https://doi.org/10.15218/zjms.2024.033

Efficacy, safety, and adverse effects of finasteride and dutasteride in treating benign prostatic hyperplasia: A retrospective cohort study

Received: 25/09/2022 Accepted: 04/12/2022

Wishyar Jamal Al-Bazzaz [1*]

Abstract

Background and objective: Symptomatic benign prostatic hyperplasia (BPH) results in several symptoms including the lower urinary tract symptoms. Consequently, BPH may affect the bladder and finally the kidneys. There are various pharmacological options for the treatment of BPH including 5-Alpha Reductase Inhibitors (5-ARIs) (finasteride or dutasteride). Recent researchers have demonstrated that using 5-ARIs for treating BPH may have unfavorable adverse effects. Therefore, this study aimed to compare finasteride and dutasteride in terms of their efficacy, safety, and adverse effects.

Methods: This retrospective cohort study included 170 patients, 77 patients who received finasteride and 93 patients who received dutasteride, the data obtained retrospectively from medical databases and file sheets were reviewed and selected according to inclusion and exclusion criteria followed by the comparison between two groups regarding baseline characteristics, prostate volume and the incidence of adverse effects.

Results: Similarity observed between two groups at baseline characteristics. Statistically, no significant differences were identified between dutasteride and finasteride in the reduction of prostate volume. However, dutasteride and finasteride significantly reduced prostate volume at 1-year follow-up. No significant differences were observed between two agents regarding the incidence of adverse effects.

Conclusion: Finasteride and dutasteride improved lower urinary tract symptoms (LUTS) at one-year follow-up by reducing prostate volume. The incidence rate of adverse effects for finasteride and dutasteride was similar over one year.

Keywords: Adverse; Benign prostatic hyperplasia; Dutasteride; Finasteride; Volume.

Introduction

Benign prostatic hyperplasia (BPH), is a common disease in men, it is a nonmalignant proliferation of smooth muscle and epithelial cells also known as benign prostate enlargement (BPE).[1] Clinically, BPH is known as prostate adenoma/adenomata and results in several symptoms including nocturia, frequency, urinary retention, urgency, straining to urinate, and a weak urinary stream (referred as to lower urinary tract symptoms) that may affect the bladder and finally the kidneys.[2] These verity of symptoms increases with age and lower quality of life, in untreated cases.[3]

Aside from non-pharmacological treatments (surgical procedures), currently, there are various pharmacological options for the treatment of BPH, including; alpha-blockers, 5-alpha reductase inhibitors, phosphodiesterase inhibitors, anticholinergics, beta-3 agonists, or combination therapy.[1,4-9]

Alpha-adrenoreceptor antagonists (ABs) and 5 α-reductase inhibitors (commonly abbreviated to as 5-ARIs), either alone or in combination, are the first-line pharmaceutical therapy for treating moderate-to-severe LUTS-associated BPH.[10] Finasteride and dutasteride are two commercially available, clinically

[1] Department of Urology, Rizgary Teaching Hospital, Ministry of Health, Erbil, Iraq.
Correspondence: dr.wishyaralbazzaz@gmail.com

https://doi.org/10.15218/zjms.2024.033

authorized 4-aza steroid competitive inhibitors that work by inhibiting the 5 α-reductase (5-AR) which is responsible for converting testosterone to dihydrotestosterone (DHT).[11] Thus, Finasteride and dutasteride reduce prostate volume byblocking the conversion of testosterone to DHT.[12-14]

Finasteride selectively inhibits the Type 2 isoenzyme of (5-AR) whereas dutasteride inhibits both Type 1 and Type 2 (5-AR).[15,16] Theoretically, dutasteride induces a greater reduction in DHT hormone than finasteride, as it targets Type 1 and Type 2 (5-AR).[16] However, finasteride is most efficient in men with enlarged prostates and the most rigorous symptoms and is also permitted for the treatment of male-pattern hair loss (androgenetic alopecia) and vertex baldness at a low dose (1 mg).[17,18] Additionally, the most recent clinical trials discovered that the side effects of dutasteride, primarily erectile dysfunction, ejaculation disorder, and decreased libido, limited the drug's efficacy.[19] Information on the side effects (sexual function, Gynecomastia, depression, and quality of life) of finasteride and dutasteride is still contradictory.[19-21] This study aimed to compare the effectiveness, safety, and side effects of finasteride and dutasteride, in patients with BPH.

The objective is to evaluate the efficacy, safety, and adverse effects of (0.5 mg) dutasteride and (5 mg) finasteride for treating BPH patients in Erbil city.

