as cases. A matching number of women with PUR who did not require ISC were included as controls. These controls were randomly selected from the hospital database.

The International Consultation on Incontinence Questionnaire Female Lower Urinary Tract Symptoms Module (ICIQ-FLUTs) was posted to all women along with a patient information leaflet and consent form. Women wishing to take part in the study returned these via pre-paid return envelope. No follow-up reminders were sent and any woman who did not return their questionnaire was recorded as a non-responder.

The self-administered form of the ICIQ-FLUTs consists of 12 questions divided into three domains: filling, voiding, and incontinence. All questions have an associated, unscored, bother scale from 0 – 10, with 10 indicating the most bother⁸.

Categorical variables were analysed using the Chi-squared test or Fisher's Exact Test, as appropriate. Continuous variables were analysed using Student's t-test or Mann-Whitney U Test, as appropriate. Two-tailed p-values were used throughout, and the 5% level was deemed significant. All statistical analyses were performed using R4.3.2 (R Foundation for Statistical Computing, Vienna, Austria).

This study was approved by the hospital research and ethics committee (ref: EC06.2024).

Results

From January 2015 to December 2023, 491 women were identified as having postpartum urinary retention. Of these, 40 women were recorded as having protracted PPUR (8.1%). During the same epoch, 71,482 women delivered an infant weight ≥ 500 g in our unit. Thus, the incidence of postpartum urinary retention was 6.9/1000 deliveries and the incidence of PPUR was 0.6/1000 deliveries. One woman was included twice due to recurrent PPUR in a subsequent pregnancy while a further five women were identified from written records who were treated for PPUR in 2014, giving a total of 44 women with PPUR. Overall figures for postpartum urinary retention for 2014 were not available. Of the women with PPUR, 11 responded to the postal questionnaire, while nine women with PUR not requiring ISC responded, giving a total response rate of 22.7% (20/88).

Demographics and clinical characteristics

The median age of women at delivery was 34 (range 19–40) and the median follow-up was six years (range 1–10). Thirty eight (43.2%) delivered spontaneously, 27 (30.7%) had a vacuum-assisted delivery, 15 (17.0%) had a forceps delivery, seven (8.0%) had a forceps delivery following a failed vacuum delivery, and one (1.1%) woman was delivered by emergency caesarean section.

Differences between non-protracted and protracted postpartum urinary retention

Women with PPUR were younger ($p = .003$), had a longer length of IDC use ($p = .001$), and a longer second stage of labour ($p = .048$). These women had more second-degree tears and episiotomies when compared to those with non-protracted urinary retention ($p = 0.14$). Lastly, women with PPUR had more forceps deliveries ($p = .042$) and all sequential instrumental deliveries were in the PPUR group. Demographics and clinical characteristics of study participants based on their type of urinary retention (non-protracted vs. protracted) are shown in Table 1.

When analysed individually, i.e. rates of second degree tears in each group, there were no significant differences in any obstetrical variables, however numbers in each of these analyses are low.

ICIQ-FLUTs responses

Overactive bladder symptoms

Overactive bladder symptoms were assessed using questions on nocturia, frequency and urgency on the ICIQ-FLUTS. Sixteen (80%) women reported getting up once (13) or twice (3) per night to urinate, while four women (20%) denied any nocturia. Urinary frequency of up to eight times per day was reported by 70% (14/20) of women. Two women stated they had severe frequency (13 or more times per day). Seven women (35%) denied any urgency, while a further seven (35%) reported urgency occurring more than ‘occasionally’, with one woman describing this as occurring ‘all of the time’. Despite this significant level of urgency, the median bother score was 2.5 (range 0–10, interquartile range [IQR] 0–7.75).

Urge urinary incontinence (UUI) was assessed with the questions “Does urine leak before you can get to the toilet?” and “Do you ever leak urine for no obvious reason and without feeling

that you want to go?”. With these, over half (55% [11/20]) denied any UUI whatsoever. Non-bothersome UUI has previously been defined as an answer of ‘none’ or ‘occasionally’ (9,10). Using this definition, four (20%) women had bothersome UUI. The median bother score with UUI was 0 (range 0–10, IQR 0–5). There were no differences in nocturia ($p = .788$), frequency ($p = .809$), urgency ($p = .502$), or UUI ($p = .575$) between those women with non-protracted and protracted postpartum urinary retention.

