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Original Research Article

Comparing the Frequency of Commonly Occurring Complications of Bladder Outlet Obstruction: A Hospital Based Study

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Abstract: Bladder Outlet Obstruction is a major urological problem frequently encountered in the aging population especially males. This condition leads to lower urinary tract symptoms which may be very distressing to the patients. Most times, presentation to a health facility is late with attendant complications. One hundred and three (103) patients records who were diagnosed with cancer of the prostate, benign prostate hyperplasia and urethral stricture. Their clinical characteristics and complications were collated and analyzed using the statistical package for social sciences (SPSS) Version 20.0 software and presented here for discussion. Out of the 103 patient, 54 patients (52.4%) were seen in the surgical outpatients department while 49 patients (47.6%) were seen in Accident and emergency department. 33 patients (32.0%) had cancer of the prostate (Cap) while 52 patients (50.5%) and 18 patients (17.5%) had benign prostatic hyperplasia (BPH) and urethral stricture respectively. Urinary retention was the commonest complication of bladder outlet obstruction seen in 35.02%. 87.5% of the patient studied had anaemia at various levels of severity. Bladder outlet obstruction is a major urological condition with grave complication especially when patients present late. Urinary retention is a frequent occurrence and anemia of varying degrees is also encountered.
Keywords: Frequency, complications, bladder outlet obstruction

INTRODUCTION:

Bladder outlet obstruction (BOO) occurs when there is an impedance of urine flow from the bladder to the urethra [1]. This can be caused by pathologies in the bladder, prostate and in the urethra. BOO leads to lower urinary tract symptoms which could be either obstructive or irritative or both. Cancer of the prostate, benign prostatic hyperplasia and urethral stricture has been noted as the commonest causes of BOO [2]. The symptoms may be mild and patients tend to ignore or may be severe with attendant complications. It is noteworthy to mention here that our patients have the habit of presenting late to health facilities and most times having exhausted all the options of treatment by the tradomedical practitioners. They may present with both the complications of the disease and that of the treatments. Complications following bladder outlet obstruction are many, but we choosed to compare the frequency of the most encountered ones in our facility namely Urinary Retention, Weight loss, Haematuria and Low back pain. Uncommon ones that occurred in association with the major complications included Paraplegia, Paraparesis, Erectile dysfunction and Urethro cutaneous fistulae. Urinary retention was the commonest complication occurring in 35.02% of the population studied. The study also looked at haemoglobin level of these patients since most of them were reported as being pale in their medical records. It was found that 87.5% of them were anaemic at various levels of severity. Anemia in BOO patients has several mechanisms ranging from blood loss, bone marrow suppression as in Cap metastasis and anemia of chronic renal failure.

PATIENTS AND METHODS:

One hundred and three (103) patients aged between 19 to 93 years with a mean age of 61.70 years (SD±11.139) all of Christian faith were retrospectively studied who presented in our facility between January 2014 to December 2014. There were all males and presented with symptoms of bladder outlet obstruction (BOO). Information retrieved from their cause notes included biodata, clinical symptoms and signs. Methods of diagnosis were a Prostate specific antigen (PSA) and prostate biopsy where applicable (PSA > 10ng/ml and an abnormal prostate findings in digital rectal examination), Micturating Cystourethrogram and a Retrograde Urethrocystogram. Full blood count, renal function test and a mandatory fasting blood sugar were all done. The results were collated and data analyzed using the statistical package for the social sciences (SPSS) version 20.0 and used for the discussion.

RESULTS:

One hundred and three (103) patients were studied. They were all males. 54 patients (52.4%) were

seen in the surgical outpatient department while 49 patients (47.6%) were seen in accident and emergency department. Patients diagnosed with Cap were 33 (32.0%) while BPH and Urethral Stricture patients were respectively 52 (50.5%) and 18 (17.5%). Haematuria was seen in 22 patients (22.66%), Low back pain in 16 patients (10.16%), Urinary retention in 34 patients (35.02%) while 31patients (31.93%) had weight loss (Table 2). Association between complications and causes of BOO showed that it was statistically significant (Table 3). Table 4 shows grading of anemia according to the National Cancer Institute classification and grading of anemia and blood sugar levels. Table 5 shows diagnosis and degree of anemia. Haemoglobin (HB) level ranged from 5.1g/dl to 14g/dl with a mean of 11.43g/dl (SD± 2.247).

