

## Review Article

## Post-partum voiding dysfunction and urinary retention

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Voiding difficulty and urinary retention is a common phenomenon in the immediate post-partum period. The importance of prompt diagnosis and appropriate management of this condition cannot be over-emphasised as it is the key to ensuring a rapid return to normal bladder function. Despite this, studies revealed a low level of awareness of this problem amongst obstetric units, and there is little information regarding this condition in the published literature. This article aims at reviewing the available literature and providing an informative guide as to the associated risk factors, pathogenesis, clinical presentation and management of this largely overlooked condition.

**Key words:** Post-partum, urinary retention, voiding difficulty.

### Introduction

Voiding difficulty and urinary retention is a common phenomenon in the immediate post-partum period. The importance of prompt diagnosis and appropriate management of this condition cannot be overemphasised as it is the key to ensuring a rapid return to normal bladder function.<sup>1,2</sup> Despite this, Zaki *et al.*<sup>3</sup> revealed a low level of awareness of this problem amongst obstetric units in England and Wales, where less than a quarter were complying with the RCOG recommendations for post-partum bladder care. Furthermore, despite its clinical importance, this frequently under-diagnosed condition has failed to gain the recognition it deserves in the published literature. This article aims at reviewing the available literature and providing an informative guide as to the associated risk factors, pathogenesis, clinical presentation and management of this largely overlooked condition.

### Incidence

The exact incidence of post-partum urinary retention (PPUR) is uncertain.

Estimated incidences range from 0.05% to 37.0%.<sup>1–14</sup> This large range can be accounted for by the various definitions used to define PPUR in the different studies.<sup>15</sup> Each study also varied in their inclusion and exclusion

criteria, thus some figures are reflective of incidences amongst all post-partum women (including caesarean section deliveries), whilst others only report the incidence of PPUR post-vaginal delivery or post-caesarean section alone.

Similarly, figures varied widely depending on whether studies focussed on overt urinary retention (0.2%–4.9%),<sup>2,5,10</sup> covert voiding dysfunction (9.7%–37.0%),<sup>10,14</sup> persistent urinary retention (0.05%–0.07%)<sup>7,12</sup> or various combinations of the above.

However, more recent publications have now adopted Yip *et al.*'s<sup>10</sup> classification of overt and covert urinary retention. In Yip *et al.*'s study, the incidence of overt PPUR was 4.9% (higher than more recent studies [0.2%–0.45%]<sup>2,5</sup>), covert PPUR was 9.7%, and 85.4% were normal.<sup>10</sup>

### Pathogenesis and risk factors for PPUR

The exact aetiology of PPUR is unclear, but it is likely to be multifactorial, involving physiological, neurological and mechanical processes in the post-partum period. As it is almost impossible to predict which patients will develop PPUR, all patients on the post-partum ward should be considered to be at high risk; however, studies have identified several independent risk factors.

#### 1 Epidural and regional anaesthesia<sup>2,5,10,12,16,17</sup>

Epidurals and other forms of regional anaesthesia disrupt the afferent input and suppress sensory stimuli from the bladder to the pontine micturition centre.<sup>2,5</sup> This inhibits the reflex mechanism that normally induces micturition.<sup>2</sup> Subsequently, the bladder may become over-distended, reducing the contractile ability of the bladder. This further prolongs the course of PPUR.<sup>2</sup>

#### 2 Prolonged 1st and/or 2nd stage of labour<sup>4,10</sup>

Prolonged 1st and 2nd stages of labour may impair post-partum voiding in two ways; neurologically and mechanically.

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Neurologically, the pudendal and pelvic nerves may sustain injury because of prolonged pressure from the fetal head, or "stretching" of the nerves during repetitive straining in 2nd stage.<sup>10</sup> This would impair the afferent and parasympathetic pathways in pelvic nerves required to initiate normal voiding.<sup>10</sup> Injury to the pudendal nerve is thought to contribute to post-partum urinary incontinence as well.