Bladder pain and symptoms of obstruction

Bladder pain was reported as ‘none’ or ‘occasionally’ by 18 (90%) women, with the remaining two women describing pain as ‘sometimes’. The median bother score for bladder pain was 0 (range 0–10, IQR 0–0). Hesitancy before micturition of more than ‘occasionally’ was reported by six women (30%), six (30%) said they had to strain to empty their bladder either ‘sometimes’ or ‘all of the time’, and 45% (9/20) of respondents described stopping and starting while micturating as ‘sometimes’ (6), ‘some of the time’ (2), or ‘all of the time’ (1). There were no differences in bladder pain ($p = .253$), hesitancy ($p = .101$), stopping and starting ($p = .365$), or straining ($p = .306$) between the two study groups.

Stress urinary incontinence

Seven (35%) women denied any stress urinary incontinence (SUI) at the time of their follow-up. A further seven (35%) women reported SUI ‘occasionally’ and only one (5%) woman reported it as ‘all of the time’. There was no difference in the prevalence of SUI ($p = .233$) between study groups.

Questionnaire responses for each study group are seen in Figure 1.

Discussion

This study has shown that postpartum urinary retention requiring intermittent self-catheterisation is an uncommon clinical entity and appears to have minimal sequelae for women. Symptoms reported by women with PPUR are similar to those reported by the low-risk postpartum population¹¹ and do not appear to be worse than those with postpartum retention who did not require ISC.

Comparison of our questionnaire responses to other studies is challenging given that most published studies do not incorporate a validated patient-reported outcome questionnaire. A small Dutch study—eight patients with PPUR—used the Urogenital Distress Inventory (UDI-6) and reported 12% of women having bothersome OAB symptoms at one year postpartum¹². Our figure of 20% for ‘bothersome’ UUI is slightly higher, though direct comparison between our questionnaires is difficult given the UDI-6 is primarily a measure of quality of life rather than symptom prevalence. The remaining studies in the literature have used non-validated or partial questionnaires or were severely limited by sample size¹³. Future research into PPUR should include a validated questionnaire.

Most women in our cohort responded quickly to intermittent catheterisation, with 75% (33/44) voiding spontaneously within one month of therapy, however, those with a protracted course required treatment for up to seven months. This raises two possibilities: first, that these women have separate pathologies or second, that a watershed moment exists where urinary retention becomes severe enough to significantly impair bladder function. Some women are likely more ‘at-risk’ when compared to others, though attempts to identify these women have not been satisfactory¹⁴.

Predicting postpartum urinary retention remains a challenge. While some studies have identified epidural anaesthesia¹³, a prolonged first and second stage of labour¹⁴, and episiotomy¹⁵ as risk factors for PUR, other analyses have found no such association^{16,17}. Operative vaginal delivery has been highlighted as the only consistent risk factor for PPUR in a recent meta-analysis³. While this did not reach statistical significance, women with PPUR accounted for all the sequential instrumental deliveries in our study.

Similar results were seen with perineal injuries. There was a significant difference in the pattern of perineal injuries in women with PPUR compared to women who did not require ISC. While an association between PPUR and worse perineal outcomes may be plausible, there remains a sizable proportion of women with minor perineal injuries who required ISC for a prolonged period, again suggesting an alternative pathophysiology for some women.

Inconsistent definitions of PUR may explain some of the contradictions in the literature. A recent expert review⁵ has suggested three definitions. (1) Overt PUR: the inability to void six hours after a vaginal delivery or catheter removal following a caesarean section. (2) Covert PUR: urinary symptoms or a postvoid residual volume of greater than or equal to 150 mL after a spontaneous void, as measured by ultrasound or catheterisation. (3) Persistent PUR: urinary retention lasting longer than three days following delivery which requires catheterisation. International adoption of these definitions may help homogenise research in the future.