Methods

Study design and data collection:

This retrospective cohort study was performed in Erbil city- Iraq. The medical databases and case files from (Jan 2019) to (Mar 2022) were used for collecting data retrospectively which was followed by reviewing and comparing between two groups (patients who received finasteride were considered as group 1,and patients who received dutasteride were considered as group 2). This study included 170 patients, 77 patients in group 1 and 93 patients in group 2, who were diagnosed with BPH and visited the clinic at 3, 6, 9, and 12-month follow-ups.

Inclusion criteria: Inclusion criteria were based on the age at baseline, history, physical examination, laboratory investigations, and International prostate symptom score (IPSS). Patients with a follow-up history of 12 months were included in this study, their age range was between (45-75 years), their prostate volume was (≥30 cm^3), an international prostate symptom score (IPSS) of (8-30), postvoid residual assessment (PRA) <125 mL, maximal flow rate (Qmax) < 15 mL/s, and prostate-specific antigen (PSA) <4.0 ng/ml.

Exclusion criteria: patients with confirmed prostate carcinoma, neurogenic bladder disorders, renal failure, bladder calculi, orurethral stenosis. Prostate volume was chosen as the study's main outcome. Therefore, prostate volume, clinical symptoms, and IPSS measured at the first screening visit, 3, 6, and 12-month follow-up for all patients in both groups. This study also addressed adverse effects at the last follow-up (1 year) including sexual function disorder, loss of libido, impotence, ejaculation disorders, gynaecomastia, hypertension, prostate surgery, and prostate cancer.

Statistical analysis: We used software package of social science SPSS version 25 (IBM Corp., Armonk, NY, USA), for the statistical analysis. The results of the present study were given as a percentage and/or mean ± standard deviation. Unpaired t-test and Chi-square test were used, and the *P*-values of ≤ 0.05 was considered to indicate statistical significance.

Results

Overall, retrospectively data collected from medical records for 170 patients with BPH who either received finasteride (n = 77) or dutasteride (n = 93), patient characteristics at baseline were similar between the two groups and there were no statistically

https://doi.org/10.15218/zjms.2024.033

significant differences observed regarding age, prostate volume, IPSS, QoLS, Qmax, PVR and PSA, as shown in Table 1.

The mean of prostate volume at the first screening visit was (60.51 ml) and (62.44 ml) in the finasteride and dutasteride group, respectively. The finasteride and dutasteride significantly reduced prostate volume in treated patients with BPH, in one -year follow-up as shown in Table 2.

Table 1 Characteristics of both groups at the first visit

Characteristics	Group 1 (n = 77) Mean (SD)	Group 2 (n = 93) Mean (SD)	*P*-value
Age (year)	59.42 (8.96) 45-80	62.67 (8.01) 50-80	0.302
Prostate size (ml)	60.51(9.10) 45-75	62.44 (7.76) 50-75	0.095
IPSS (score)	19.09 (6.84) 8-30	19.45 (6.55) 8-30	0.341
PVR (Ml)	90.31 (23.21) 50-130	103.44 (27.95) 60-150	0.068
PSA (ng/ml)	3.28 (0.43) 2.5-4	3.21 (0.45) 2.5-4	0.403

SD = Standard Deviation, IPSS = international prostate symptom score, Qmax = maximal flow rate, PVR = postvoid residual assessment, and PSA = prostate-specific antigen. Unpaired t-test was used.

Table 2 The effectiveness of finasteride and dutasteride in the reduction of prostate volume

Group		Baseline	12 months	Difference	*P*-value
Drug	N	Mean (SD)	Mean (SD)		
Finasteride	77	60.51 (9.10)	33.46 (5.33)	-27.050	< 0.0001
Dutasteride	93	62.44 (7.76)	30.90 (4.59)	-31.540	< 0.0001

SD = Standard Deviation.

https://doi.org/10.15218/zjms.2024.033

According to the results presented in Table 3, there was no significant differences between the two groups in term of prostate volume at baseline and reducing prostate volume in studied periods (3, 6, and 12-month follow-up).
This study also investigated the incidence rate of adverse effects in both groups and compared them as shown in Table 4.

Differences were observed between the two groups in terms of sexual function disorder, loss of libido, impotence, ejaculation disorders, gynaecomastia, hypertension, prostate cancer. However, statistically, no significant differences were observed between the two groups regarding the incidence rate of adverse effects.

