

# Audit of Inpatient Chronic Urinary Retention Management

Joanna Galea, Kimberley Hallett, Gerald Busuttil, Keith Pace

## Background

Chronic urinary retention (CUR) occurs when urine accumulates in the bladder secondary to incomplete voiding. The aim of this audit was to assess compliance to the Mater Dei Hospital Urinary Retention Management Guidelines in a cohort of patients admitted between August 2019 and February 2020.

## Methodology

Patients admitted because of CUR were included. Data was acquired from medical files, discharge letters, hospital electronic record systems and urology outreach records.

## Standard used

The Urinary Retention Management Guidelines, published in 2018, were considered standard for outcome comparison.

## Results

The quantitative results included data on clinical presentation, inpatient management and medium-term outcomes. 55% had a successful TWOC after CUR. 45% were treated pharmacologically, 35% had a trans-urethral resection of the prostate, 10% started a self-intermittent catheterisation (SIC) programme, 5% remained with a long-term catheter and 5% required a re-trial without catheter (TWOC).

## Conclusion

Compliance to MDH guidelines was suboptimal in some cases. This audit highlights CUR management issues which can be optimised and also current outcomes of patients presenting in CUR. 55% of patients presented with a degree of acute kidney injury. Nephrology specialists were rarely involved in the management of these patients.

**Ms Joanna Galea, MD, MRCSI, MSc**  
Department of Surgery  
Mater Dei Hospital,  
Msida, Malta

**Dr Kimberley Hallett, MD, MRCEM**  
Department of Emergency Medicine  
Mater Dei Hospital,  
Msida, Malta

**Mr Gerald Busuttil, MRCSEd, FRCS (Urol), FEBU**  
Department of Surgery  
Mater Dei Hospital,  
Msida, Malta

**Mr Keith Pace, MRCSEd, MCh, FEBU**  
Department of Surgery  
Mater Dei Hospital,  
Msida, Malta

Urinary retention is defined as the incapability of voluntary complete bladder voiding, resulting in accumulation of urine in the bladder.<sup>1</sup> Chronic urinary retention (CUR) is described as painless retention accompanied by an increased post void residual (PVR).<sup>2</sup> In July 2018 local guidelines for the management of urinary retention were published, delineating the clinical features of CUR, necessary investigations and management according to findings, including discharge plans. The aim of this audit was to evaluate compliance to the Urinary Retention Management Guidelines (Supplementary File 1), in a cohort of patients suffering from CUR. The evaluation included assessment of patient's presentation, investigations chosen and eventual treatment plans.

## METHODOLOGY

All patients admitted with CUR in the period between August 2019 to February 2020, were included in the audit. The data was predominantly obtained from patient's medical files (current and old notes), discharge letters, hospital electronic systems and urology outreach records. The information obtained from all sources comprising, patient demographics, investigations, management and treatment plans, were inputted into a database accordingly.

## RESULTS

### Demographics

A total of 20 patients were included in the audit, 19 (95%) of which were male and 1 (5%) female. The maximum age was that of 84 years and the minimum age 57 years, with an average age of 71.6 years.

### Referral Source

Patients were predominantly referred from the Accident and Emergency department, 18 (90%). Other referral sources included, 1 (5%) from another surgical firm and 1 (5%) from the community (Figure 1).

### Clinical Features

Of the patients included, only 8 (40%) had significant lower urinary tract symptoms (LUTS). 14 (70%) were found to be in painful urinary retention, while 6 (30%) were in painless retention. 9 (45%) had a previous history of urinary retention and only 1 (5%) had a preceding transurethral resection of the prostate (TURP).

On presentation 85% of patients were already on pharmacological treatment, of which, 11 were on a combination of Dutasteride and Tamsulosin (Combodart), 4 on Tamsulosin and 2 on Finasteride.

Post-void residual volume (PVR) was measured in 90% of cases. The minimum PVR was 350ml and the maximum PVR was 2300ml, with an average of 1075.1ml.

