

ASSOCIATION BETWEEN BENIGN PROSTATIC HYPERPLASIA AND URINARY TRACT INFECTION

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ABSTRACT

Benign prostatic hyperplasia is a progressive condition characterized by prostate enlargement. It has an estimated prevalence of 50% in men aged 50-60 and 90% in men over 80 years. Scottish Intercollegiate Guidelines Network, using urodynamic techniques, revealed significant underlying lower urinary tract abnormalities, mainly involving bladder out flow obstruction in 80% of adult males presenting with simple or recurrent urinary tract infection. Mid stream urine samples were collected from 94 BPH patients and 94 age-matched non BPH patients. Samples were processed within one hour of production. Based on evidence of pyuria on wet preparation and significant bacteriuria on culture, samples were considered to be positive for UTI. UTI prevalence was higher among BPH patients (33.0%) than their control (23.4%). Odd ratio 0.33 with p-value 0.2 was obtained for ages 50-59 while odd ratio 4.4 with p-value 0.03 was obtained for ages 80 and above. Prevalence of UTI was higher among BPH patients than men without BPH. Significant association between BPH and UTI was found among ages 80 years and above.

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INTRODUCTION

Urinary tract infection (UTI) usually refers to the presence of bacteria greater than or equal to a hundred thousand per milliliter of properly collected urine together with, sometimes, symptoms and signs of inflammation (Chedi *et al.*, 2009). UTI is uncomplicated when the urinary tract is entirely normal and complicated when the urinary tract is compromised, either structurally, functionally, metabolically or immunologically.

The urinary tract consists of the Kidneys, Ureters, Bladder and Urethra. Often, UTIs are classified as either upper or lower based on the anatomical site of infection. The lower urinary tract comprises of the Bladder and Urethra while the upper urinary tract comprises of the Ureters and Kidneys.

The urethra is a thin-walled tube that drains urine from the Bladder and transports it out of the body. In males the Urethra is about 20cm long and has three regions (Maried and Hoeln 2007; Van De Graff 1998). The Prostatic Urethra about 2-5cm in length, runs through the prostate. The Membranous Urethra, runs through the urogenital diaphragm, is about 2cm. The Spongy Urethra, about 15cm in length passes through the penis and opens at the external urethral orifice. The male urethra conveys semen and urine out of the body.

Benign Prostatic Hyperplasia (BPH) is defined histologically as a disease condition characterized by stromal and epithelial cell hyperplasia beginning in the prostatic urethral zone of the prostate. (American Urology Association (AUA) 2003). BPH can be defined as microscopic BPH, macroscopic BPH or Clinical BPH. Microscopic BPH represents histological evidence of cellular proliferation of the prostate. Macroscopic BPH refers to enlargement of the prostate resulting from microscopic BPH. Clinical BPH represents the Lower Urinary Tract Syndrome (LUTS), bladder dysfunction, haematuria, and UTI resulting from microscopic BPH (Lepor 2004).

The prostate surrounds the male urethra. The prostate's main function is to produce ejaculatory fluid. As the prostate grows, it exerts pressure on the urethra that can cause difficulty with urination. The prostate causes symptoms that irritate and obstruct the bladder, when it becomes hypertrophic and infected.

A wide variety of factors predispose a person to acquire UTI. In infants and young children, congenital anatomic abnormalities are associated with UTI. Females develop UTI more frequently than males because of the shorter urethra and the close proximity of the urethra to the anus. Abnormalities such as BPH and urethral stricture from gonococcal infections interfere with the free flow of urine and create a complicated setting in which infections are likely to occur (Oni *et al.*, 2003).

Despite the fact that BPH is the commonest disease that are managed by urologist and has a big impact on the public health, the aetiological agents and pathophysiology are still not yet clear (Chan 2011). BPH is a progressive condition characterized by prostate enlargement accompanied by lower urinary tract symptoms has an estimated histological prevalence of 50% in men aged 50-60years and 90% in men over 80years (Chan 2011; Crawford and Dall'Era 2006). There is a report of initial development usually after 40years of age (AUA 2003).

Urodynamic techniques, such as pressure/flow videocystography revealed significant underlying lower urinary tract abnormalities, mainly involving bladder out flow obstruction, in 80% of adult males with simple or recurrent urinary tract infection but without prior urinary symptoms or disorders (Scottish intercollegiate 2006). To the best of our knowledge the relationship between BPH and UTI has not been documented. Hence this study aims at establishing the relationship between UTI and BPH.

MATERIALS AND METHODS

This study was carried out in Ilorin, the capital of Kwara state, Nigeria, from January 2013 to May 2013. The study was a cross sectional study of UTI among BPH patients to establish the relationship between BPH and UTI. The study was controlled with a group of age matched men without BPH. Men who are on antibiotics within the last 72 hours from time of sample collection and BPH patients on catheter or who had been on catheter before are excluded from the study.

Ethical approval was granted by the University of Ilorin Teaching Hospital Ethics Review Committee while informed consent was obtained from all participants after been informed fully about the study.

Sample Collection

Using purposive sampling technique, mid stream urine samples were collected from 94 BPH patients attending urology clinic, UITH, Ilorin and 94 age-matched men without clinical BPH with or without UTI symptoms, into a sterile universal bottle. Age of patients were obtained and recorded accordingly.

Laboratory Procedure

Urine samples were processed within one hour after collection. Samples were mixed and divided into 2 parts. One part was centrifuge at 2500 rpm for 5 minutes. The supernatant poured off and the sediments tapped and poured onto a clean glass slide. Covered with a cover slip and examined using 10x and 40x objectives. Pus cells and bacterial cells were looked out for and recorded accordingly.

