SAS Journal of Medicine ISSN 2454-5112
SAS J. Med., Volume-2; Issue-6 (Nov-Dec, 2016); p-147-151
Available online at http://sassociety.com/sasjm/

Original Research Article

Pattern of Urine Volume Drained After Catheterization for Urinary Retention

Elijah A. Udoh[1], Aniekpeno E. Eyo[1]
[1]Urology Unit, Department of Surgery, University of Uyo Teaching Hospital Uyo, Akwa Ibom State, Nigeria.

***Corresponding author**
Dr. Elijah A. Udoh
Email: elijah_udoh@yahoo.com

Abstract: Urinary retention is a global health problem especially in the aged males due to cancer of the prostate (Cap) benign prostatic hyperplasia (BPH) and to a lesser extent Urethral Stricture. It results in poor quality of life, severe morbidity and mortality. Acute urinary retention (AUR) and acute on chronic urinary retention are usually painful while chronic urinary retention (CUR) is usually painless. These are usually preceded by lower urinary tract symptoms (LUTS). We studied forty (40) male patients with a mean age of 62.93±12.323 years (range 22-91 years) who presented in accident and emergency department (95%) and surgical outpatient department (5%) in urinary retention between January and March 2016. Mean volume of urine drained was 1,270.0±555.139mls (range 500 – 2000mls) and a mean duration of LUTS of 27.537±30.004 months (range 0.3 – 132 months). BPH patients were more in number 22(55.0%). Urethral catheterization was done for 65% of the patients and 35% had suprapubic cystostomy (SPC) for failed urethral catheterization. Post obstructive complications were haematuria in < 1% and diuresis in ~1.5% of patients. These complications were recognized and dealt with. Awareness campaign to populations at risk of urinary retention from these and other causes should be done to checkmate this damaging health problem.

Keywords: Urinary retention, Urine Volume, Catheterization.

INTRODUCTION

Urine is normally produced by the kidneys through the process of ultra-filtration of plasma at the glomerulus and transported to the urinary bladder by the ureters. Urine is stored in the bladder until enough volume is reached to stimulate the voiding reflex. The bladder function of storage and emptying is controlled by the peripheral nerve supply, the spinal motor integrated centre, the supra-spinal centre, the pontine and supra-pontine centres. Any disruption in this neural pathway or anatomical obstruction to the bladder outlet may lead to urinary retention. This study excludes conditions that lead to functional obstruction of bladder outlet and focuses on causes of anatomical obstruction such as Cap, BPH and Urethral Stricture which had been noted to commonly lead to bladder outlet obstruction (BOO) [1]. The commonest mechanism of urinary retention is increased outlet resistance resulting from the static component of the obstructing prostate or of localized narrowing of the urethra by urethral stricture accompanied by dynamic component from α-adrenergic stimulation that increases the tone of the smooth muscles at the bladder neck. This process ultimately results in bladder hypertrophy and deposition of collagen in between the smooth muscle fibres leading to poor bladder compliance. These culminate to varying degrees of lower urinary tract symptoms which may be both obstructive and irritative. The now dysfunctional bladder may suddenly decompensate and AUR results and may also progress insidiously with progressive distension of the bladder resulting in CUR. The exact mechanism that results to either AUR or CUR is not known [2]. Urinary retention may be defined as inability to empty the bladder to completion [2] and may be classified into AUR, acute-on-chronic or chronic urinary retention. AUR may be further classified into precipitated or spontaneous. Precipitated, when there are triggering factors like prostatic inflammation and infarct, urinary tract infection (UTI), general or loco-regional anaesthesia, use of drugs e.g. anti-cholinergics and excessive alcohol [2, 3]. Spontaneous, when no triggering event is known as in AUR associated with BPH [3]. CUR on the other hand may be low or high pressure and the reason for this development is not known [4].

A major factor involved in the diagnosis of urinary retention is the drainage of large volume of urine after catheterization with the relief of pain [5] as in AUR. CUR is usually painless. We studied 40 men who presented in urinary retention in our facility with strict exclusion criteria to arrive at this number and concluded that the Mean volume of urine drained after catheterization was in excess of 1 litre (>1270±555.139mls) coupled with a mean duration of

LUTS in excess of 2 years, this may result in grave health condition and fatal outcome.

MATERIALS AND METHOD

A prospective study of 40 patients who were seen in both accident and emergency (A&E) department and urology clinic in urinary retention and were relieved by catheterization with documentation of urine volume drained. Slow decompression of the bladder was done by clamping and releasing the clamp intermittently for a total of 10-15 minutes following catheterization. Strict exclusion criteria were patients in retention due to retained catheter, retention following urethral injury, post operative urinary retention and retention in paraplegics from any cause. Patient's bio-data, symptoms and signs were documented together with follow- up of specific tests to diagnose their conditions. Data generated from this exercise was entered into and analyzed using SPSS version 20.0 and used for the discussion.