### Investigations

In 80% of cases, urinalysis and microscopy was sent. Renal profile was taken and sent in 95% of cases. The minimum eGFR was 6 ml/min/1.73m<sup>2</sup> and the maximum 125 ml/min/1.73m<sup>2</sup>, with an average of 55.95 ml/min/1.73m<sup>2</sup>. 45% of patients had an eGFR of >60 ml/min/1.73m<sup>2</sup>, while the remaining 55% had some degree of acute kidney injury (AKI).

An ultrasound of the kidneys, ureters and bladder (US KUB) was performed in 35% of cases. 15% of patients were found to have signs of hydronephrosis on US KUB. None of the patients who underwent US KUB

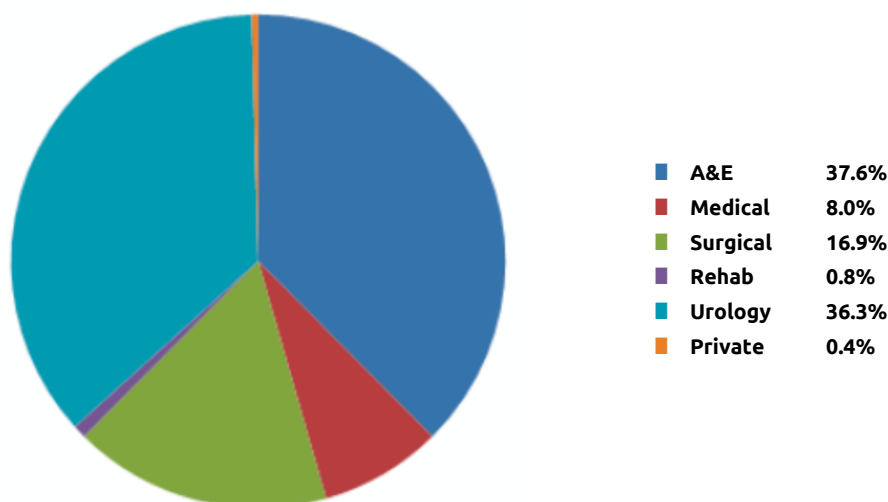
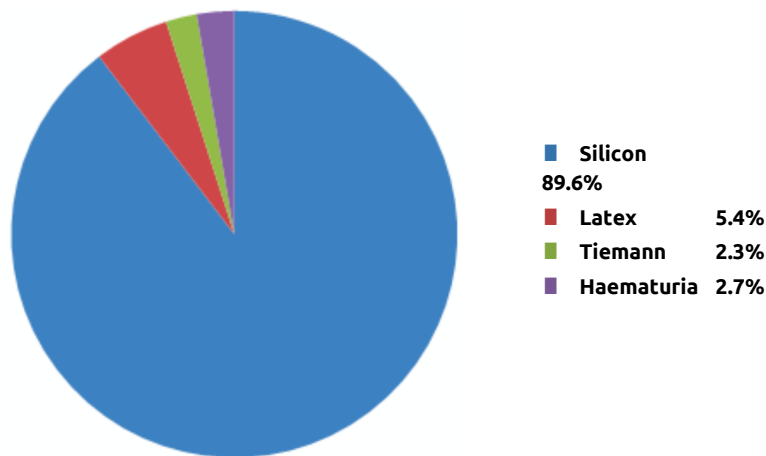


Figure 1 Source of Referral



**Figure 2** Type of catheter inserted

had signs of renal atrophy. Renal Replacement Therapy (RRT) was not required in any instance.

### Management

In 90% of cases a urinary catheter was inserted, 13 (72.2%) of which were silicone catheters, 4 (22.2%) haematuria catheters and 1 (5.5%) latex catheter. Of the catheters inserted 50% were 16F in size (Figure 2).

### Type Of Catheter Inserted

Post-obstructive diuresis (POD), defined as >200ml urine output over 2 hours or >3 L urine output over 24 hours, was noted in 45% of cases. The maximum duration of POD (>3l/24hrs) was 5 days, with an average duration of 2.75 days. The total urine output over the first 24 hours on average was 2,327.3 ml.

Intravenous fluid replacement was set up in 60% of cases. Serum electrolytes and serum creatinine 12 hourly were only taken in 25% of patients. Moreover, urine samples for measurement of urinary sodium,

potassium and osmolality were sent for as little as 10% of patients. Daily weight of patient was not recorded throughout. Nephrologists were consulted in just one case.