Table 3 Mean prostate volume of the two study groups at different times of the study

	Prostate volume		
Time of tests	**Finasteride (n = 77) Mean (SD)**	**Dutasteride (n = 93) Mean (SD)**	***P*-value**
Baseline	60.51 (9.10)	62.44 (7.76)	0.095
3 months	51.53 (5.55)	50.35 (6.19)	0.125
6 months	45.19 (5.80)	41.18 (5.81)	0.626
12 months	33.46 (5.33)	30.90 (4.59)	0.122

SD = Standard Deviation. Unpaired t-test used.

Table 4 The incidence of adverse effects in both groups, 1-year follow-up

Adverse effects	**Finasteride (n = 77) No. (%)**	**Dutasteride (n = 93) No. (%)**	***P*-value***
Sexual function disorder	8 (10.3%)	6 (6.45%)	0.353
Loss of libido	5 (6.49%)	4 (4.30%)	0.525
Impotence	6 (7.79%)	5 (5.37%)	0.524
Ejaculation disorders	3 (3.89%)	2 (2.15 %)	0.503
Gynaecomastia	1 (1.29%)	0 (0%)	0.270
Hypertension	1 (1.29%)	1 (1.07 %)	0.893
Prostate surgery	3 (3.89%)	2 (2.15%)	0.503
Prostate cancer	2 (2.59%)	1 (1.07 %)	0.453

*By Chi-square test.

https://doi.org/10.15218/zjms.2024.033

Discussion

It is challenging to evaluate outcomes for various treatments in real-life conditions because observational studies to date have tended to concentrate on individual therapy.[22] Comparative large-scale studies are therefore required to assess the variety of treatments used to treat LUTS/BPH in everyday practice and to enable treatment results to be compared. For this purpose, the present study aimed to compare (0.5 mg) dutasteride and (5 mg) finasteride in terms of their efficacy, safety, and adverse effects among treated patients with LUTS-associated BPH at the period of 1-year follow-up.

The significant improvements observed in both groups regarding the prostate volume compared to the baseline characteristics and prostate volume at 3, 6, and 12-month follow-ups. However, similar reductions in prostate volume were achieved by dutasteride and finasteride therapy, and no significant differences were observed between the two groups. This finding is inline with the findings of a previous study.[23] However, this finding disagrees with earlier meta analysis findings that suggested dutasteride would be more effective than finasteride in clinically improving Qmax in BPH patients.[24]

Recent researchers have demonstrated that using 5-ARI for treating BPH may have unfavorable adverse effects, including erectile dysfunction, ejaculation disorder, and decreased libido, and impotence.[25-27] Additionally, research on both humans and animals suggests that the central effect of 5-ARI, specifically its capacity to inhibit the levels of some CNS neurosteroids likely involved in the regulation of sexual desire and erection, may play a role in the onset of undesirable sexual effects following treatment.[28,29]

However, the recommendation of these medications (5-ARI) is still regarded as the optimum course of treatment for BPH despite all the adverse effects documented in the literature.[25,30]

Theoretically, dutasteride induces a greater reduction in DHT hormone than finasteride, as it targets Type 1 and Type 2 (5-AR).[16] The present study found no significant differences between the two groups regarding the incidence rate of adverse effects at 1-year follow-up. Corresponding results were reported by.[31,32] Therefore, higher DHT reduction from inhibiting both types (type 1 and 2) of 5-AR than from inhibiting just type 2 of 5-AR does not increase adverse outcomes. According to a systematic review and meta-analysis study, dutasteride and finasteride appear to have comparable rates of side effects, particularly in terms of sexual adverse events.[33]

The present study compared dutasteride and finasteride in a 1-year period of follow-up which may limit the ability to detect significant differences between the two groups due to the long-term, progressive nature of BPH. Regarding the clinical trials, LUTS-associated BPH continues to improve over time by 5-ARI.[34]

Conclusion

The results of this study demonstrate that there were no significant differences between finasteride (group 1) and dutasteride (group 2) regarding the reduction of prostate volume and improvement of LUTS-associated BPH at one-year follow-up. Additionally, the incidence rate of adverse effects between the two groups was similar over one year.

Funding

Not applicable.

Competing interests

The authors declare that they have no competing interests.

References

1. Bortnick E, Brown C, Simma-Chiang V, Kaplan SAJ. Modern best practice in the management of benign prostatic hyperplasia in the elderly. Ther Adv Urol 2020; 12:17. doi: 10.1177/1756287220929486.
2. Foo KTJ. What is a disease? What is the disease clinical benign prostatic hyperplasia (BPH)?

