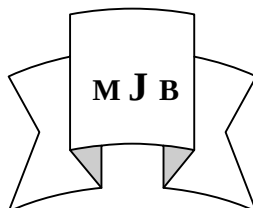


Bacteriological and Clinical Study of Patients with Benign Prostatic Hyperplasia and Urinary Tract Infection

Ban Hussein Mohmma Sbri* Emad Hssan*

College of Dental Medicine, University of Babylon, Hilla, Babylon, Iraq.

*College of Medicine , University of Babylon, Hilla, Babylon, Iraq.



Abstract

The study included (150) patients with benign prostatic hyperplasia and or chronic prostatitis who referred Al-Hilla Teaching Hospital-Department of Urology, from (October) 2004 to (May) 2005.

. Patients age ranged from (30-99) years with mean age of (63.9) years. It was found that (78%) of them had benign prostatic hyperplasia 13.3% had chronic prostatitis and 8.7% had benign prostatic hyperplasia and chronic prostatitis.

The clinical features were frequency (98%), nocturia (90%), urgency (82%), hesitancy (53%), dysuria (51.3%), poor stream (46.7%), dribbling of urine (22%). Other clinical features were pain (22%) such as supra pubic pain, lower backache, groin and perineal pain.

About (20.7%) of patients had post voiding residual urine, while (10%) had history of catheterization and cystoscopy was done to (4%).

Results of general urine examination were pyuria (54%), red blood cells (20.7%), bacteruria (8%) and (12%) had sterile pyuria with urine culture and sensitivity negative.

Regarding the results of urine cultures in patients with benign prostatic hyperplasia and or chronic prostatitis, (43.3%) had positive culture for bacteria. *E.coli* was the most common type of bacterial isolates (14.7%), *Staphylococcus epidermidis* (6%), *Klebsiella pneumoniae* and *Staphylococcus aureus*, each of which represented (4%), *Acinetobacter* spp. (3.3%), *Enterobacter* spp. and *Pseudomonas aeruginosa* represented (2.7%) for each, *Proteus mirabilis* (2%).

الخلاصة

شملت هذه الدراسة (150) مريضاً يعانون من تضخم البروستات الحميد أما أو التهاب الغدة المزمن ممن راجعوا استشارية الجراحة البولية في مستشفى الحلة التعليمي وكانت أعمارهم تتراوح بين الثلاثين والتسعين (30 – 99) سنة من العمر وكان متوسط أعمارهم (63,9) . كان (78 %) منهم يعانون من تضخم البروستات الحميد، (13.3 %) يعانون من التهاب البروستات المزمن و (8.7 %) كان لديهم التهاب البروستات المزمن والتضخم الحميد .

من الناحية السريرية كانت اهم الاعراض التي عانى منها هؤلاء المرضى هي تكرار التبول (98 %) ، لتبول الليلي (90 %) ، الحرج البولي (82 %) ، التلؤك البولي (53 %) ، حرقة البول (51.3 %) ، ضعف المجرى البولي (46.7 %) ونقطير البول (22 %) . أما بقية الأعراض فقد تضمنت ألم مثل ألم البطن ، أسفل الظهر ، المنطقة التناسلية والعجانية (22 %) .

المرضى الذين كان لديهم حجم باق بعد التبول كانت نسبتهم (20.7 %) و (10 %) من المرضى كان لديهم تاريخ وضع أنبوب بزل الإدرار و (4 %) خضعوا لعملية تنظيف المثانة .

وكانت نتائج فحص الإدرار العام هي خلايا قيقحية (54 %) وكريات الدم الحمراء (20.7 %) ، أما الخلايا البكتيرية فقد مثلت (8 %) وخلايا قيقحية نظيفة (12 %) الناتجة من الزرع السالب .

