Received: 9 December 2020 | Revised: 12 March 2021 | Accepted: 16 April 2021

DOI: 10.1111/ijcp.14250

ORIGINAL PAPER

Therapy Area: Urology

THE INTERNATIONAL JOURNAL OF CLINICAL PRACTICE WILEY

Real-world therapeutic management and evolution of patients with benign prostatic hyperplasia in primary care and urology in Spain

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Funding information
This study was funded by GlaxoSmithKline (GSK study number: 208444). The funder was involved in the study design, data collection, data analysis, manuscript preparation and decision to publish.

Abstract

Objectives: This study aimed to describe the real-world therapeutic management of patients with lower urinary tract symptoms (LUTS) due to benign prostatic hyperplasia (BPH) (LUTS/BPH) attending primary care and urology clinics in Spain.

Methods: This observational, retrospective, multicentre study included men ≥50 years of age diagnosed with LUTS/BPH (≤8 years prior to study visit) (N = 670). Therapeutic management according to healthcare service (primary care vs. urology clinics) or progression criteria, proportion of patients with treatment change, patient profile according to therapy and evolution of LUTS severity were assessed.

Results: Overall differences were noticed in the management of patients between healthcare service ($P < .001$) and with or without progression criteria ($P < .05$). Most patients received pharmacological treatment at diagnosis (70.7%; 474/670), which increased at study visit (81.6%; 547/670) with overall similar profiles between primary care and urology clinics for each therapy. α1-Blockers were the most used pharmacological treatment across healthcare settings at diagnosis (61.8%; 293/474) and study visit (51%; 279/547). Only 27.1% (57/210) of patients with progression criteria at diagnosis and 35.6% (99/278) at study visit received 5α-reductase inhibitor (5ARI) alone or in combination with a α1-blocker. Overall, most patients did not change treatment (60%; 402/670) with a trend of more patients worsening in symptoms when not receiving α1-blocker plus 5ARI combination therapy.

Conclusion: Most patients with LUTS/BPH received pharmacological treatment; however, most men with progression criteria did not receive a 5ARI alone or in combination. These results support the need to reinforce both primary care and urologists existing clinical guideline recommendations for the appropriate medical management of patients with LUTS/BPH.

1 | INTRODUCTION

Benign prostatic hyperplasia (BPH) is a progressive, non-malignant overgrowth of the prostate gland and the most common cause of lower urinary tract symptoms (LUTS) in ageing men.[1-4] The prevalence of BPH increases with age, affecting >50% of men ≥50 years of age,[5,6] and is a significant burden on health-related quality of life (QoL) worldwide and in Spain.[2,4,7,8] BPH may lead to long-term complications, such as acute urinary retention or the requirement for surgery.[9] The progressive nature of BPH and the growth of the ageing population imposes a considerable socio-economic burden with regard to the treatment of BPH.[10,11] The main aims of BPH therapy are to improve QoL and LUTS and minimise disease progression.[7,12,13] Therapy choice should depend on the severity of LUTS, risk of progression, the type of symptoms, how bothersome they are and patient preference.[8,13-15]

Clinical guidelines provide specific recommendations for management of mild-to-moderate and moderate-to-severe LUTS due to BPH (LUTS/BPH).[8,13,16,17] For men with mild-to-moderate and nonbothersome LUTS/BPH, which do not warrant pharmacological or surgical intervention, are generally subject to watchful waiting. The recommended first-line treatment for patients with moderate-to-severe LUTS/BPH criteria is monotherapy with α1-blockers due to their rapid onset of action. Muscarinic receptor antagonists may be used for this group of patients presenting bladder storage symptoms and phosphodiesterase 5 inhibitors (PDE5Is) in individuals with or without erectile dysfunction. Combination therapy with an α1-blocker and a muscarinic receptor antagonist may be used in patients with moderate-to-severe LUTS/BPH if monotherapy with either agent did not relieve storage symptoms. For patients with moderate-to-severe LUTS/BPH at risk of disease progression (eg, prostate volume >40 mL or prostate-specific antigen [PSA] >1.4-1.6 ng/mL), 5α-reductase inhibitor (5ARI) monotherapy or combination therapy with an α1-blocker is recommended where long-term treatment (>12 months) is intended. Surgical treatment is reserved for patients with bothersome moderate-to-severe LUTS/BPH who do not respond to pharmacological therapy. Phytotherapy has a history of use in treating LUTS/BPH; however, the European Association of Urology does not provide a specific recommendation on their use due to the lack of efficacy data and in vivo effects of these compounds.[8]