RESULTS

40 men aged between 22 and 91 years with a mean age of 62.93±12.323 years presented in urinary retention. Mean duration of LUTS was 27.537±30.004 months (Range 0.3-132 months) while the mean volume of urine drained was 1,270.0±555.139mls (range 500-2000mls). The mean duration of retention in hours was 36.795±24.5005 (Range 3-96 hours).

Table-1: Mode of admission

Department	Frequency (n)	Percent (%)
A&E	38	95
SOPD	2	5

Table-2: Frequency of Diagnosis

Diagnosis	Frequency (n)	Percent (%)
Cap	4	10
BPH	22	55
Urethral Stricture	14	35

Table-3: Volume of Urine drained

Volume of Urine	Frequency(n)	Percent (%)
500-800mls (AUR)	15	37.5
>800mls (CUR or Acute on Chronic)	25	62.5
Total	40	100

Table-4: Physical examination/Treatments

Physical Examination	Frequency (n)	Percent (%)
Painful Distress	29	72.5
No Distress	11	27.5
Palor	14	35.0
Dehydration	8	20.0
Palor/ Distress	11	27.5
Treatment (n=40):		
Urethral Catheterization	26	65.0
SPC	14	35.0

DISCUSSION

Urinary retention is a global health problem especially in the aged males. It is quite rare in younger males. AUR is about 5 times commoner in men in their 70^{s} than men in their 40^{s} [6]. Cap, BPH and Urethral Stricture have been implicated as the commonest causes of urinary retention in the aging males [1]. Urinary retention may be acute where there is sudden, painful inability to void or chronic where a patient retains a substantial amount of urine in the bladder after voiding [7]. It's usually painless. Occasionally they may also develop inability to void and this is termed acute-on-chronic urinary retention.

In this study, majority of the patients (95%) were seen in accident and emergency department and the rest in surgical outpatient (SOP) Clinic. Urinary retention in most instances is an emergency condition that needs urgent bladder decompression to relief pain and subsequent management of the causal pathology. In the remaining 5% of the patients seen in the SOP, their presentations were typically CUR with painless suprapubic (bladder) mass and large volume of drained urine. Majority of the patients were diagnosed with BPH, also reported in other studies as the commonest cause of urinary retention [8-10].

There is no universal cut-off urine volume diagnostic of urinary retention. It has been suggested by many authors that volumes drained between 500-800mls are typical of AUR and volumes more than 800mls is suggestive of either acute-on-chronic or chronic urinary retention [2]. Using the above benchmark by Kaplan and colleagues [2], majority of the patients (62.5%) presented in CUR or acute on chronic urinary retention while the remaining number (37.5%) of patients presented in AUR (Table 3). These patients had antecedent history of LUTS which are usually mild initially for patients with CUR until onset of nocturnal enuresis when the urethral pressure drops or when symptoms of renal failure occur. CUR may be low pressure or high pressure. There is no known reason why patients develop either condition. These pressures refer to detrusor pressure at the end of micturition [11]. In the high pressure CUR, the persistent elevated detrusor pressure during storage and voiding phases of micturition may result in functional failure of the uretero-vesical valve leading to hydroureteronephrosis. With time, this high intra-renal pressure will lead to tubular epithelial and nephron loss resulting in impaired glomerular function and chronic renal failure (CRF) [4]. Other complications are UTI, Stone formation, bladder diverticulum, anaemia of CRF and Uraemia. In the low pressure CUR, even though large volumes are drained, there are no dangers to the upper tract because detrusor pressure is low in a still compliant bladder with mild LUTS. Urodynamic studies will confirm low detrusor pressure, low flow rate and large volume of retained urine. Patients with AUR on the other hand, may present with history of LUTS superimposed by the acute retention. It can be precipitated or spontaneous. Precipitated in those with triggering factors like UTI, prostatic inflammation and infarct, excessive fluid or alcohol intake, general and loco-regional anaesthesia [2, 3] and spontaneous in patients who have no triggering events. This distinction is of clinical importance because BPH surgeries are less common in precipitated AUR[3] but commoner in spontaneous AUR as a sign of disease progression [3, 12].