Regardless of discrepancies in the definition of PUR, there exists a multitude of proposed management strategies—most of which have no evidence base^{5,6}. As an example, the recommendation from an American expert review is to utilise an IDC for up to five days⁵, citing patient discomfort due to vulvar swelling as a barrier to ISC. In contrast, two recent, European randomised-controlled trials demonstrated patient preference for ISC^{6,18}. Irish guidelines suggest the use of an IDC for up to five days dependent on the degree of bladder distension⁴, followed by ISC unless the woman is unwilling or reluctant, in which case an IDC can be replaced. Unfortunately, management protocols are likely to be dictated by local staffing arrangements and will prove difficult to standardise internationally.

We consider our results to be robust for several reasons. First, we had a precisely defined group of participants, including only those who required ISC or IDC. All women were identified through an institutional database rather than ICD-10 coding which should eliminate the risk of misidentification^{19,20}. Additionally, all women will have been seen by specialist urodynamics nurses or midwives. Second, we used a validated questionnaire—one recommended by the International Continence Society—to capture women's current symptoms^{8,21}. Finally, delivery data was available for almost all women.

There are several limitations worthy of discussion. We had a low questionnaire response rate—something typical of postal-based research. Further reminders could have been helpful, but this was outside the remit of our research ethics approval. This remains the biggest limitation of the study. Second, regardless of the response rate, we were limited by a small sample size. Given the rarity of protracted PUR, this limitation will be common to any work in the area. Third, we lacked sufficient numbers to perform a robust regression analysis, which could have been helpful to identify risk factors. Fourth, we were unable to characterise non-responders, and so our results may have some degree of selection bias, though we cannot control for this. Finally, while this remains a single-centre study, our institution delivers 13-14% of infants in Ireland, and as we followed national guidelines in our management of PUR, our results are likely to be representative of the Irish population.

PUR is an uncommon entity with minimal sequelae. Protracted postpartum urinary retention is even rarer again and does not appear to be associated with any further deterioration in urinary dysfunction. Longer-term follow-up would be helpful; however, women can be reassured in the shorter term that there appear to be minimal sequelae following protracted postpartum urinary retention.

Declarations of Conflicts of Interest:

None declared.

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Table 1: Demographics and clinical characteristics of study participants

	Required IDC only (n = 44)		PPUR (n = 44)		P value
Answered questionnaire	20.5%	(9/44)	25.0%	(11/44)	.799 ^a
Maternal age	35	(27–40)	31	(19–40)	.003 ^b
Gestational age at delivery	40.4	(37.3–42)	40.4	(34–42.1)	.593 ^b
Birthweight (grams)	3521	± 438	3440	± 416	.372 ^c
Length of catheterisation					
Indwelling catheter (hours)	24	(22–75)	72	(0–720)	.001 ^b
Intermittent self-catheterisation (days)	0	(0–0)	16	(3–210)	<.001 ^b
Length of second stage of labour (mins)	53	(7–210)	92	(8–203)	.048 ^b
Epidural anaesthesia	93.2%	(41/44)	86.4%	(38/44)	.685 ^a
Perineal injury					
Intact	11.4%	(5/44)	0.0%	(0/44)	.014 ^d
First degree	9.1%	(4/44)	0.0%	(0/44)	
Labial tear	0.0%	(0/44)	2.3%	(1/44)	
Periurethral tear	0.0%	(0/44)	4.5%	(2/44)	
Second degree	27.3%	(12/44)	22.7%	(10/44)	
Episiotomy	50.0%	(22/44)	65.9%	(29/44)	
Obstetric anal sphincter injury	2.3%	(1/44)	4.5%	(2/44)	
Mode of delivery					
Spontaneous vaginal	47.7%	(21/44)	38.6%	(17/44)	.042 ^d
Vacuum-assisted	34.1%	(15/44)	27.3%	(12/44)	
Forceps	15.9%	(7/44)	18.2%	(8/44)	
Sequential*	0.0%	(0/44)	15.9%	(7/44)	
Emergency caesarean section	2.3%	(1/44)	0.0%	(0/44)	
Index delivery					
1	79.5%	(35/44)	81.8%	(36/44)	1 ^d
2	13.6%	(6/44)	13.6%	(6/44)	