Primary care is expected to have an increasingly important role in the management of LUTS/BPH.[10,11,13,18] With this in mind, a joint consensus document has been developed between primary care and urology clinic settings in Spain, presenting evidence-based best practice recommendations for the appropriate management and referral of patients with LUTS/BPH between healthcare services.[15,17] The therapeutic management of BPH may vary depending on the healthcare service attended; complex patients may require specialist care, and patients managed in urology services may have different treatment trajectories to those managed in primary care.[10] To identify the areas for improvement and optimise efficiency of BPH management in Spain, comprehensive knowledge of the current BPH treatment landscape is key. However, there are a lack of available data describing the real-world management of patients with BPH in both primary care and urology clinic settings.

What's known

- Clinical guidelines for the management of lower urinary tract symptoms (LUTS) due to benign prostatic hyperplasia (BPH) are well established for levels of symptom severity.
- Primary care is expected to have an increasingly important role in disease management, and consensus guidelines outline best practice for referrals between healthcare services.
- In Spain, BPH management may differ between healthcare settings, and adherence to clinical guidelines has not been widely investigated.

What's new

- The overall management of BPH in Spain differed between primary care and urology clinics. However, treatment patterns were largely dependent on symptom severity, rather than healthcare service.
- In both healthcare settings, most patients with progression criteria were not receiving treatment with a disease-modifying 5ARI (either as monotherapy or in combination with an α1-blocker) as per clinical guidelines. This may represent undertreatment of men with LUTS due to BPH in Spain.

A study (208 444) investigating the real-world demographic and clinical characteristics of patients attending primary care and urology clinics in Spain observed that the characteristics of patients with BPH were largely similar between healthcare services.[19] However, it was also noted that methods of LUTS evaluation and BPH diagnosis were not fully aligned with guideline recommendations, with differences discerned between healthcare settings.[19] Here, we present additional secondary endpoints from Study 208 444 with the aim of describing the real-world therapeutic management of patients with LUTS/BPH attending primary care and urology clinics in Spain. Also, the relationship between therapeutic management and patient clinical characteristics, including progression criteria, and the evolution of symptom severity and treatment over time were assessed.

2 | METHODS

2.1 | Study design

This was an observational, retrospective, multicentre study (208444) carried out in primary care and urology clinics in Spain. The study

design has been described previously.[19] Briefly, data from LUTS/BPH diagnosis and last follow-up visits were collected from patient healthcare records by 52 primary care physicians and 36 urologists who met feasibility criteria. Data were collected from May 2018 to September 2018, and data from May 2010 to September 2018 were analysed. Additionally, patients completed the eight-item International Prostate Symptom Score (IPSS) questionnaire at the time of study inclusion (ie, at the study visit) as described previously.[19] The management and provision of clinical data were performed by IQVIA.

The study protocol and procedures were reviewed and approved prior to study commencement by an Independent Review Board and Ethics Committee (CElm del Hospital Universitario Severo Ochoa, Madrid, Spain). Classification from the Spanish Agency of Medicines and Medical Devices was obtained.[20] Written informed consent was provided by each patient prior to study participation.

2.2 | Patient population

Male patients ≥50 years of age diagnosed with LUTS/BPH ≤ 8 years prior to the study visit were included. Full details on eligibility and exclusion criteria, diagnostic tests, and demographic and clinical characteristics have been described previously.[19] Data regarding clinical diagnosis of LUTS/BPH and past follow-up visits (including PSA determination) had to be available in the patient's health record. Patients attending the clinic (for any reason) who met the study eligibility criteria were also recruited, resulting in a total of 670 patients included in the study (435 patients were recruited in primary care and 235 patients from urology clinics).

2.3 | Endpoints and assessments

As previously reported, the primary endpoints of this study were to describe the demographic and clinical characteristics of patients with LUTS due to BPH.[19] Secondary endpoints of this study, investigating the therapeutic management of patients with LUTS due to BPH attending primary care and urology clinics, are described here. The following secondary endpoints were assessed at diagnosis and study visit: therapeutic management according to healthcare service or progression criteria (protocol defined as moderate or severe LUTS and prostate volume ≥30 mL and/or PSA ≥ 1.5 ng/mL), proportion of patients with treatment change, patient profile according to therapy and healthcare service, and evolution of LUTS severity according to therapeutic management in patients that did not change treatment.

