

## 5-Alpha-reductase inhibitor and benign prostatic hypertrophy; Impact on size

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### Abstract

Benign prostatic hyperplasia is a relatively frequent condition in senior men, particularly those over 50, and is generally defined as a thickening of the prostate gland. Lower urinary tract discomfort might impact 30% of males over the age of 65 in total. This study aimed to evaluate the impact of 5 alpha-reductase inhibitors, alpha-blockers, or combination therapy on prostatic size. With this study, one hundred and four patients with benign prostatic hyperplasia have been recruited from a private clinic in Kirkuk City in the period between 2019 and 2021. A radiologist conducted ultrasound assessments to measure the volume of the prostate in centimetres (cm<sup>3</sup>) both before and, after starting treatment. The follow-up ultrasound was performed two years after initiating the treatment. Prostatic volume has a dramatic decrease in patients on 5 alpha-reductase inhibitor or combination therapy. This change was statistically significant as the p-value was less than 0.05. On the other hand, patients on alpha-blocker therapy have a non-significant decrease in mean prostatic volume. In conclusion, 5 alpha reductase inhibitor when used alone or in combination with alpha blocker agents affects significantly prostatic size.

**Keywords:** Alpha Blocker, Benign prostatic Hyperplasia, Prostatic Volume, 5 Alpha Reductase Inhibitor

### Introduction

Benign prostatic hyperplasia (BPH), a relatively frequent condition in senior men, particularly those over 50, is generally defined as a thickening of the prostate gland (McVary et al., 2011). The terms "benign prostatic obstruction" or "bladder outlet obstruction" are used when a histological increase in the size of the prostate results in lower urinary tract symptoms (Luo et

al., 2013). Lower urinary tract discomfort might impact 30% of males over the age of 65 in total (Allkanjari & Vitalone, 2015). LUTS in men can be divided into voiding and storage symptoms (Anderson et al., 2001). Storage complaints are typically the result of the bladder reacting to a blockage. Those include urgency, frequency, and nocturia, which might be symptoms of an irritated or hyperactive bladder (Anderson et al., 2001; Gacci et al., 2015; Vuichoud & Loughlin, 2015). Hesitancy, sluggish flow, intermittency, and the impression of incomplete urination are symptomatic of voiding and frequently point to a blocked bladder outlet, however, they can also be brought on by a hypo-contractile bladder (Patel & Parsons, 2014; Gacci et al., 2015; Vuichoud & Loughlin, 2015). The disease involves a significant number of men beyond the age of 40 years old and its frequency rises progressively with age so that 90% of men in their 80s get affected (Kwon et al., 2013). Most frequently, transitional zone hyperplasia of the prostate affects the two types of glandular and stromal tissue (Lee et al., 2010). A few histological characteristics of BPH will probably occur in those who live for prolonged periods (Lee et al., 2010; Lewis et al., 2019). Even though there is a considerable link between BPH and LUTS, not all men with histological BPH evidence have severe LUTS (Vickman et al., 2020). In actuality, watchful waiting is used when the BPH symptoms are mild to moderate but not bothersome, and a treatment plan is used when the symptoms are moderate to severe and are upsetting the patient (Parsons, 2010). There are two possible types of BPH treatment plans medication and surgical. The doctor and patient mutually agree on the treatment plan after determining the patient's needs (Djavan et al., 2004).

### **Martial and methods**

In the present study, one hundred and four patients with benign prostatic hyperplasia have been recruited from a private clinic in Kirkuk City in the period between 2019 and 2021. The study participants were male and over 50 years of age. Those with previous prostatic or urological surgery had been excluded from the study. The participants in the study have been divided into three groups based on their treatment regimen. The first group consists of patients on 5 alpha-reductase inhibitor therapy, the second group includes those on alpha-blocker therapy, and the third group comprises patients receiving combination therapy involving both 5 alpha-reductase inhibitors and alpha-blocker medications. Prostatic volume by cm<sup>3</sup> had been evaluated using ultrasound by a single radiologist before and after commencing treatment after 2 years.

Data analysis was performed through the Statistical Package for the Social Sciences (SPSS) version 26. Quantitative continuous variables were presented as mean, median, and standard

deviation. Categorical nominal and ordinal variables were introduced in the form of frequencies and percentages.