أما بالنسبة لنتائج فحص سوائل البروستات المستخلصه بطريقة التدليك هي خلايا قيقحية (66.6 %) وكريات الدم الحمراء (12.1 %) . فيما يخص نتائج زرع الإدرار من المرضى المصابين بتضخم البروستات الحميد أما أو التهاب البروستات المزمن فقد نمت البكتيريا بنسبة (43.3 %) معظمها من نوع *E. coli* حيث مثلت (14.7 %) ، *Staphylococcus epidermidis* (6 %) ، *K. pneumoniae* و *Staphylococcus aureus* مثلت كل واحد منهما (4 %) ، أنواع *Acinetobacter* (3.3 %) ، بينما أنواع *Enterobacter* و *Pseudomonas aeruginosa* مثلت كل واحدة منهما (2.7 %) من العزلات . *Proteus mirabilis* (2 %)

، بالإضافة إلى *Staphylococcus saprophyticus*، أنواع *Corynebacterium* وأنواع *Enterococcus* مثلت كل واحدة (1.3%) .

Introduction

Benign prostatic hyperplasia is a non malignant neoplastic process secondary to increased cellular growth and it is the age related disease. The majority of men with BPH present with lower urinary tract symptoms only such as nocturia, frequency, urgency, incomplete bladder emptying, hesitancy, weak stream and straining to void [1, 2].

Elderly men are at risk for UTIs because prostatic enlargement can lead to urinary obstruction and retention, providing an excellent medium for bacterial growth. Zinc antibacterial factor, a bactericidal substance is normally found in prostatic fluid, which declines with age. In older men, prostatic fluid becomes more alkaline. All these factors put older men not only at risk for UTIs but for prostatitis as well [3,4].

This work aimed to:

- To assess bacteriologically and clinically the patients with benign prostatic hyperplasia and or chronic prostatitis.
- To study in vitro antimicrobial sensitivity pattern of bacterial isolates from those patients.

Materials and Methods

One hundred and fifty (150) male patients whose ages ranged between (30-99) years underwent the study, who visited Hilla- teaching Hospital- Department of Urology.

All patients underwent full history and complete physical examination by the urologist. (150) urine samples were collected from those patients. Investigation was sent for general urine examination, urine culture and sensitivity, blood urea, serum creatinine and abdominal ultrasound.

General urine examination, It was done according to [5].

The culture media were prepared and bacterial isolates were identified by using the diagnostic tests according to [6].

Results and Discussion

One hundred and fifty patients aged (30 – 99) years old suffered from lower urinary tract symptoms associated with benign prostatic hyperplasia and or chronic prostatitis. Clinically, this work included three variants of patients (Table 1)

Table 1 Distribution of patients with benign prostatic hyperplasia and or chronic prostatitis

Diagnosis	No. of patients	%
Benign prostatic hyperplasia	117	78%
Chronic prostatitis	20	13.3%
BPH and chronic prostatitis	13	8.7%
Total	150	100%

Seventy eight percent of patients were presented with benign prostatic hyperplasia only, while (13.3%) had

chronic prostatitis and (8.7%) had both CP and BPH. There was a significant

difference between patients according to diagnosis ($p < 0.01$).

The groups of patients were selected according to age, symptoms, physical examination by urologist and investigation. Usually, BPH patients aged more than 50 years, while chronic prostatitis patients, their ages less than 50 years and both groups presented with lower urinary tract symptoms. Pain such

as suprapubic pain, perineal and testicular pain) was presented in those who had chronic prostatitis. Third group of patients aged more than 50 years old and presented with lower urinary tract symptoms associated with pain.

The results of this research agreed with those obtained by [6] and [7] who noticed that the prevalence of BPH was (92.97%) and (86.3%) respectively.