Patient's symptomatology at presentation may also suggest type of urinary retention. AUR and acute on chronic urinary retention are usually painful while CUR are usually painless. In our study, majority of the patients 29 (72.5%) presented in painful distress suggestive of AUR and acute on chronic urinary retention. Painless retention was seen in 11(27.5%) patients implying CUR. Mean duration of LUTS prior to retention was 27.537 ± 30.004 months. This was shorter than that reported by McNeill *et al*. [13] in their study of 32 months prior to retention. This discrepancy may be due to different study populations, poor recall of events in this group of patients and also symptoms may be ignored or regarded as part of the aging process until they become severe resulting in poor memory of the total duration. However, all patients need not progress at the same rate.

All patients had immediate catheter decompression of the bladder as the initial treatment to relief pain as in AUR and acute on chronic retention and to forestall further renal dysfunction in all types of retention especially in CUR patients. 65% of them had urethral catheterization and the rest were catheterized suprapubically. Urethral Catheterization is most often done for these patients being easy with less morbidity than SPC (reserved for failed cases). In a study by Manikandan *et al*. [14], urethral catheterization was done for 98% of those who presented in retention. The choice of SPC by some patients have been documented [15] in order to maintain sexual function, this of course should be overlooked. However SPC may be preferred because of the advantage of low risk of UTI, Urethral Stricture formation and trial without catheter can easily be done by clamping the catheter rather than removing it to avoid re-catheterization in event of failure [16-18]. Some disadvantages of SPC have also been known including haematuria, pain, bowel perforation and peritonitis [19]. Urethral catheterization on the other hand, is associated with urine leak, urethral and bladder neck injury and on the long term, urethral stricture formation.

We advocated slow decompression of the bladder to avoid post obstructive haematuria. The recorded incidence was insignificant (<1%) and resolved with bladder irrigation within 48 hours. Perry *et al*. [20] also noted a low incidence of haematuria; often mild with no need of blood transfusion and resolved within 24 to 48 hours. Post obstructive haematuria is thought to be caused by sudden release of pressure in the obstructed urinary tract leading to rupture of the engorged bladder mucosal veins. It may also be caused by UTI and traumatic catheterization [21].

Our concern was also directed to those patients who drained > 1 litre of urine for post obstructive diuresis, but few patients ($\simeq$1.5%) drained > 3 litres of fluid in 24 hours and were monitored with intravenous fluid administration. This resolved within a few days. Post obstructive diuresis in thought to be due to retained urea, sodium and water during the obstruction, impaired renal tubular reabsorption, effect of circulating hormones especially atrial natriuretic peptide and sometimes caused by rigorous infusion of saline solutions [22].

Another point worth highlighting was palor, recorded in a third of the patients. Palor is a clinical expression of anaemia and in patients with BOO, causes are multifactorial. It may be due to chronic renal failure and erythropoietin deficiency, suppression of erythropoiesis by uraemic inhibitors [23], urolithiasis and UTI as a consequence of stasis and microhaematuria [24]. In a subset of patients with

advanced Cap, anaemia may be due to bone marrow infiltration with cancer cells halting erythropoiesis, nutritional decline, androgen deprivation therapy, treatment related toxicity and chronic inflammatory state [25]. Cancer growth in the prostatic urethra and bladder wall can slough-off causing haematuria and anaemia. Besides, serious morbidities are faced by patients who present in retention of large volumes of urine and long duration of LUTS which could lead to high mortality even during intervention.

Our challenge was the time consuming slow decompression of the bladder to prevent post obstructive haematuria for which other authors think it is unnecessary. Strict input and output charting to monitor drainage was defective in few patients owing to the ever-busy schedule of the emergency staff. However, it was an exciting and rewarding process to fill in gaps for the training residents in the hospital.

CONCLUSION

Urinary retention is a world health problem especially in elderly males due to Cap, BPH and to a lesser extent urethral stricture. Studies have supported long duration of LUTS in some patients, followed by urinary retention that only prompted hospital visit. Many of them regard LUTS as normal for their age until retention sets in. Awareness campaign to the population at risk should be done to forestall anticipated problems. All emergency and sessional clinicians should possess appropriate skills to catheterize patients in retention both urethrally and suprapubically (when indicated) with knowledge on how to manage post procedure complications.