2.4 | Data analysis

An analysis of 601 patients was considered necessary based on the assumption that the real-world population prevalence of LUTS/BPH was 50%,[3,5] estimating a proportion using an asymptotic normal 95% bilateral confidence interval with a maximum imprecision rate of 4%. To achieve this, 675 patients needed to be recruited, assuming a 10% dropout/missing rate. As a larger proportion of patients with LUTS/BPH are followed-up in primary care than in urology clinics, the sample distribution was approximately 2:1. All data were stratified according to level of care at the study visit (ie, primary care or urology clinic). All analyses were conducted by IQVIA and performed using SAS software statistics, Version 9.4.[19]

The changes in treatment pattern were defined as a change of treatment according to when any recorded treatment at diagnosis was different from the study visit (ie, no treatment, watchful waiting, phytotherapy or pharmacological treatment) and a change of treatment according to when pharmacological treatment prescribed at diagnosis was different from the study visit (ie, α1-blocker, 5ARI, combination of α1-blocker and 5ARI, or combination of α1-blocker and antimuscarinic). The proportion of patients receiving each type of treatment (none, watchful waiting, monotherapy or combination therapy) and prescriptions (treatment with/without watchful waiting, phytotherapy, α1-blocker, 5ARI, combination of α1-blocker and 5ARI, or combination of α1-blocker and antimuscarinic) was presented according to healthcare service at diagnosis and study visit. For each treatment type at diagnosis and study visit, the following were described: age, time since diagnosis, symptom severity, prostate volume, PSA, QoL and progression criteria.

The proportion of patients with treatment modification between diagnosis and study visit was assessed at the therapeutic group level. Their relationship with the following independent variables was described: age, age at diagnosis, healthcare service, symptom severity, time since diagnosis, prostate volume, PSA and progression criteria. Bivariate relations with a $P < 0.1$ were included in the multivariate logistic regression models.

Statistical tests were used depending on whether response variables were discrete (treatment patterns and therapeutic management, PSA level, progression criteria, QoL categorised, symptom severity and prostate volume) or quantitative (age, time since diagnosis, PSA, IPSS and IPSS QoL item). The chi-squared test or Fisher's exact test was used to analyse discrete variables, and Student's *t*-test (if the data were normally distributed, as assessed by the Kolmogorov–Smirnov test of normality) or Wilcoxon signed-rank test or median test (if the data were not normally distributed) was used to analyse quantitative variables. A statistical significance level of 0.05 was used in all tests.

3 | RESULTS

3.1 | Therapeutic management according to healthcare service

There was a significant difference in the overall management of patients in primary care and urology clinics at diagnosis and study visit (both $P < .001$) (Table 1).

TABLE 1 Treatment patterns of LUTS due to BPH at diagnosis and study visit, according to healthcare service