3	4.5% (2/44)	4.5% (2/44)
4	2.3% (1/44)	0.0% (0/44)

* Forceps following failed vacuum

^a Chi-Square ^b Mann-Whitney U Test ^c Student's t Test ^d Fisher's Exact Test

ICIQ-FLUTS responses

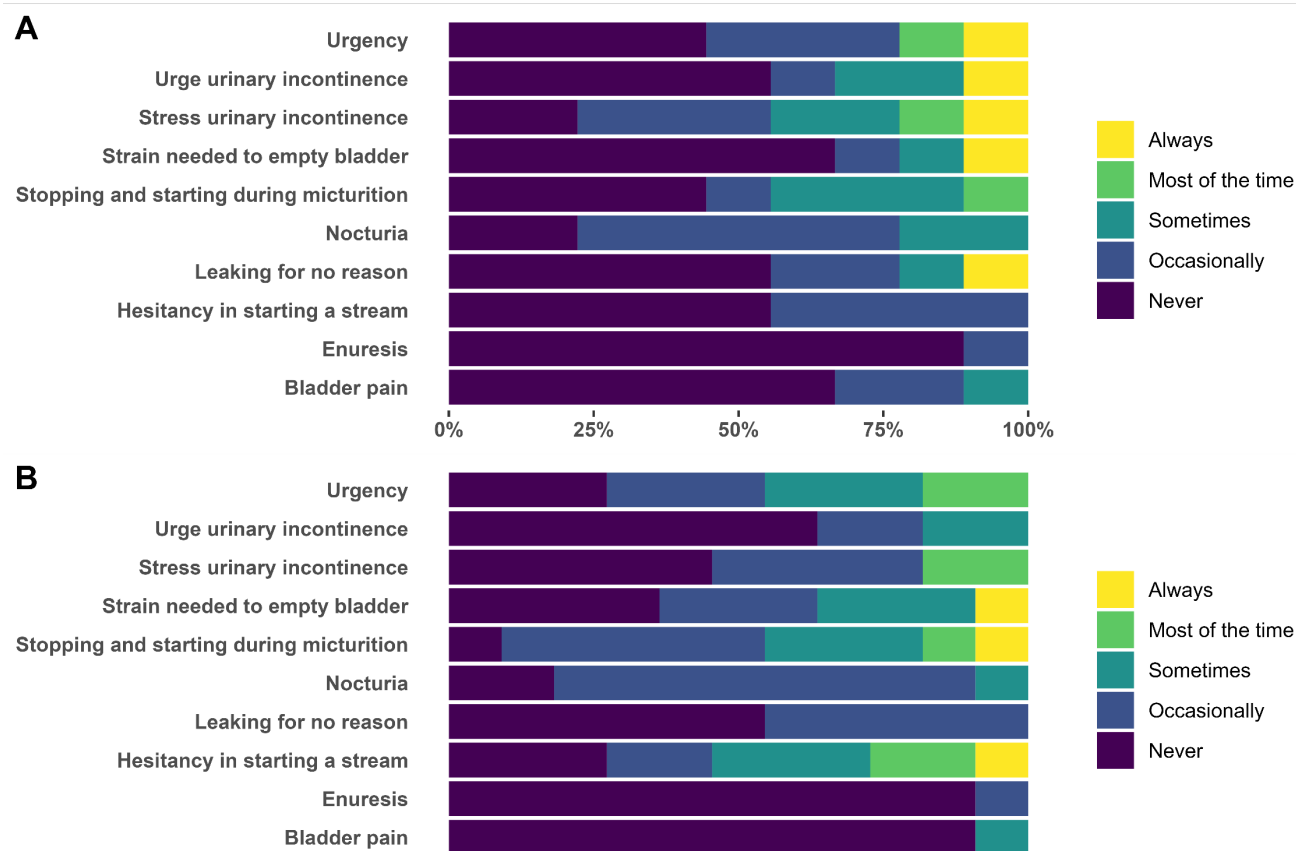


Figure 1: ICIQ-FLUTS responses

A: Women who required only an indwelling catheter

B: Women who required intermittent self-catheterisation