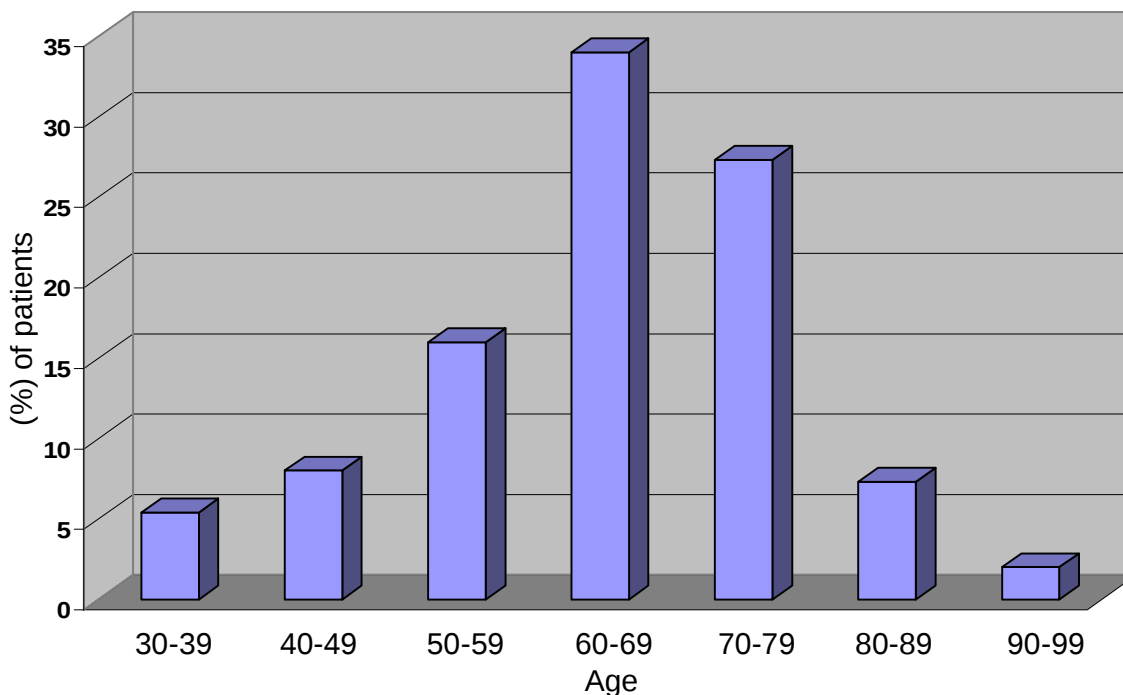


Figure 1 Percentage of ages of patients with benign prostatic hyperplasia and or chronic prostatitis.

The most affected age group presented with benign prostatic hyperplasia was between (50-79) years (77.3%) as in (Figure 3.1). The highly affected age group between (60-69) years old (34%). This correlated with the results of (8) who determined that the prevalence of lower urinary tract symptoms in men whose age was between (40-80) years old suggestive of benign prostatic hyperplasia increased linearly from 3.5% in men in their late 40s to 35% in men in their late 80s

Furthermore, (9) found that benign prostatic hyperplasia was a common adenomatous hyperplasia of periurethral gland which affected at least 65% of men over 55 years old.

Urinary tract infection

Benign prostatic hyperplasia and chronic prostatitis increase the risk for urinary tract infection; in addition, the following factors may predispose to urinary tract infection in (150) study patients (Table 2).

Table 2 Number and percentage of factors predispose to Urinary tract infection in patients with benign hyperplasia and or chronic prostatitis

Predisposing factors	NO. of patients	%
PVR*	31	20.7%
History of catheterization	15	10%
Cystoscopy	6	4%

PVR* - Post Voiding Residual Urine volume

The post voiding residual urine was found in 20.7%, while 10% had history of catheterization. Cystoscopy was done to 4% of them.

Urinary tract infection is more common in elderly men because of significant residual bladder urine, poor emptying the bladder due to prostatic hyperplasia and increased use of instrumentation [4]. The results of this work agreed with those of [10] who reported that 100% of normal men PVR less than 12ml, also noticed that chronic outflow obstruction associated with prostatic hyperplasia is believed to be

accompanied by increasing post void residual urine volumes which demonstrated by ultrasound or catheter in which depending on the degree of urine obstruction, the tension in the detrusor wall rises with increasing bladder volume and varying degrees of urinary retention.

The highest lower urinary tract symptoms associated with (150) study patients were frequency presented in (98%) of patients, nocturia (90%), urgency (82%), hesitancy (53%), dysuria (51.3%), poor stream (46.7%) and dribbling of urine (22%).

Table 3 Number and percentage of symptoms in patients with benign prostatic hyperplasia and or chronic prostatitis

Symptoms	No. of patients	%
Frequency	147	98%
Nocturia	125	90%
Urgency	123	82%
Hesitancy	80	53%
Dysuria	77	51.3%
Poor stream	70	46.7%
Dribbling of urine	33	22%
Pain	33	22%

Other symptoms included pain which presented in patients who had chronic prostatitis such as (suprapubic pain, lower backache, groin and perineal pain) in 22% (Table 3).