Treatment, n (%)	Primary care		Urology clinics		Total		*P* value[a]	
	Diagnosis (n = 435)	Study visit (n = 435)	Diagnosis (n = 235)	Study visit (n = 235)	Diagnosis (n = 670)	Study visit (n = 670)	Diagnosis	Study visit
Management[b]							**<.001**	**<.001**
Without active treatment	78 (17.9)	50 (11.5)	59 (25.1)	27 (11.5)	137 (20.4)	77 (11.5)		
Nonpharmacological treatment	45 (10.3)	39 (9.0)	14 (6.0)	7 (3.0)	59 (8.8)	46 (6.9)		
Monotherapy	259 (59.5)	228 (52.4)	113 (48.1)	103 (43.8)	372 (55.5)	331 (49.4)		
Combination	53 (12.2)	118 (27.1)	49 (20.9)	98 (41.7)	102 (15.2)	216 (32.2)		
Treatment (multiresponse[c])								
Watchful waiting	54 (12.4)	46 (10.6)	14 (6.0)	7 (3.0)	68 (10.1)	53 (7.9)	**.008**	**.001**
Pharmacological treatment[d]	312 (71.7)	346 (79.5)	162 (68.9)	201 (85.5)	474 (70.7)	547 (81.6)		
Phytotherapy	50 (16.0)	33 (9.5)	17 (10.5)	13 (6.5)	67 (14.1)	46 (8.4)	.079	.316
Monotherapy[e]	259 (83.0)	228 (65.9)	113 (69.8)	103 (51.2)	372 (78.5)	331 (60.5)		
α1-blockers	195 (75.3)	190 (83.3)	98 (86.7)	89 (86.4)	293 (78.8)	279 (84.3)	**.013**	.477
Tamsulosin	142 (72.8)	134 (70.5)	66 (67.3)	50 (56.2)	208 (71.0)	184 (65.9)		
Doxazosin	11 (5.6)	9 (4.7)	5 (5.1)	6 (6.7)	16 (5.5)	15 (5.4)		
Silodosin	30 (15.4)	39 (20.5)	24 (24.5)	31 (34.8)	54 (18.4)	70 (25.1)		
Terazosin	3 (1.5)	1 (0.5)	2 (2.0)	1 (1.1)	5 (1.7)	2 (0.7)		
Alfuzosin	9 (4.6)	7 (3.7)	1 (1.0)	1 (1.1)	10 (3.4)	8 (2.9)		
5ARI	19 (7.3)	20 (8.8)	3 (2.7)	5 (4.9)	22 (5.9)	25 (7.6)	.095	.212
Finasteride	6 (31.6)	10 (50.0)	0 (0)	0 (0)	6 (27.3)	10 (40.0)		
Dutasteride	13 (68.4)	10 (50.0)	3 (100)	5 (100)	16 (72.7)	15 (60.0)		
PDE5I	4 (1.5)	3 (1.3)	1 (0.9)	0 (0)	5 (1.3)	3 (0.9)	1.0	.555
Tadalafil	2 (50.0)	2 (66.7)	0 (0)	0 (0)	2 (40.0)	2 (66.7)		
Other	2 (50.0)	1 (33.3)	1 (100)	0 (0)	3 (60.0)	1 (33.3)		
Combination[e]	53 (17.0)	118 (34.1)	49 (30.2)	98 (48.8)	102 (21.5)	216 (39.5)		
α1-blocker + 5ARI	42 (79.2)	95 (80.5)	31 (63.3)	65 (66.3)	73 (71.6)	160 (74.1)	.074	**.018**
Doxazosin + finasteride	2 (4.8)	2 (2.1)	0 (0)	0 (0)	2 (2.7)	2 (1.3)		
Tamsulosin + dutasteride	40 (95.2)	93 (97.9)	31 (100)	64 (98.5)	71 (97.3)	157 (98.1)		
Other	0 (0)	0 (0)	0 (0)	1 (1.5)	0 (0)	1 (0.6)		
α1- blocker + antimuscarinic	11 (20.8)	23 (19.5)	18 (36.7)	33 (33.7)	29 (28.4)	56 (25.9)	.074	**.018**
Tamsulosin + solifenacin	11 (100)	23 (100)	17 (94.4)	30 (90.9)	28 (96.6)	53 (94.6)		
Other	0 (0)	0 (0)	1 (5.6)	3 (9.1)	1 (3.4)	3 (5.4)		

Abbreviations: 5ARI, 5α-reductase inhibitor; BPH, benign prostatic hyperplasia, LUTS, lower urinary tract symptoms; PDE5I, phosphodiesterase 5 inhibitor.

The bold values indicate significant *P* values.

[a]Primary care versus urology clinics.

[b]If a patient received more than one treatment, management was grouped as the most restrictive treatment (eg, a patient receiving monotherapy and phytotherapy was considered as 'monotherapy'). Without active treatment includes only patients with no watchful waiting or pharmacological treatment. Nonpharmacological treatment includes only watchful waiting. Monotherapy includes all patients treated with monotherapy pharmacological treatment including phytotherapy. Combination includes all pharmacological treatments in combination.

[c]Multiresponse variable; for example, a patient who received phytotherapy and α1-blockers was included in both groups.

[d]Percentages for named agents use the number of patients receiving a treatment in that drug class as the denominator.

[e]Percentage for monotherapy and combination therapy subcategories use the number of patients receiving each monotherapy or combination therapy type, respectively, as the denominator.