Table 1: Diagnosis and frequency of complications:

Diagnosis	**Complications (n)**	**Percent (%)**
Cancer of the prostate	49	50.47
Benign prostatic hyperplasia	36	37.08
Urethral stricture	18	18.54
Total	103	100.0

Table 2: Frequency of complications of bladder outlet obstruction:

Complications	**Frequency (N %)**	**Cap**	**BPH**	**Stricture**
Haematuria	22 (22.66)	9 (41.0%	10(45.5%)	3 (13.5%)
Low back pain	16 (10.16)	9 (56.2%)	7 (43.8%)	0 (0.0%)
Urinary retention	34 (35.02)	7 (20.6%)	14 (41.2%)	13 (38.2%)
Weight loss	31 (31.93)	24 (77.4%)	5 (16.1%)	2 (6.5%)
Total	103 (100.0%)	49 (50.47%)	36 (37.08%)	18 (18.54%)

Table 3: Association between complications and causes of bladder outlet obstruction

Characteristics	**Causes of Bladder outlet obstruction**			
	CAP (n %)	**BPH (n %)**	**Urethral Stricture (n %)**	**Test Statistics & value**
Haematuria	9 (18.3)	10 (28.0)	3 (16.7)	$X^2 = 29.9$
Low back pain	9 (18.3)	7 (19.4)	0 (0.0)	DF = 8
Urinary retention	7 (14.4)	14 (38.8)	13 (72.2)	*P = 0.000
Weight loss	24 (49.1)	5 (13.8)	2 (11.1)	

***There was a statistically significant association between complications and causes of BOO. (P value<0.05)**

Table 4: Level of anaemia [24] and blood sugar in respondents:

Characteristics	**Frequency**	**Percent (%)**
Degree of anaemia (g/dl) (n = 72)		
Normal (14.0-18.0)	9	12.5
Mild (10.0-13.9)	47	65.3
Moderate (8-9.9)	11	15.3
Severe (6.5 - 7.9)	2	2.8
Life threatening (< 6.5)	3	4.2
Fasting blood sugar level in mmol/l (n=44)		
< 3.0	4	9.1
3.0-5.5	26	59.1
> 5.5	14	31.8

Table 5: Diagnosis and degree/severity of anemia

Diagnosis	**Normal (14-18)**	**Mild (10-13.9)**	**Moderate (8-9.9)**	**Severe 6.5-7.9**	**Life threatening < 6.5**
Cap	0 (0.0%)	14 (29.8%)	4 (36.4%)	1 (50%)	1 (33.3%)
BPH	8 (88.9%)	24 (51.5%)	5 (45.5%)	0 (0.0%)	0 (0.0%)
Urethral stricture	1 (11.1%)	9 (19.1%)	2 (18.1%)	1 (50.0%)	2 (66.7%)
	9 (12.5%)	47 (65.3%)	11 (15.3%)	2 (2.7%)	3 (4.2%)

Normal subjects – 12.5%
Anaemic subjects – 87.5%:
- Cap – (100%), - BPH (78.4%), -Urethral stricture (93.3%)

DISCUSSION:

Bladder outlet obstruction (BOO) occurs when there is impedance of urine flow from the bladder into the urethra [1]. This can be caused by pathologies in the bladder neck and beyond ranging from benign and malignant lesions of the bladder, the prostate and the urethra. Amugo *et al.;* [2] reported that Cap, BPH and Urethral Stricture are the leading causes of BOO. This pathologic event is not without complications which are rare in clinical trials because of strict inclusion and exclusion criteria but are more common in real life practice [3]. In real life practice, admissions with urinary retention, frank haematuria, recurrent infections and acute kidney injury are a regular event [3]. The various causes of BOO in this study were Cap, BPH and Urethral Stricture and the commonly encountered complications were gross haematuria, low back pain, urinary retention and weight loss (Table 1). The study was meant to compare the frequency of the most commonly encountered complications and so the less common ones that occurred in association with the major complications namely Paraparesis, Paraplegia, Urethro cutaneous fistula and erectile dysfunction were not included in the analysis. Comparing diagnosis and their attendant complications; Cap had the highest frequency (50.47%). This is expected because of combining the effect of bladder outlet obstruction and cancer-related complications. Followed by BPH with 37.08% and Urethral Stricture with 18.54%. Association between causes of BOO and complications was statistically significant (P value<0.05) (Table 3). Urinary retention was seen in 34 patients representing 35.02% and was the commonest complication. It is defined as inability to empty the bladder to completion [4]. It may be acute, acute on chronic and chronic, but because of the retrospective nature of this study, facts were not made clear as to the classic distinguishing symptoms. Therefore the patients were classified as having urinary retention. Acute urinary retention (AUR) is usually characterized by sudden, painful inability to void. Painless AUR is rare and is often associated with central nervous system pathology [5].