In accordance with the Declaration of Helsinki, the study methodology was approved, and patient consent was obtained prior to accessing and reviewing their medical records.

## Results

A total of 104 participants diagnosed with benign prostatic hyperplasia were included in this study; 67 of them in group A were on combination therapy, 22 of them in group B were on 5 alpha-reductase inhibitor and 15 patients in group C were on alpha-blocker therapy.

The mean age of the participants group was  $64.74 \pm 9.7$ . There were no statistical differences between the three groups in terms of age as the p-value was 0.895. When it comes to measuring the size of the prostate using ultrasound we noticed that Group B had a higher volume compared to the other groups. However, this difference was not significant among the three groups Table (1).

**Table 1.** Demographic information of participants.

Demographic data	Group A	Group B	Group C	p-value
Patients number(%)	67 (64.4%)	22 (21.15%)	15 (14.42%)	
Age (years)	$65.01 \pm 11.2$	$66.81 \pm 9.6$	$62.4 \pm 10.5$	0.395
Prostatic volume (cm <sup>3</sup> )	$38.98 \pm 8.7$	$39.92 \pm 11.2$	$39.36 \pm 9.6$	0.868

In terms of prostatic volume after 2 years of commencing therapy has a dramatic decrease in both groups A and B as it dropped to  $28.31 \pm 7.1$  and  $30.39 \pm 9.5$  respectively. This change was statistically significant as the p-value was less than 0.05. On the other hand, patients on alpha-blocker therapy had a decrease in mean prostatic volume to  $35.01 \pm 11.4$ ; this change was not statistically significant (p-value = 0.156) Table (2).

**Table 2.** Prostatic volume cm<sup>3</sup>.

Group A	Group B	Group C	p-value
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<b>At presentation</b>	38.98 ± 8.7	39.92 ± 11.2	39.36 ± 9.6	0868
<b>After 2 years</b>	28.31 ± 7.1	30.39 ± 9.5	35.01 ± 11.4	0.003
<b>p-value</b>	<0.001	0.001	0.156	

## Discussion

Lower urinary tract symptoms are accompanied by prostate enlargement in BPH, a progressive disorder (Parsons, 2010). Compared to similar androgen-dependent organs, the prostate retains its capacity to react to androgens across life (Djavan et al., 2004). This study evaluated the effect of medical drug therapy on prostatic size. This study came out with the result that patients on 5 alpha-reductase inhibitors had a significant decrease in prostatic size over 2 years of follow-up. This result agrees with Boyle et al. (Boyle et al., 1996), and Roehrborn et al. (Roehrborn et al., 2002), those researchers concluded that patients on 5 alpha-reductase inhibitor needed less surgical approach in the treatment of benign prostatic hypertrophy and considered those medications as safe options in terms of management. On the other hand. This study demonstrated the effect of combination therapy on prostatic volume as there was a significant decrease in its volume. This agrees with Roehrborn et al. (Roehrborn, 2006), Crawford et al. (Crawford et al., 2006), and the Roehrborn et al. study (Roehrborn et al., 2010); none of these studies showed the superiority of combination therapy over monotherapy. In terms of using alpha-blockers, this study showed that there was a non-significant decrease in prostatic size. This result agrees with Herbert et al. (Lepor, 2016), and it can be explained by the fact that alpha blockers main mechanism of action is smooth muscle relaxation with a significant decrease in lower urinary tract symptoms via smooth muscle relaxation. Both the European Association of Urology (EAU) and the American Urologic Association (AUA) prominently include 5-ARIs in their recommendations for handling BPH in light of the numerous research proving the clinical usefulness of 5-ARIs in the therapeutic management of BPH. The EAU recommends using 5-ARIs with alpha-blockers for men who have moderate to severe LUTS and enlarged prostates (>40 g), and it recommends using 5-ARIs alone for men who are likely to see disease progression (McNeill et al., 2005; Hellstrom & Sikka, 2006). There are several limitations of this study, the patients have been recruited from the clinic but it was of small size. The second issue was using lower urinary tract symptoms has not been evaluated in this study.

## Conclusion

The study findings indicate that both 5 alpha-reductase inhibitors and combination therapy have an effect in reducing the size of the prostate. However, the study did not demonstrate a significant effect on prostatic volume reduction when using alpha blockers alone.

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