World J Urol 2019; 37(7):1293–6. doi: 10.1007/s00345-019-02691-0
3. Heidari M, Hadi AJ. Relationship between Serum Level of Vitamin D in patients with BPH compared to healthy people in age group over 45. Pak J Med Health Sci 2020; 14(2):1376–80.
4. Kim EH, Brockman JA, Andriole GLJ. The use of 5 -alpha reductase inhibitors in the treatment of benign prostatic hyperplasia. Asian J Urol 2018; 5(1):28–32. doi: 10.1016/j.ajur.2017.11.005
5. Nettleton J, Jones P, Pietropaolo A, Geraghty R, Rai B, Drake M, et al. The industrial revolution for the management of benign prostate obstruction: worldwide publication trends for surgical and medical therapies over the past two decades. Cent European J Urol 2019; 72(2):149. doi: 10.5173/ceju.2019.1876
6. Bauer SR, Harrison SL, Cawthon PM, Senders A, Kenfield SA, Suskind AM, et al. Longitudinal Changes in Adiposity and Lower Urinary Tract Symptoms Among Older Men. J Gerontol A Biol Sci Med Sci 2021. doi: 10.1093/gerona/glab227
7. Fogaing C, Alsulihem A, Campeau L, Corcos JJM. Is early surgical treatment for benign prostatic hyperplasia preferable to prolonged medical therapy: pros and cons. Medicina 2021; 57(4):368. doi: 10.3390/medicina57040368
8. Lokeshwar SD, Harper BT, Webb E, Jordan A, Dykes TA, Neal DE, et al. Epidemiology and treatment modalities for the management of benign prostatic hyperplasia. Trans androl urol 2019; 8(5):529. doi: 10.21037/tau.2019.10.01
9. Pisco JM, Bilhim T, Pinheiro LC, Fernandes L, Pereira J, Costa NV, et al. Medium-and long-term outcome of prostate artery embolization for patients with benign prostatic hyperplasia: results in 630 patients. J Vasc Interv Radiol 2016; 27(8):1115–22. doi: 10.1016/j.jvir.2016.04.001
10. Kaplan SAJ. The Effects of Dutasteride and Finasteride on BPH-Related Hospitalization, Surgery and Prostate Cancer Diagnosis: A Record-Linkage Analysis. World Jurol 2014; 192(5):1493. doi: 10.1007/s00345-012-1000-4
11. Dhingra N. Steroidal 5α-Reductase: A Therapeutic Target for Prostate Disorders. Oxidoreductase: Intech Open. Intech Open 2021. doi: 10.5772/intechopen.95809
12. Nemane ST, Bhusnure OG, Gholve SB, Mitakari PR, Karwa PNJ. Therapeutics. A Review on Finasteride: A 5-Alpha Reductase Inhibitors, its Mechanism, Facts and Benefits. J Drug Del Thera 2019; 9(3-s):1132–6. doi: 10.22270/jddt.v9i3-s.3013
13. Drobnis EZ, Nangia AK. 5α-Reductase inhibitors (5ARIs) and male reproduction. Impacts of Medications on Male Fertility. Adv Exp Med Biol 2017; 1034:59–61. doi: 10.1007/978-3-319-69535-8_7
14. Deng T, Lin X, Duan X, He Z, Zhao Z, Zeng GJP. Prostate cancer patients can benefit from 5-alpha -reductase inhibitor treatment: a meta-analysis. Peer J 2020; 8:e9282. doi: 10.7717/peerj.9282
15. Banerjee PP, Banerjee S, Brown TR, Zirkin BRJ. Androgen action in prostate function and disease. Am J Clin Exp Urol 2018; 6(2):62. PMID: 29666834
16. Zhou Z, Cui Y, Wu J, Jin HJE, Medicine T. Efficacy and safety of dutasteride compared with finasteride in treating males with benign prostatic hyperplasia: A meta‐analysis of randomized controlled trials. Ex Ther Med 2020; 20(2):1566–74. doi: 10.3892/etm.2020.8851
17. Aminova MJT. Can Androgenetic Alopecia be Reversed and What Are the Effective Treatments? The Science Journal of the Lander College of Arts and Sciences 2022; 15(2):27–35.
18. Fu Y, Han S, Wang L, Gao W, Wu E, Cao X, et al. Comparison of characteristics of benign prostatic hyperplasia (BPH) patients treated with finasteride and alpha blocker combination therapy versus alpha blocker monotherapy in China: an analysis of electronic medical record data. Adv Ther 2018; 35(8):1191–8. doi: 10.1007/s12325-018-0748-3
19. Kiguradze T, Temps WH, Yarnold PR, Cashy J, Brannigan RE, Nardone B, et al. Persistent erectile dysfunction in men exposed to the 5α-reductase inhibitors, finasteride, or dutasteride. Peer J 2017; 5:e3020. doi: 10.7717/peerj.3020
20. Saengmearnuparp T, Lojanapiwat B, Chattipakorn N, Chattipakorn SJB, Pharmacotherapy. The connection of 5-alpha reductase inhibitors to the development of depression. Biomed Pharmacother 2021; 143:112100. doi: 10.1016/j.biopha.2021.112100
21. Traish AM, Hassani J, Guay AT, Zitzmann M, Hansen MLJT. Adverse side effects of 5α-reductase inhibitors therapy: persistent diminished libido and erectile dysfunction and depression in a subset of patients. J Sex Med 2011; 8(3):872–84. doi: 10.1111/j.1743-6109.2010.02157.x
22. Alcaraz A, Carballido-Rodríguez J, Unda-Urzaiz M, Medina-López R, Ruiz-Cerdá JL, Rodríguez-Rubio F, et al. Quality of life in patients with lower urinary tract symptoms associated with BPH: change over time in real-life practice according to treatment—the QUALIPROST study. Int Urol nephrol 2016; 48(5):645–56. doi: 10.1007/s11255-015-1206-7
23. Kaplan SAJ. Comparison of dutasteride and finasteride for treating benign prostatic hyperplasia: the Enlarged Prostate International Comparator Study (EPICS). J Urol 2012; 187(2):584–5. doi: 10.1016/j.juro.2011.10.106
24. Li Y, Ma J, Qin X-H, Hu C-Y. The efficacy and safety of dutasteride and finasteride in patients with benign prostatic hyperplasia: a systematic review and meta-analysis. Transl Androl Urol 2022; 11(3):313. doi: 10.21037/tau-22-58
25. Silva MHA, Souza JA. Vulnerability of patients with prostatic hyperplasia treated with dutasteride and finasteride. Revista Bio 2021; 29:394–400. doi: 10.1590/1983-80422021292477.