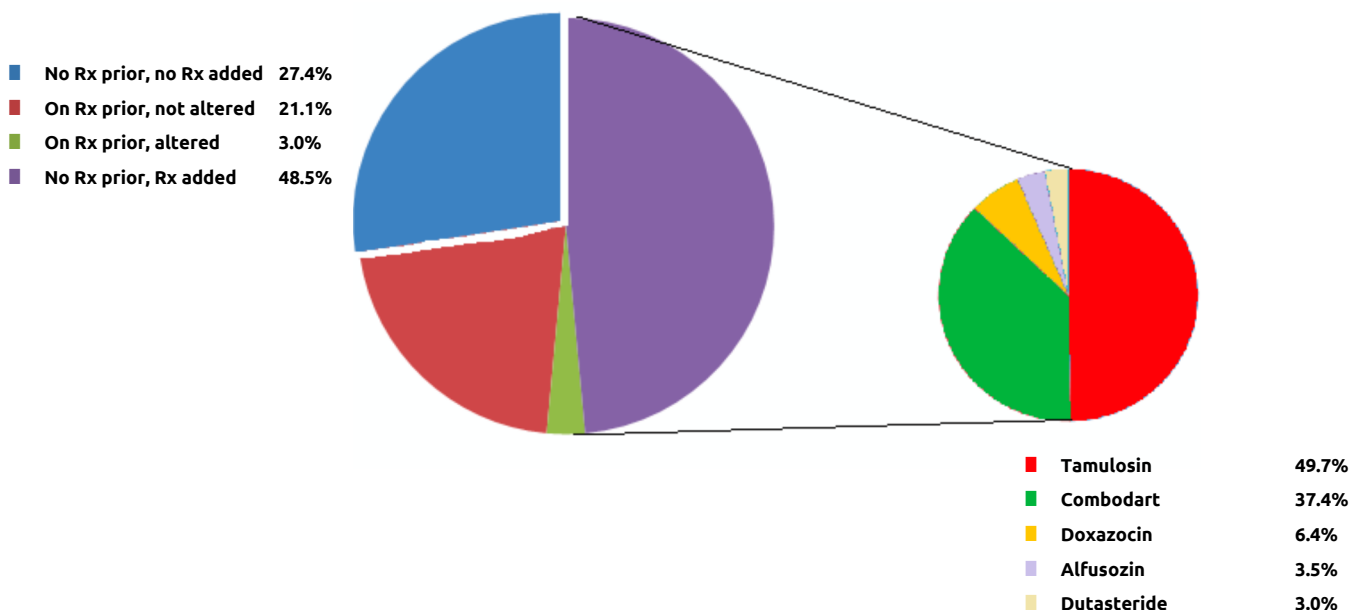
### Pharmacological Treatment

45% of patients were started on drug treatment for benign prostatic hyperplasia (BPH). 8 (40%) individuals were already being treated for BPH, 3 (15%) of which had their treatment changed accordingly.

85% of the cohort were discharged on various pharmacological treatment. 11 (55%) were discharged on Combodart, 4 (20%) on Tamsulosin and 2 (10%) on Finasteride (Figure 3).

### Trial without Catheter (TWOC)

The average amount of days spent with a bladder catheter was 17.17, with a minimum of 4 days and a maximum of 86 days. In 13 patients TWOC was only



**Figure 3** Treatment changes and type of treatment started

attempted once, while in the remaining patients there were 2 or 3 attempts. TWOC was successful in 55% of cases. The average PVR following TWOC was that of 188.67ml, with a maximum of 700ml and a minimum of 0ml. In the 45% who failed TWOC, the average catheter residual was 525 ml (maximum of 700 ml and a minimum of 350ml).

## Outcome

The average length of stay for patients admitted with CUR was 585 days. Nine (45%) patients were discharged on medical treatment and followed up at outpatients. Seven (35%) patients underwent TURP. One (5%) remained with a long-term catheter and in another patient (5%) TWOC was reattempted. The remaining two patients (10%) were introduced to self-intermittent catheterization (SIC).