REFERENCES

1. Jacobsen SJ, Jacobson DJ, Girman CJ, Roberts RO, Rhodes T, Guess HA, Lieber MM. Natural history of prostatism: risk factors for acute urinary retention. The Journal of urology. 1997 Aug 31;158(2):481-7.
2. Kaplan SA, Wein AJ, Staskin DR, Roehrborn CG, Steers WD. Urinary retention and post-void residual urine in men: separating truth from tradition. The Journal of urology. 2008 Jul 31;180(1):47-54.
3. Fitzpatrick JM, Kirby RS. Management of acute urinary retention. BJU international. 2006 Apr 1;97(s2):16-20.
4. O'reilly PH, Brooman PJ, Farah NB, Mason GC. High pressure chronic retention. Incidence, aetiology and sinister implications. British journal of urology. 1986 Dec 1;58(6):644-6.
5. Mitchell JP. Management of chronic urinary retention. British medical journal (Clinical research ed.). 1984 Sep 1;289(6444):515.
6. Emberton M, Cornel EB, Bassi PF, Fourcade RO, Gomez JM, Castro R. Benign prostatic hyperplasia as a progressive disease: a guide to the risk factors and options for medical management. International journal of clinical practice. 2008 Jul 1;62(7):1076-86.
7. Ghalayini IF, Al-Ghazo MA, Pickard RS. A prospective randomized trial comparing transurethral prostatic resection and clean intermittent self-catheterization in men with chronic urinary retention. BJU international. 2005 Jul 1;96(1):93-7.
8. Rosenstein D, McAninch JW. Urologic emergencies. Medical Clinics of North America. 2004 Mar 31;88(2):495-518.
9. Udoh EA, Ukpong A. Causes of bladder outlet obstruction in adult males, relative frequency and mean age at diagnosis, SAS J. Surg; 2(4) (Jul-Aug; 2016); P 156-160.
10. Mbibu NH, Nwofor AM, Khalid L. Spectrum of urologic disease in the West African sub region. Annals of African Medicine. 2002;1(1):44-52.
11. George NJ, O'Reilly PH, Barnard RJ, Blacklock NJ. High pressure chronic retention. Br Med J (Clin Res Ed). 1983 Jun 4;286(6380):1780-3.
12. Emberton M, Fitzpatrick JM. The Reten-World survey of the management of acute urinary retention: preliminary results. BJU international. 2008 Mar 1;101(s3):27-32.
13. McNeill SA, Hargreave TB, Alfaur Study Group. Alfuzosin once daily facilitates return to voiding in patients in acute urinary retention. The Journal of urology. 2004 Jun 30;171(6):2316-20.
14. Manikandan R, Srirangam SJ, O'Reilly PH, Collins GN. Management of acute urinary retention secondary to benign prostatic hyperplasia in the UK: a national survey. BJU international. 2004 Jan 1;93(1):84-8.
15. Ahluwalia RS, Johal N, Kouriefs C, Kooiman G, Montgomery BS, Plail RO. The surgical risk of suprapubic catheter insertion and long-term sequelae. The Annals of The Royal College of Surgeons of England. 2006 Mar;88(2):210-3.
16. Horgan AF, Prasad B, Waldron DJ, O'sullivan DC. Acute urinary retention. Comparison of suprapubic and urethral catheterisation. British journal of urology. 1992 Aug 1;70(2):149-51.
17. Abrams PH, Shah PJ, Gaches CG, Ashken MH, Green NA. Role of suprapubic catheterization in retention of urine. Journal of the Royal Society of Medicine. 1980 Dec 1;73(12):845-8.
18. Scorer CG. The Suprapubic Catheter A Method Of Treating Urinary Retention. The Lancet. 1953 Dec 12;262(6798):1222-5.
19. Ahmed SJ, Mehta A, Rimington P. Delayed bowel perforation following suprapubic catheter insertion. BMC urology. 2004 Dec 15;4(1):16.
20. Perry A, Maharaj D, Ramdass MJ, Naraynsingh V. Slow decompression of the bladder using an intravenous giving set. International journal of clinical practice. 2002 Oct;56(8):619-.
21. Nyman MA, Schwenk NM, Silverstein MD. Management of urinary retention: rapid versus gradual decompression and risk of complications.

InMayo Clinic Proceedings 1997 Oct 31 (Vol. 72, No. 10, pp. 951-956). Elsevier.

22. Gulmi FA, Mooppan UM, Chou S, Kim HO. Atrial natriuretic peptide in patients with obstructive uropathy. The Journal of urology. 1989 Aug;142(2 Pt 1):268-72.
23. Eschbach JW, Rebecca Haley N, Adamson JW. The Anemia of Chronic Renal Failure: Pathophysiology and Effects of Recombinant Erythropoietin1. InTerminal Renal Failure: Therapeutic Problems, Possibilities and Potentials 1990 Jul 1 (pp. 24-37). Karger Publishers.
24. Tanagho EA, MC Anninch JW. Smith general urology 16th ed. New York NY: Mc Graw-Hill 2003.
25. Jeffrey GN, Angela GM, Edith CH. Anaemia in men with advanced prostate cancer. Incidence, aetiology and treatment. Rev. urol 2004;6(1):1-4.