Mechanically, prolonged labour may be associated with an over-distended bladder that interferes with the contractile abilities of the bladder and may lead to permanent detrusor damage.<sup>4,5,12,18,19</sup> Prolonged labour can also result in extensive vaginal and perineal oedema, which can further inhibit voiding by causing a mechanical obstruction.<sup>5</sup>

### 3 Instrumental deliveries<sup>2,10,12</sup>

Similar to prolonged 1st and 2nd stage of labour, patients having instrumental deliveries are at risk of PPUR on two fronts. Neurologically, instrumental delivery may injure the pelvic nerves and pudendal nerves, resulting in the same diminished reflex and voluntary mechanism required for voiding.<sup>5,10</sup> Similarly, perineal trauma associated with instrumental deliveries can also cause mechanical obstruction because of oedema or haematoma, or even cause voiding dysfunction through direct injury to the bladder or urethra.<sup>4,5</sup> The local trauma may also cause pain severe enough to cause urethral over-activity, thus giving rise to a functional obstruction.<sup>4</sup>

### 4 Primiparity<sup>2</sup>

#### 5 Birth weight of >3.8 kg<sup>4</sup>

It is likely that a birth weight of more than 3.8 kg would lead to the same factors seen in instrumental deliveries and prolonged labour mentioned previously. These factors would predispose the woman to PPUR.

## Physiological changes contributing to PPUR

The physiological changes of pregnancy and the puerperium may be yet another factor in PPUR.<sup>4,6,20,21</sup> Elevated progesterone levels in pregnancy and the immediate post-partum period results in reduced smooth muscle tone. This results in a dilated bladder, ureters and renal pelvises during pregnancy and the first few weeks post-partum. This fact coupled with changes in vesical pressures (an initial rise in pregnancy followed by a rapid drop to normal values within a few days after delivery) results in a hypotonic bladder in the early puerperium.<sup>6,20-22</sup>

## Clinical presentation

Symptoms and signs of PPUR range from a complete inability to void, to the asymptomatic patient with large post-void residual volumes.

Clinical suspicion should be raised in patients with small voided volumes, urinary frequency, slow or intermittent stream, urgency, bladder pain or discomfort, urinary incontinence and those who strain to void, or describe no sensation to void.

Patients with excessive perineal oedema, vaginal or vulval haematomas, or excessive perineal trauma especially close to the urethra are also at risk.

According to Groutz *et al.*, up to 45% of women will complain of significant voiding symptoms in the post-partum period, but only 22% of these patients will demonstrate lower flow rates.<sup>4</sup> The most common symptom was pain (63%) followed by weak stream (44%), intermittent stream (38%) and hesitancy (33%). In this study, the symptomatic group had significantly longer 2nd stage and significantly more ventous deliveries (compared to non-instrumental and caesarean delivery). Maximal urinary flow rates were also significantly lower in those delivering babies with birthweights of 3.8 kg or more.<sup>4</sup>

In contrast, Ramsy and Torbet reported abnormal flow rates in 43% of patients in the immediate post-partum period, the majority of whom were asymptomatic.<sup>23</sup>

In the light of this finding, it is important to have a high level of suspicion as many patients may not report obvious symptoms, but urinary chart may reveal signs of abnormal voiding such as small frequent voids or an apparently low urinary output.

In a clinical setting, the diagnosis of overt PPUR can be made if the patient has been unable to void within 6 h of delivery and require catheterisation to drain greater than a normal bladder capacity (400–600 mL).

The diagnosis of covert PPUR can be made if the patient is unable to pass more than 50% of normal bladder capacity or if their post-void residual volume is greater than 150 mL.<sup>10</sup>

## Management

Management recommendations in the literature vary from author to author, but the majority have supported the following recommendations in suspected PPUR.<sup>3,8,11,24</sup>

- No patient should be left >6 h without voiding or being catheterised for residual volumes.
- Strict input and output charts should be instituted.
- Timing of voids should be recorded, and voided volumes should be measured.
- Timed voiding every 3–4 h in the immediate post-partum period.
- Post-void residual volumes should be measured.

Catheterisation offers the most accurate post-void residual volume measurement in the post-partum period. Whilst some patients find this uncomfortable and there is a small risk of developing a urinary tract infection, the accuracy of ultrasound measurements of residual volumes in the post-partum patient is questionable because of the size of the post-partum uterus. However, Yip *et al.* argues that the bladder maintains an ellipsoid shape and therefore should allow accurate assessment by ultrasound even in the post-partum period.<sup>25</sup>

## Measures to aid voiding

- Ensure patient is well analgesed.
- Ice to perineum to help reduce oedema.
- Help the patient to stand and walk to the toilet.