The international continence society defines chronic urinary retention as non-painful bladder which remains palpable or percussable after the patient has passed urine. Such patients may be incontinent [6]. Occasionally these patients also develop inability to void and it is termed acute-on-chronic retention. Another distinguishing factor is the volume of urine drained after retention is suspected. Even though there is no cut-off volume that is diagnostic of urinary retention, it has been suggested that volumes drained between 500-800mls are typical of acute retention while > 800mls is suggestive of either chronic or acute on chronic urinary retention which has also been seen with bladder volumes > 4 litres [7]. These symptoms and signs characterizing the different types of retention such as painful or painless percussable bladder or urinary volumes drained at presentation were not documented. However, this study has helped in recognizing and appreciating the high incidence of urinary retention in the setting of BOO and this study also compares with other documented results. Urinary retention could be very distressing to patients. Beyond the acute event with agonizing pain and distress, patients with chronic urinary retention risk developing recurrent urinary tract dysfunction and renal failure. BPH was the leading cause of urinary retention with 41.2% of the patients seen. This was slightly higher than 35.7% documented by Ugwumba *et al.;* in their study [8], being higher than 34.1% in another study [9] and lower than 53% of BPH as the cause of urinary retention in another work [10]. 38.2% of patients diagnosed with Urethral stricture had urinary retention in the population studied higher than 10.1% by Ugare *et al.;* [9]. However, evaluating the cohorts of patients that were diagnosed with urethral stricture as a group, urinary retention was seen in 72.2% higher than that reported by Anthony *et al.;* [11] who documented urinary retention as a complication rate of 60% from untreated urethral strictures. Retention was seen in 20.6% of patients with Cap lower than 25.0 reported in another study [9].

The pathogenesis of urinary retention is usually from anatomical obstruction at the bladder neck and beyond by BPH, Cap, Urethral Stricture, others may be iatrogenic causes as in intraurethral injection of bulking agents in the treatment of intrinsic sphincter deficiency (ISD) and also psychogenic causes [12]. This leads to increased outlet resistance which is the commonest mechanism of urinary retention. Progressive increase in intravesical pressure will cause detrusor hypertrophy with trabeculations, sacculations and diverticular formation. This can also result in bladder dysfunction which may manifest as detrusor instability with decreased compliance secondary to excessive collagen deposition and a compromise of the storage function leading to irritative symptoms superimposed on the obstructive symptoms. Such a dysfunctional bladder can suddenly decompensate culminating in AUR or does it insidiously with progressive distention of the bladder resulting in chronic retention [13]. The exact mechanisms responsible for gradual or sudden decompensation have not been elucidated [4].

In this study, weight loss followed closely with 31 patients representing 31.93%. Out of this, 24 patients (77.4%) diagnosed with Cap had this distressing symptom. Weight loss is usually a symptom of advanced disease and may also result from anorexia and malnutrition that characterize cancer patients. This is actually called cancer anorexia cachexia syndrome which basically describes marked weight loss in patients with cancer that cannot be reversed by normal nutritional support. New studies have shown that the cancer itself causes many profound metabolic changes [14]. Cancer alters the body's metabolism by modifying the synthesis and breakdown of amino acids and fats

[15]. It also alters how the body responds to insulin leading to changes in glucose levels; it actually leads to increased insulin sensitivity. All these contribute to a reduction in muscle mass, body weight and overall deterioration of general health and strength [15].

Gross haematuria as a complication was seen in 22.0% of patients which was lower than 27.6% reported by Ramyil *et al.;* [16] although their study documented BPH and Cap as causes of haematuria. It is a very distressing symptom to both the patients and caregivers. Even a single episode of haematuria should not be overlooked for it could be a harbinger of a more serious pathology in and outside the urinary tract. Approximately 20 percent of patients with gross haematuria are found to have a tumour of the urinary tract [17]. In our study, haematuria was seen more among BPH patients with a frequency of 45.5%, followed with 41% in Cap patients. This is a reverse in Ramyil's report [16], where 29.2% and 26.7% were respectively seen in Cap and BPH patients. Dawan *et al.;* [18] also documented a higher percentage (15%) in BPH patients compared to 0.6% of cases of gross haematuria in Cap patients.

The pathophysiology of haematuria due to Cap and BPH is usually caused by the friable hyper vascularity of the prostate, the vessels of which are easily disrupted by physical activity [19]. The physical activity may be related to straining at micturition where poor urinary stream is the main symptom or even coughing. In Cap, cancer cells infiltration of the prostatic urethra and bladder wall can slough-off resulting in bleeding and haematuria. In all of the causes of BOO studied, urinary stasis can lead to urinary tract infection (UTI), bladder stone and all can cause haematuria.