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A sterile wire loop designed to deliver 0.001ml of urine was used for the plating. A loopful of well mixed urine samples were inoculated onto plates of Blood agar and CLED (CystineLactose Electrolyte Deficient) agar. All plates were then incubated at 37°C aerobically for 18-24 hours. The plates were then examined macroscopically for bacterial growth and colonies counted to determine significant bacteriuria (10⁵cfu).

Data obtained were entered into a computer and analysed using SPSS

RESULTS

A total of 188 men were recruited for this study (94 BPH; 94 Control). Statistical analysis, comparing ages of BPH patients and their age matched control group are shown in Table 1

Table 1. Statistical analysis of age of BPH patients with ages of their age matched control

STAT Parameters	BPH	CONTROL
Minimum Value	51	50
Maximum Value	92	90
Range	41	40
Mean Value	69.90	69.57

t-value of 0.237 was obtained

Based on evidence of pyuria on wet preparation and significant bacteriuria on culture samples were considered positive for UTI. Prevalence of 33.0% and 24.4% was obtained for the BPH patients and control group respectively, details on Table 2.

Table 2: Comparing Prevalence of UTI among patients diagnosed with BPH and their age-matched Control group

Age (yrs)	n for each group	Prevalence of UTI among patients diagnosed with BPH (%)	Prevalence of UTI among their age-matched Control (%)	Association	
				Odds Ratio	P-value
50 – 59	17	11.8	29.4	0.32	0.200
60 – 69	26	24.1	7.7	4.42	0.067
70 – 79	34	29.4	26.5	1.16	0.700
80 and above	17	70.6	35.3	4.4	0.030
SUMMARY	94	33.0	23.4	1.61	0.14

Prevalence of UTI was found to be higher among patients diagnosed with BPH (33.0%) than their age-matched Control (23.4%). A significant association between BPH and UTI was found among ages 80 years and above.



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DISCUSSION

The t-value of 0.237 obtained, in comparing the ages of BPH patients with their age matched controls, indicates that there is no significant difference in the mean age of the BPH patients and their age matched control. This implies that with respect to age the study is well controlled.

Thirty one of the patients diagnosed with BPH were found to have UTI while twenty two men of their age-matched control were also found to have UTI. The trend line shows higher steady increase of UTI with age among patients diagnosed with BPH than their age-matched control. This implies that BPH increases the probability of having UTI and this agrees with the report of Crawford and Dall'Era (2006); Getenet and Wondewosen (2011) and Ryan (2004).

The consistent increase in the prevalence of UTI with age among patients diagnosed with BPH with an overall prevalence of 33% and a high prevalence of 70.6% for ages 80 years and above confirms the expectation that the prevalence of UTI promoted by stasis secondary to BPH should increase with age because BPH is a progressive disease which usually starts after the first five decades of life (Table 2).

Odd Ratio (OR) of 1.61 obtained in this study also implies that BPH increases chances of having UTI but χ^2 of 2.13 and P – value of 0.14 was obtained. Analysis of the association by age shows same trend for all ages on till ages eighty years and above where OR 4.4 was obtained with a P – value of 0.03 indicating that BPH significantly increases the chance of having UTI, within this age range.

Urinary tract infection prevalence of 33.0% found among patients diagnosed with benign prostatic hyperplasia is significant. Out of every 10 patients diagnosed with benign prostatic hyperplasia 3 will have urinary tract infection. As the condition progresses rate of urinary tract infection increases. At ages 80 years and above rate of urinary tract infection is as high as 7 out of every 10 patients diagnosed with benign prostatic hyperplasia.

REFERENCES

- American Urological Association (AUA) (2003): Guideline on the management of benign prostatic hyperplasia, Diagnosis and Treatment Recommendations, American Urological Association Education and Research, Inc.
- Chan, SW (2011): Pathology and medical therapy of benign prostatic hyperplasia, *The Hong Kong Medical Diary*, **16** (6) 4 – 7.
- Chedi, BAZ, Wannang, NN, Halliru, MA and Bichi, LA (2009): A seven months retrospective study on urinary tract infection among patients at Aminu Kano Teaching Hospital, Kano – Nigeria, *Bayero Journal of Pure and Applied Science*, **2** (2) 95 – 98.
- Crawford, ED and Dall'Era, J (2006): Benign prostatic hyperplasia and progression of lower urinary tract symptom – a review, *US Genito – Urinary Disease*, Pp 44 – 46.
- Getenet, B and Wondewosen, T (2011): Bacteria uropathogen in urinary tract infection and antibiotic susceptibility pattern in Jimma University specialized hospital, southwest Ethiopia, *Ethiop J Health Sci*, **21** (2) 141 – 146.
- Lepor, H (2004): Evaluating men with benign prostatic hyperplasia, *Reviews in Urology*, **6** (1) S8 – S15.
- Maried, EN and Hoehn, K (2007): *Human anatomy and physiology*, 7th Edition, Pearson Benjamin Cummings, San Francisco, Pp 998 – 1031.



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Oni, AA, Mbah, GA, Ogunkunle, MO, Shitu, OB and Bakare, RA (2003): Nosocomial infection: urinary tract infection in patients with indwelling catheter. *African Journal of Clinical & Experimental Microbiology*, **4** (1) 63 – 71.

Ryan, KJ (2004): Urinary Tract Infections, in: KJ Ryan and CG Ray, eds. *Sherris medical microbiology an introduction to infectious diseases*, McGraw-Hill, New York

Scottish Intercollegiate Guidelines Network (2006): Management of suspected bacterial urinary tract infection in adults, A National Clinical Guideline.

Van De Graaff, KM (1998): *Van De Graaff Human anatomy*, 5th Edition, WBC/McGraw-Hill, New York, Pp 656 – 675.

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