Nonpharmacological treatment (which included only watchful waiting) was used by 10.3% (45/435) of patients in primary care and 6% (14/235) in urology clinics at diagnosis. At study visit, nonpharmacological treatment was used by 9% (39/435) of patients in primary care and 3% (7/235) of patients in urology clinics (Table 1).

TABLE 2 Therapeutic management of LUTS due to BPH according to progression criteria at diagnosis and study visit

Treatment, n (%)	No progression		Progression		*P* value[a]	
	Diagnosis (n = 365)	Study visit (n = 346)	Diagnosis (n = 239)	Study visit (n = 324)	Diagnosis	Study visit
Management[b]					**<.001**	**.033**
Without active treatment	86 (23.6)	51 (14.7)	20 (8.4)	26 (8.0)		
Nonpharmacological treatment	45 (12.3)	26 (7.5)	9 (3.8)	20 (6.2)		
Monotherapy	190 (52.1)	159 (46.0)	156 (65.3)	172 (53.1)		
Combination	44 (12.1)	110 (31.8)	54 (22.6)	106 (32.7)		
Treatment (multiresponse[c])						
Watchful waiting	49 (13.4)	28 (8.1)	13 (5.4)	25 (7.7)	**.002**	.857
Pharmacological treatment[d]	234 (64.1)	269 (77.7)	210 (87.9)	278 (85.8)	**<.001**	**.007**
Phytotherapy	44 (18.8)	23 (8.6)	19 (9.0)	23 (8.3)	**.003**	.907
Monotherapy[e]	190 (81.2)	159 (59.1)	156 (74.3)	172 (61.9)		
α1-blockers	147 (77.4)	136 (85.5)	125 (80.1)	143 (83.1)	.533	.461
Tamsulosin	103 (70.1)	89 (65.4)	92 (73.6)	95 (66.4)		
Doxazosin	9 (6.1)	6 (4.4)	7 (5.6)	9 (6.3)		
Silodosin	26 (17.7)	34 (25.0)	20 (16.0)	36 (25.2)		
Terazosin	3 (2.0)	1 (0.7)	2 (1.6)	1 (0.7)		
Alfuzosin	6 (4.1)	6 (4.4)	4 (3.2)	2 (1.4)		
5ARI	6 (3.2)	6 (3.8)	14 (9.0)	19 (11.0)	**.021**	**.012**
Finasteride	1 (16.7)	2 (33.3)	5 (35.7)	8 (42.1)		
Dutasteride	5 (83.3)	4 (66.7)	9 (64.3)	11 (57.9)		
PDE5I	3 (1.6)	1 (0.6)	2 (1.3)	2 (1.2)	1.0	1.0
Tadalafil	1 (33.3)	1 (100)	1 (50.0)	1 (50.0)		
Other	2 (66.7)	0	1 (50.0)	1 (50.0)		
Combination[e]	44 (18.8)	110 (40.9)	54 (25.7)	106 (38.1)		
α1-blocker + 5ARI	27 (61.4)	80 (72.7)	43 (79.6)	80 (75.5)	**.047**	.645
Doxazosin + finasteride	0	0	2 (4.7)	2 (2.5)		
Tamsulosin + dutasteride	27 (100)	80 (100)	41 (95.3)	77 (96.3)		
Other	0	0	0	1 (1.3)		
α1-blocker + antimuscarinic	17 (38.6)	30 (27.3)	11 (20.4)	26 (24.5)	**.047**	.645
Tamsulosin + solifenacin	16 (94.1)	30 (100)	11 (100)	23 (88.5)		
Other	1 (5.9)	0	0	3 (11.5)		

Abbreviations: 5ARI, 5α-reductase inhibitor; BPH, benign prostatic hyperplasia, LUTS, lower urinary tract symptoms; PDE5I, phosphodiesterase 5 inhibitor.

The bold values indicate significant *P* values.

[a]Progression versus no progression.

[b]If a patient received more than one treatment, management was grouped as the most restrictive treatment (eg, a patient receiving monotherapy and phytotherapy was considered as 'monotherapy'). Without active treatment includes only patients with no treatment or therapy. Nonpharmacological treatment includes only watchful waiting. Monotherapy includes all patients treated with monotherapy pharmacological treatment including phytotherapy. Combination includes all pharmacological treatments in combination.