- Provide privacy.
- Assist patient into a warm bath.
- Prevent constipation.

Up to 50% of maternal patients diagnosed with PPUR were subsequently able to void after implementing these simple measures.<sup>7,8,11,15</sup>

### If the patient has not voided within 6 h, or PPUR is suspected

Institute the measures mentioned previously to aid voiding.

Assess the adequacy of the patient's voiding (voids >150 mL, post-void residuals <150 mL). If deemed inadequate, the patient should be referred to a continence nurse, a midstream urine or catheter urine specimen should be collected for microbiology to rule out an infection, and an indwelling catheter should be inserted for 24 h.

Should the next trial of void be unsuccessful, an indwelling catheter should be inserted for approximately 1 week, and the patient should be taught about catheter care prior to discharge from hospital.

A hospital admission for a repeat trial of void is undertaken in a week later and if unsuccessful again, the patient should be instructed to perform timed voids every 3–4 h and taught to intermittently self catheterise.

These patients require close follow up to monitor for signs and symptoms of urinary tract infection. They should also be referred to an urogynaecology unit where further assessment and a uroflowmetry study can be performed approximately 2 weeks after the last failed trial of void. The patient should be asked to keep a diary of voided volumes and post-void residual volumes.

The majority of cases should have resolved by the time of the uroflowmetry, but any persistent cases of PPUR should be asked to continue the previous regiment and have a repeat assessment and uroflowmetry study every 2–4 weeks until complete resolution of symptoms. Any cases of PPUR that remain unresolved by 3 months require full urodynamic evaluation and tertiary urogynaecology management.

### Sequelae

If managed promptly and appropriately, the majority of patients with PPUR will have resumed normal bladder function at the time of discharge from hospital.<sup>3</sup> However, failure to diagnose and manage PPUR promptly resulted in persisting bladder dysfunction requiring catheterisation (ISC) for many weeks in several studies.<sup>3,5</sup>

Carley *et al.*<sup>5</sup> investigated overt PPUR and found that 45% had resolved within 48 h, 29.4% resolved by 72 h and 25.5% required ISC for persistent PPUR (longest for 45 days), but ultimately there was a resolution of symptoms in all patients.

As mentioned earlier, residual volumes of greater than 700–750 mL at diagnosis resulted in a poorer prognosis.<sup>1,2,7</sup> Various case reports of persistent post-partum voiding dysfunction have indicated that a post-void residual volume of greater than 700–750 mL at diagnosis of PPUR led to a

significantly longer duration of catheterisation, or greater risk of requiring repeat catheterisation.<sup>1,2</sup> A review of 10 case reports of persistent PPUR also revealed three common features to all 10 cases: instrumental delivery, epidural analgesia and delayed diagnosis of PPUR.<sup>12</sup> Thus, these are not only risk factors for the development of PPUR, but also for the persistence of PPUR.

Interestingly, Yip *et al.*<sup>10</sup> found that all covert PPUR resolved spontaneously without intervention as long as the patient remained asymptomatic.

Long-term follow up of PPUR patients revealed that the prevalence of urinary symptoms following PPUR was no higher than the general population.<sup>6,7,25</sup> In one study, 2.6% (three patients) of PPUR patients reported symptoms of urgency and frequency at 9 months, whilst in another study, 10% (one patient) had occasional urge symptoms and 20% (two patients) had occasional stress incontinence 4 years post-PPUR. However, these figures have to be interpreted with caution because of the small number of patients.

### Conclusion

Post-partum voiding dysfunction and urinary retention is very much an enigma. Its exact incidence is unknown, pathogenesis is unclear, and mechanism of recovery is uncertain. However, what is known is that careful surveillance of post-partum patients and enforcement of simple bladder care guidelines can minimise the risk of permanent bladder injury from occurring. Clearly, early diagnosis and prompt, appropriate management is the key to ensuring a rapid return to normal bladder function following post-partum urinary retention.

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