These results correlated with those of [11] who reported that the important lower urinary tract symptoms

in men aged between (40-80) years old are frequency 72.7%, nocturia 72.7%, urgency 30%, and dysuria 76.5%, poor stream 54.5%, dribbling of urine 35%.

Bacterial isolation

Bacterial isolates from urine specimens in patients with benign prostatic hyperplasia and or chronic

prostatitis. The results of (150) urine culture revealed that (65) samples had resulted in positive culture for bacteria 43.3% (Table 3.4). (11) samples showed that the prevalence of urinary tract infection in males increases with age, among ages ranging from (36-65) years old, the prevalence is 20% and in more than 65 years group is 35%. Those infections were almost invariably complicated and related to many causes such as prostatic hyperplasia, chronic prostatitis and catheterization.

In this study, *E. coli* was the most common type of bacterial isolates, since it accounted for 14.7%, followed by *Staphylococcus epidermidis* 6%, *Klebsiella pneumoniae* and *Staphylococcus aureus* which represented 4% for each *Acinetobacter* spp. 3.3%, *Enterobacter* and *Pseudomonas aeruginosa* and each of which represented 2.7%, *Proteus mirabilis* 2%. In addition, *Staphylococcus saprophyticus*,

Corynebacterium spp. and *Enterococcus* spp. represented 1.3% each (Table 4).

These results can be compared with the results of [12] who established that complicated UTIs involve a diverse spectrum of microorganisms, but the most common one is *E. coli* which is responsible for more complicated UTIs than any other single organism, it represented approximately (40-55)% of isolates from patients with complicated UTIs. *K. pneumoniae*, *Enterobacter* spp., *Proteus mirabilis* and *Enterococcus* spp. each one represented (5-10) % of isolates. The remaining was due to *P. aeruginosa* and *Staphylococcus* spp.

In addition, [13] noticed that in a survey of UTI pathogens, the top isolate was *E. coli* (48.6%), *Enterococcus* spp. 13.7%, *Klebsiella* spp. (12%), and *Pseudomonas aeruginosa* (6.2%). These results are to some extent comparable to the results of this study. However, [14] found that the common types of isolates in UTI were *Klebsiella* spp.

Table 4 Number and percentage of bacterial isolates from urine specimens in patients with benign prostatic hyperplasia and or chronic prostatitis

Types of bacterial isolates	No. of isolates	%
<i>E. coli</i>	22	14.7%
<i>Staphylococcus epidermidis</i>	9	6%
<i>Klebsiella pneumoniae</i>	6	4%
<i>Staphylococcus aureus</i>	6	4%
<i>Acinetobacter</i> spp.	5	3.3%
<i>Enterobacter</i> spp.	4	2.7%
<i>Pseudomonas aeruginosa</i>	4	2.7%
<i>Proteus mirabilis</i>	3	2%
<i>Staphylococcus saprophiticus</i>	2	1.3%
<i>Enterococcus</i> spp.	2	1.3%
<i>Corynebacterium</i> spp.	2	1.3%
Culture positive	65	43.3%
Culture negative	85	56.7%
Total	150	100%

Effect of some antibiotics on the bacterial isolates

The effect of some antibiotics on isolated bacteria are listed in (Figure 2).