Low back pain was the least common of all the complications and occurred in 10.16% of the patients. It was higher (56.2%) in Cap than in BPH (43.8%) patients. No patients in the urethral stricture group complained of low back pain. Low back pain may result from cancer metastasis to the spine and bone metastases are the most common cause of cancer-related pain [20]. At least 40% of newly diagnosed cases of Cap can be expected to have metastasized at the time of initial discovery [20]. This high percentage is accounted for by late presentation to health facility typical of our patients. Metastatic deposit to the bone may be disabling and can contribute to a decline in the quality of life, patients may also end up with paraplegia, decubitus ulcers, sepsis and death. The pathology of skeletal events in cancer metastasis has been well studied. The axial skeleton is most commonly affected. It contains the red marrow in the adult, which suggest that the properties of the circulation, cells and extracellular matrix within this region could assist in the formation of bone metastasis [21]. There is strong evidence that blood from some anatomic sites may drain directly into the axial skeleton. Batson [22] showed that venous blood from the breasts and pelvis flowed not only into the venae cavae but also into a vertebral-venous plexus of vessels that extended from the pelvis throughout the epidural and prevertebral veins. This, however, in part explains the process of cancer-vertebral bone metastasis. Molecular and cellular biological characteristics of the tumour cells and the tissues to which they metastasize are also important and influence the pattern of metastatic spread [23]. Low back pain in non-cancer patients could be due to degenerative diseases of the spine and that may be the explanation in BPH patients. Lumbar spondylosis appears to be a non-specific aging phenomenon unrelated to cancer metastasis and aging is central in both lumbar spondylosis and prostate diseases.

The study also looked at the incidence of anemia in this group of patients for which most of them were stated to be pale. Seventy two (72) patients completed their full blood count tests and this information was used to grade them into normal, mild, moderate, severe and life threatening anemia according to the National Cancer Institute Classification and grading of anaemia [24] (Table 4). Only 12.5% had normal haemoglobin level and were classified as normal subjects while 87.5% were anaemic at various levels of severity. This was higher than 72.7% reported in another study [25]. This high incidence of anemia may be due to late presentation to health facility allowing disease progression to affect erythropoiesis. All the patients that presented with Cap were anaemic at different levels of severity. Anaemia in men with Cap may be caused by several factors including androgen deprivation, nutritional decline, bone marrow infiltration, treatment-related toxicity and the chronic inflammatory state [26]. Haematuria and other sources of slow blood loss can also contribute to anemia in men with advanced prostate cancer where there is growth of cancer cells in the bladder wall and prostatic urethra. This can slough-off and lead to bleeding predisposing to anaemia. >80% of the 29 men with prostate cancer in a study by Toshihiko *et al.;* [27] were seen with anaemia. This has been recognized as a common haematological abnormality seen in cancer patients in general. Anaemia in Urethral stricture patients (93.3%) and BPH patients (78.4%) were also alarming which clearly shows the effect of late presentation. Generally the effect of BOO is urinary stasis in the bladder with back pressure effect to the upper tracts causing progressive atrophy of the renal parenchymal cells. Notably, erythropoietin is produced by the peritubular cells which are lost in this disease process. This will eventually affect the ability of the bone marrow to effect erythropoiesis for which process is dependent on erythropoietin. The result is gradual reduction in the red blood cell number and mass leading to anaemia. Aside from erythropoiesis deficiency, anaemia of chronic renal failure has been known caused by haematinic deficiency, low grade haemolysis, blood loss particularly from the

gastrointestinal tract and suppression of erythropoiesis by uraemic inhibitors [28]. Urinary stasis also encourages urolithiasis that can cause micro haematuria and gross haematuria, both leading to anaemia of varying severity. Urolithiasis was a cause of micro haematuria in about 85% of patients, but gross haematuria tends to be rare [29]. Urinary tract infection (UTI) frequently seen in patients with BOO due to stasis can also cause anaemia. A case of acute haemolytic anaemia due to infection with E. Coli was reported [30] in which cessation of haemolytic process coincided with introduction of appropriate antibiotic therapy.

In our facility, it is mandatory to screen all patients for diabetes mellitus with Fasting blood sugar at presentation because of the similarity of symptomatology. Forty four (44) patients were able to complete their fasting blood sugar tests and 14 patients (31.8%) were diagnosed with diabetes mellitus (Dm) and managed accordingly. This figure was higher than 4.4% in another report [9], although they only reported newly diagnosed cases in their cohort. Dm is recognized as one of the components of metabolic syndrome [31] which is said to be an independent risk factor for poor outcome in the management of many disease entities in clinical medicine [32].

CONCLUSION:

Bladder outlet obstruction is commonly caused by pathologies in the bladder neck, prostate and the urethra. It is also commoner in aging males. Symptomatology is quite distressing to the patients and worse still when complications arise. Cap, BPH and Urethral Stricture are the common causes of BOO and most frequently complicated by Urinary retention. Other common complications are weight loss, gross haematuria and low back pain. Anaemia is also an issue of much concern in BOO patients. Our take is that patients should present early for care to avoid these complications.

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