26. Nguyen D-D, Marchese M, Cone EB, Paciotti M, Basaria S, Bhojani N, et al. Investigation of suicidality and psychological adverse events in patients treated with finasteride. JAMA dermatol 2021; 157(1):35–42. doi: 10.1001/jamadermatol.2020.3385
27. Andrade CJT. Why odds ratios can be tricky statistics: the case of finasteride, dutasteride, and sexual dysfunction. J Clin Psychiatry 2018; 79(6):22473. doi: 10.4088/JCP.18f12641
28. Giatti S, Foglio B, Romano S, Pesaresi M, Panzica G, Garcia-Segura LM, et al. Effects of subchronic finasteride treatment and withdrawal on neuroactive steroid levels and their receptors in the male rat brain. Neuroendocrinology 2016; 103(6):746–57. doi: 10.1159/000442982
29. Favilla V, Cimino S, Alessio P, Volti GL, Russo G, Trovato F, et al. Neuroactive steroid levels in cerebrospinal fluid of patients treated with dutasteride: A case-control study. Europ Urol Suppl 2019; 18(1):e252. doi: 10.1016/S1569-9056(19)33588-2
30. Barkin JJ. Benign prostatic hyperplasia and lower urinary tract symptoms: evidence and approaches for best case management. Can J Urol 2011; 18(1):14. PMID: 21501546.
31. Nickel JC, Gilling P, Tammela TL, Morrill B, Wilson TH, Rittmaster RS. Comparison of dutasteride and finasteride for treating benign prostatic hyperplasia: the Enlarged Prostate International Comparator Study (EPICS). BJU Int 2011; 108(3):388–94.doi: 10.1111/j.1464-410X.2011.10195.x
32. Favilla V, Russo GI, Privitera S, Castelli T, Giardina R, Calogero AE, et al. Impact of combination therapy 5-alpha reductase inhibitors (5-ARI) plus alpha-blockers (AB) on erectile dysfunction and decrease of libido in patients with LUTS/BPH: a systematic review with meta-analysis. Aging Male 2016; 19(3):175–81. doi: 10.1080/13685538.2016.1195361
33. Zhou Z, Song S, Gao Z, Wu J, Ma J, Cui YJCiia. The efficacy and safety of dutasteride compared with finasteride in treating men with androgenetic alopecia: a systematic review and meta-analysis. Clin Interven Aging 2019; 14:399. doi: 10.2147/CIA.S192435
34. Roehrborn CG, Siami P, Barkin J, Damião R, Major-Walker K, Nandy I, et al. The effects of combination therapy with dutasteride and tamsulosin on clinical outcomes in men with symptomatic benign prostatic hyperplasia: 4-year results from the CombAT study. Euro Urol 2010; 57(1):123–31. doi: 10.1016/j.eururo.2009.09.035