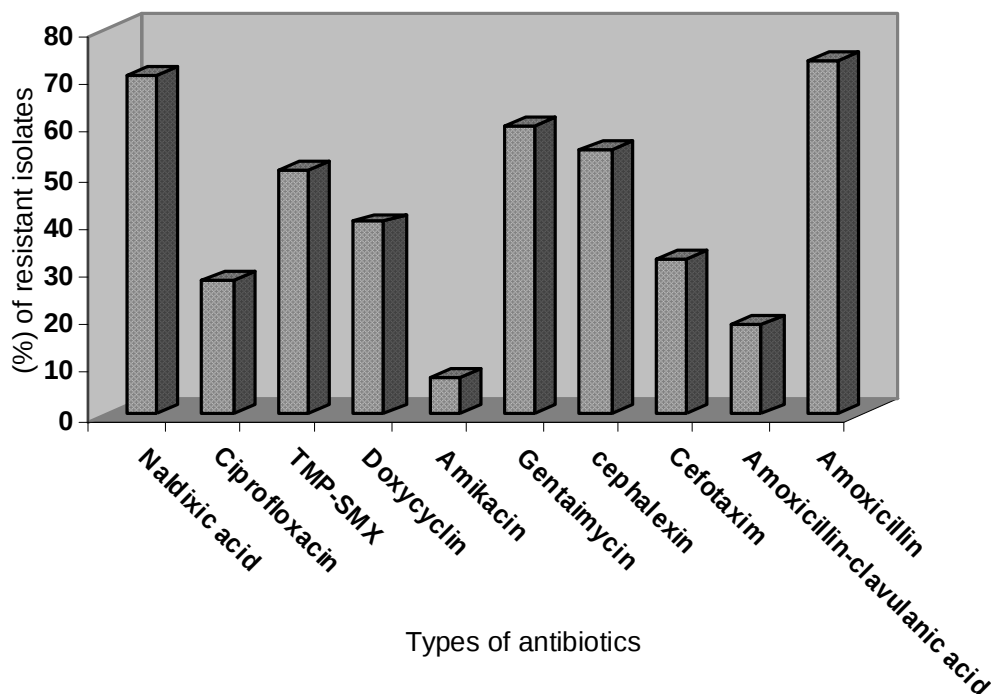


Figure 2 Resistance of bacterial isolates to several antibiotics.

Figure (2) shows that the resistance of isolates to amoxicillin was (73.8%) while to amoxicillin-clavulanic acid was (18.5%). the resistance of isolates to amoxicillin was significantly more than to amoxicillin-clavulanic acid ($p < 0.05$). These results matched those obtained by [12] who pointed that the uropathogens resistance to amoxicillin was as high as to amoxicillin-clavulanic acid. The use of clavulanic acid decreased the resistance of bacteria to β -lactam drugs. The mechanism of this resistance is mostly due to either production of β -lactamases that hydrolyze β -lactam ring which is controlled by plasmid or chromosomal regulation, or lack of penicillin receptors on cell wall and/or alteration in their permeability to β -lactam antibiotics and preventing the uptake of antibiotics by blocking the pores of outer membrane [14]. In addition, [15] explained that over the past decade the utility of this class of

antibiotics for treatment of UTIs and chronic prostatitis decreased due to increasing levels of resistance to β -lactam antibiotics.

Regarding cephalosporins, the resistance of isolates to cephalexin was significantly higher than to cefotaxim ($p < 0.05$) except *K. pneumoniae*, *P. mirabilis* and *Acinetobacter*, (32.3%) of isolates were resistant to cefotaxim. These results matched those of [16] who reported that more than 2/3 patients with various UTIs were sensitive to cefotaxime, and found that only one isolate of *Enterobacter cloacae* was resistant to cefotaxim. Fluoroquinolones resistant isolates especially to ciprofloxacin were (27.7%), these results matched those of [17] who showed that a bacteriological cure rate by ciprofloxacin treatment for UTIs especially for chronic bacterial prostatitis has increased within the recent years

between (70-80) % higher than the resistance of isolates to TMP-SMX (40-71).

The resistance of isolates to gentamycin and amikacin were (60%) and (7.7%) respectively. Resistance of isolates to amikacin was least compared to other antibiotics, (Figure 2). The resistance of isolates to gentamycin was significantly much higher than amikacin except *Enterococcus* spp. ($p < 0.05$), (9.1%) of *E. coli* were resistant to amikacin, while other Enterobacteriaceae, *P. aeruginosa*, *Acinetobacter* spp. were significantly sensitive. results are identical with (18) who noticed that the effectiveness of parenteral amikacin in the treatment of UTI which has a good activity against gram-negative uropathogens.

From previous results we can conclude the following:

1-Benign prostatic hyperplasia affects older age men who are more than 50 years old, while chronic prostatitis affects young men less than 50 years, (BPH may precede CP at the same time).