[c]Multiresponse variable; for example, a patient who received phytotherapy and α1-blockers was included in both groups.

[d]Percentages for named agents use the number of patients receiving a treatment in that drug class as the denominator.

[e]Percentage for monotherapy and combination therapy subcategories use the number of patients receiving each monotherapy or combination therapy type, respectively, as the denominator.

Most patients (total diagnosis: 70.7% [474/670]; study visit: 81.6% [547/670]) received pharmacological treatment (monotherapy or combination) for LUTS/BPH, with a trend for primary care to prescribe more monotherapy and less combination compared with urology clinics at either diagnosis or study visit. Of the patients receiving pharmacological treatment, monotherapy was the most

common in both primary care (diagnosis: 83% [259/312]; study visit: 65.9% [228/346]) and urology clinics (diagnosis: 69.8% [113/162]; study visit: 51.2% [103/201]) (Table 1).

Of the monotherapy treatments assessed, α1-blockers were the most used across both healthcare settings (diagnosis: 78.8% [293/372]; study visit: 84.3% [279/331]) and were significantly greater in urology clinics at diagnosis ($P = .013$). Of the α1-blockers used, tamsulosin was the most used across both healthcare settings (diagnosis: 71.0% [208/293]; study visit: 65.9% [184/279]) (Table 1).

Monotherapy with a 5ARI was used at a much lower rate (diagnosis: 5.9% [22/372]; study visit: 7.6% [25/331]) with no significant difference between healthcare settings (Table 1).

Combination therapy was used at diagnosis by 17% (53/312) in primary care and 30.2% (49/162) in urology clinics. At study visit, combination therapy was used by 34.1% (118/346) in primary care and 48.8% (98/201) in urology clinics. No statistical analysis was performed. The most common combination therapy in both healthcare settings was α1-blocker plus 5ARIs (total diagnosis: 71.6% [73/102]; study visit: 74.1% [160/216]), which was significantly greater in primary care versus urology clinics at study visit ($P = .018$). Tamsulosin and dutasteride appeared to be the most prescribed α1-blocker plus 5ARIs combination therapy; however, no statistical analysis was performed. At study visit, use of α1-blocker plus antimuscarinic combination therapy was significantly greater ($P = .018$) in urology clinics (33.7% [33/98]) than in primary care (19.5% [23/118]). Specifically, tamsulosin and solifenacin accounted for nearly all α1-blocker plus antimuscarinic combination therapy used (Table 1).

3.2 | Therapeutic management according to progression criteria

There was a significant difference in the overall management of patients showing progression criteria and those who did not at both diagnosis ($P < .001$) and study visit ($P = .033$). The proportion of patients with progression criteria that received no active treatment was 8.4% (20/239) and 8% (26/324) at diagnosis and study visit, respectively. Similarly, only 3.8% (9/239) and 6.2% (20/324) had nonpharmacological treatment, that is, only watchful waiting, at diagnosis and study visit, respectively (Table 2).

Most patients showing progression criteria received pharmacological treatment for LUTS/BPH (at diagnosis: progression 87.9% [210/239] compared with no progression 64.1% [234/365], $P < .001$; at study visit: 85.8% [278/324] compared with no progression 77.7% [269/346], $P = .007$). At diagnosis, the most frequently prescribed pharmacological treatment for patients showing progression criteria was α1-blocker monotherapy (59.5% [125/210]) that decreased by study visit (51.4% [143/278]). The second most frequently prescribed therapy at diagnosis was α1-blocker plus 5ARI combination therapy (20.5% [43/210]) that increased at study visit (28.8% [80/278]). At diagnosis and study visit, phytotherapy as a monotherapy alone (7.1% [15/210] and 2.9% [8/278], respectively), 5ARI monotherapy (6.7% [14/210] and 6.8% [19/278], respectively) and α1-blocker plus antimuscarinic (5.2% [11/210] and 9.4% [26/278], respectively) were prescribed in patients with progression criteria (Table 2).

There was a significantly larger proportion of 5ARI monotherapy used in patients with progression criteria at either diagnosis ($P = .021$) or study visit ($P = .012$) versus those with no progression criteria. At diagnosis, there was also a larger proportion of patients with progression criteria receiving α1-blocker plus 5ARI combination therapy ($P = .047$); at study visit, this was not significantly different between patients with and without progression criteria. At diagnosis, significantly more patients with no progression criteria received α1-blocker plus antimuscarinic combination therapy than patients with progression criteria ($P = .047$) (Table 2).