---

## DISCUSSION

---

Chronic urinary retention is the inability to void the bladder, which is usually painless, as opposed to acute urinary retention. The PVR is a measurement used to distinguish chronic from acute urinary retention. It is easily quantified by an ultrasound scan of the bladder post-micturition. Up till now, there has been no agreement on a defined PVR value, over which chronic urinary retention is diagnosed. Most agree that a significant PVR is between 300 to 1000ml<sup>3</sup> While Abrams et al, used a diagnostic minimum PVR value of 300ml.<sup>4</sup>, the American Urological Association defines non-neurogenic CUR as a PVR of more than 300ml, persisting for a minimum of 6 months and documented on at least 2 or more instances<sup>5</sup> The PVRs in the patients included range from a minimum of 350ml and a maximum of 2300ml.

CUR mostly affects men rather than women and mostly targets the elderly.<sup>6</sup> 95% of our cohort were male while only 5% were female and the average age was around 71 years, with the lowest being 57 years. Only 30% were found to be in painless CUR The remaining had painful retention. This could be due to acute-on-chronic urinary retention where a person suffering from CUR suddenly stops voiding.<sup>7</sup>

Recognizing CUR is not always a simple task. Some points in the history-taking which are useful are the presence of lower urinary tract symptoms such as voiding difficulties, frequency, nocturia and nocturnal enuresis. A previous history of a urinary tract infection, constipation or previous episodes of CUR helps in reaching a CUR diagnosis. Medications

which hint towards CUR include alpha adrenergic blockers, 5 alpha reductase inhibitors and anticholinergics; 85% were already on some. NICE also recommends a patient examination comprised of an abdominal, a genital and a digital rectal examination.<sup>7</sup>

CUR can be divided into 2 categories: low pressure CUR (LPCUR) and high-pressure CUR (HPCUR). Bladder pressures post-micturition of 30cm H<sub>2</sub>O and above are classified as HPCUR while pressures of around 20 or less fall under LPCUR Patients with HPCUR are at increased risk of developing upper urinary tract involvement such as hydronephrosis or a decline in renal function shown by a rising creatinine. Differentiating between the two is essential since patients with HPCUR need urgent catheterisation.<sup>8</sup> HPCUR always requires catheterisation as opposed to LPCUR According to a randomised controlled trial conducted by Boettcher et al, slow, or gradual bladder decompression does not confer additional benefits, such as minimising the risk of circulatory collapse or haematuria, when compared to rapid decompression. Thus, rapid decompression is preferred.<sup>9</sup>

As mentioned above a rising creatinine and hydronephrosis are both important indicators for urgent catheterization. During this audit a renal profile was taken in 95% of cases, with 55% having some degree of AKI However, US KUB was only done in 35% of cases, with 15% of those having hydronephrosis. This high level of non-compliance means that possible upper urinary tract involvement was missed.

A urinary catheter was used in 90%, with the majority having a 16F silicone catheter inserted. When inserting a urinary catheter, output charting must be done to identify the potential development of POD This was noted in 45%. The Urinary Retention Management Guidelines of 2018, state that if POD is diagnosed the following are advised: a daily weight, 12-hourly renal profiles, testing the urine for electrolytes and osmolality, nephrology consultations and setting up an IVI if POD continues after reaching haemostasis.<sup>10</sup>

The results show that no daily weights were taken, only one case was discussed with a nephrologist, 12-hourly renal profiles taken in 25% and a minimum of 10% checked for urinary electrolytes and osmolality. On the other hand, intravenous fluid replacement was set up for 60% of cases. Despite satisfactory levels of input-output charting and identification of POD, it was still inadequately managed in most cases.

Moreover, the fact that urinary electrolytes were only checked in 10% of patients, reveals that fluid types may have not been chosen appropriately.

Studies have shown that in patients with benign prostatic hyperplasia (BPH), a successful TWOC is more likely to be achieved when starting alpha adrenergic blockers with catheterisation and attempting a TWOC 3 days after.<sup>11</sup> In this cohort, a minimum of 4 days passed before a TWOC was attempted.