2-Most patients with benign prostatic hyperplasia and chronic prostatitis are presented with LUTS.

3-The bacterial infection is associated with BPH and or CP including *E. coli*, *K. pneumoniae*, *Enterobacter* spp., *P. mirabilis*, *P. aeruginosa*, *Acinetobacter* spp., *Staphylococcus* spp., *Corynebacterium* spp., and *Enterococcus* spp.

4-The isolates have shown multi-resistance to antibiotics and more sensitive antibiotics in the treatment of patients with benign prostatic hyperplasia with chronic prostatitis or CP are amikacin, amoxicillin-clavulanic acid and ciprofloxacin respectively.

References

- 1-Donovan, J.L., H.E. Kay, T.J. Peters, P.C. Abrams and M.M. Silva. 1997. Lower Urinary tract symptoms in BPH. *J. Br. Urol.* 80 (5): 712-21.
- 2-Saldeen, S.C., 2000; Community study of lower urinary tract symptoms in old males. *Australian J. Surg.* 70(5): 322-8.
- 3- Judith, L.B. 1996. Urinary tract infection in elderly. *J. Am. Sc. Cons. Pharm.* 74(11): 805-19.
- 4- Lipsky, B.X. 2003. Prostatitis and urinary tract infection in men. *J. Am. Med. Urol.* 106 (3): 327-34.
- 5- Graham, J.C. and A.F. Galloway. 2001. The laboratory diagnosis of urinary tract infection. *J. Clin. Microb.* 54:911-19.
- 6- MacFaddin, J.F. 2000. Biochemical test for identification of medical bacteria. 3rded. Williams and Wilkins-Baltimore. PP:321-400.
- 6- Mittal, B.V., F.K. Amin and S.G. Kiner. 1989. Spectrum of histological lesion in 185 consecutive prostatic specimens. *J. Clin. Med.* 35: 157-61.
- 7- Kaplan, S., R.B. Reis and S.G. Stefilamin. 2000. Detrusor contraction duration may predicate response therapy for lower urinary tract symptoms. *J. Eur. Urol. Colombia. Presbyterian Med. Cent.* 37(3): 314-17.
- 8- Huges, A.M., M.J. Saldeen, J.E. Ward and G.H. Hirt. 2000. Community study of uncomplicated lower urinary tract symptoms in Italian immigrants. *J. Eur. Urol.* 37 (2): 191-8.
- 9- Lukacs, B. 2005. Treatment of benign prostatic hyperplasia and lower urinary tract symptoms. *J. Urol.* 33(4): 44-7.
- 10- Steele, G.S., M.P. Sullivan, D.J. Sleep and S.V. Yallav. 2000. Combination of symptoms score, flow rate and prostate volume in bladder outflow obstruction. *J. Urol.* 164(2): 344-8.
- 11- Morten, A.K. 2004. UTI in elderly male. *J. Eur. Urol.* 23: 245-65.
- 12- Romolo, G., L. Facep, M.A. Warcester and B. Gideon. 2004.

Complicated urinary tract infection: Risk stratification, clinical.

13- Jone, A.K. 2005. Etiology of complicated urinary tract infection and laboratory diagnosis. J. Min-Urol-Nephrol. 44(4): 239-44.

14- Thomson, C.J. and S.G. Amyes. 1993. Selection of variants of TEM-1 β -lactamase encoded by a plasmid of clinical origing with increased resistance to β -lactamase inhibitors. J. Antimicrob. Chem. 31: 655-64.

15-Gupta, K., M. Hooton and W. Stamm. 2001. Increasing antimicrobial

resistance and the managment of community-a.

16- Guibert, J.A., C.F. Justin and M.D. Kizis. 1981. Evaluation clinical usage of cefotaxim at various dosage and levels in urinary tract infections. J. Drugs. 10(8): 625-7.

17-Brahler, F.D., W.M. Weidner and G.O. Luding. 1999. Outcome of antibiotic therapy with ciprofloxacin.

18- Dulawa, J., K. Poland and J. Katowice. 2003. Urinary tract infection and metabolic diseases. Ann. Academiae Medicae Bialotocensis. 10(3):45-50.