Pharmacological intervention is essential in managing CUR As BPH is one of the leading causes of CUR in males, drugs targeting this have been widely used. Alpha-1 adrenergic antagonists, such as tamsulosin, relax the bladder neck and the prostate capsule while 5-alpha reductase inhibitors like finasteride work as anti-androgens to reduce prostatic tissue mass. When used together, they significantly reduce BPH progression hence decreasing CUR<sup>12</sup> 85% were discharged with pharmacological treatment, with the majority discharged on Combodart, which is a 5-alpha reductase inhibitor and alpha-1 adrenergic antagonist combination.

A total of 35% underwent TURP while 10% had SIC introduced. A study comparing TURP with SIC showed that both are effective for symptom relief with SIC showing to be useful for recovery of bladder function. SIC was shown to be useful before TURP in cases of LPCUR while those with HPCUR had good outcomes from surgery.<sup>13</sup>

---

## RECOMMENDATIONS

---

Every patient presentation should be assessed clinically and managed according to the appropriate pathway. US kidneys and renal profiles should be performed in all CUR patients. When opting for urethral catheterization, urine residuals and urine output need to be measured and recorded diligently. More education regarding POD, its potential complications and management is required. Emphasising the importance of adequate investigations, fluid replacement and involvement of nephrologists when necessary. Improving knowledge of guidelines and coordination between clinicians and health professionals, can lead to better patient outcomes. Patients should also be educated, encouraged to comply to pharmacological treatment and involved in their own catheter care.

---

## CONCLUSION

---

The audit carried out showed that the guidelines were only partially followed in most cases. Inadequate management of CUR may lead to several complications, which may include chronic kidney disease and hence life-long repercussions. Improving compliance to, and application of these guidelines in all patients presenting with CUR,

will result in standardisation of care and preferable end results. This will be achieved by organizing teaching sessions for healthcare professionals, based in both wards and the emergency department, and reauditing once teaching has been completed.

---

## REFERENCES

---

1. Health Quality Ontario, 2019. Intermittent catheters for chronic urinary retention: A health technology assessment. *Ontario health technology assessment series*, 19,(1) p.1.
2. Selius, BA and Subedi, R, 2008. Urinary retention in adults: diagnosis and initial management. *American family physician*, 77,(5) pp.643-650.
3. Negro, CL and Muir, GH, 2012. Chronic urinary retention in men: how we define it, and how does it affect treatment outcome. *BJU international*, 110,(11) pp.1590-1594.
4. Abrams, PH, Dunn, M and George, N, 1978. Urodynamic findings in chronic retention of urine and their relevance to results of surgery. *Br Med J*, 2(6147), pp.1258-1260.
5. Stoffel, J, Lightner, D, Peterson, A, Sandhu, J, Suskind, A, Wei, J, Bertsch, J, Hubbard, H, Pope, S and Wilder, MV, 2016. Non-neurogenic chronic urinary retention: consensus definition, management strategies, and future opportunities. AUA White Paper. Linthicum, MD: American Urological Association.
6. Serlin, DC, Heidelbaugh, JJ and Stoffel, JT, 2018. Urinary retention in adults: evaluation and initial management. *American family physician*, 98,(8) pp.496-503.

7. National Institute for Health and Care Excellence, 2015. Lower urinary tract symptoms in men: management.
8. Martin, J, Chandler, W and Speakman, M, 2019. Investigating chronic urinary retention. *bmj*, 366, p.l4590.
9. Boettcher, S, Brandt, AS, Roth, S, Mathers, MJ and Lazica, DA, 2013. Urinary retention: benefit of gradual bladder decompression-myth or truth? A randomized controlled trial. *Urologia internationalis*, 91,(2) pp.140-144.
10. Sciberras, J, Pace, K, Busuttil, G, Piscopo, T, 2018. Urinary Retention Management Guidelines.
11. Selius, BA and Subedi, R, 2008. Urinary retention in adults: diagnosis and initial management. *American family physician*, 77,(5) pp.643-650.
12. Tarter, TH and Vaughan Jr, ED, 2006. Inhibitors of 5 $\alpha$ -reductase in the treatment of benign prostatic hyperplasia. *Current pharmaceutical design*, 12,(7) pp.775-783.
13. Ghalayini, IF, Al-Ghazo, MA and Pickard, RS, 2005. A prospective randomized trial comparing transurethral prostatic resection and clean intermittent self-catheterization in men with chronic urinary retention. *BJU international*, 96,(1) pp.93-97.