3.3 | Proportion of patients with treatment change from diagnosis to study visit

Overall, 40% (268/670) of patients had a change in treatment between diagnosis and study visit ($P = .869$). The mean (standard deviation [SD]) time from diagnosis to study visit was 3.47 (2.38) years. Treatment change proportions were similar in primary care (39.8% [173/435]) and urology clinics (40.4% [95/235]). The factors influencing a change in treatment from diagnosis to study visit in primary care were time since diagnosis, prostate volume at study visit and PSA at study visit. In urology services, however, increasing age, symptom severity and prostate volume at study visit had a significant effect on change in treatment (Table S1).

3.4 | Patient profile according to therapy at diagnosis and study visit, according to healthcare service

3.4.1 | Monotherapy with α1-blocker

At diagnosis, patients treated with α1-blocker therapy showed similar profiles across healthcare settings with no significant differences observed (Table 3). Most patients receiving α1-blocker therapy at diagnosis had moderate-to-severe symptoms (total diagnosis: 71.3% [204/286]) and a mean (SD) IPSS of 16.9 (7.0). In total at diagnosis, 76.5% (153/200) of patients had a prostate volume ≥30 mL, 45.7% (122/267) of patients showed progression criteria and the median PSA value was 2.7 ng/mL. Several patient profile differences were observed between healthcare settings among those receiving α1-blockers at the study visit. Mean age (mean [SD] age: primary care, 69.9 [8.6] years; urology clinics, 66.7 [6.7] years; $P = .002$) and time since diagnosis (mean [SD] time since diagnosis: [SD] primary care, 3.7 [2.4] years; urology clinics, 2.8 [2.3] years; $P = .003$) were significantly higher in primary care than in urology clinics at study visit. Also, mean PSA values were significantly higher in primary care (7.3 [14.2] ng/mL) than in urology clinics (2.8 [2.0] ng/mL) at study visit ($P = .022$) (Table 3).

TABLE 3 Profile of patients treated with α1-blockers at diagnosis and study visit, according to healthcare service

	Primary care		Urology clinics		Total		*P* value[a]	
	Diagnosis (n = 190)	Study visit (n = 183)	Diagnosis (n = 97)	Study visit (n = 88)	Diagnosis (n = 287)	Study visit (n = 271)	Diagnosis	Study visit
Age (y), mean (SD)	66.6 (8.0)	69.9 (8.6)	64.7 (7.5)	66.7 (6.7)	65.9 (7.9)	68.9 (8.2)	.052	**.002**
Age group, n (%)							.314	.061
<60 y	38 (20.0)	26 (14.2)	27 (27.8)	15 (17.0)	65 (22.6)	41 (15.1)		
60-65 y	54 (28.4)	30 (16.4)	21 (21.6)	24 (27.3)	75 (26.1)	54 (19.9)		
66-70 y	41 (21.6)	45 (24.6)	24 (24.7)	23 (26.1)	65 (22.6)	68 (25.1)		
>70 y	57 (30.0)	82 (44.8)	25 (25.8)	26 (29.5)	82 (28.6)	108 (39.9)		
Time since diagnosis, mean (SD)	—	3.7 (2.4)	—	2.8 (2.3)	—	3.4 (2.4)	—	**.003**
IPSS, mean (SD)[b]	16.4 (7.2)	13.0 (6.7)	18.0 (6.5)	12.6 (6.3)	16.9 (7.0)	12.9 (6.6)	.248	.733
Symptom severity, n (%)							.414	.565
Mild	59 (31.2)	40 (21.9)	23 (23.7)	22 (25.0)	82 (28.7)	62 (22.9)		
Moderate	102 (54.0)	109 (59.6)	58 (59.8)	54 (61.4)	160 (55.9)	163 (60.1)		
Severe	28 (14.8)	34 (18.6)	16 (16.5)	12 (13.6)	44 (15.4)	46 (17.0)		
Missing, n	1	0	0	0	1	0		
QoL (IPSS Item 8), mean (SD)	3.6 (1.4)	2.6 (1.4)	3.9 (1.3)	2.5 (1.4)	3.7 (1.4)	2.5 (1.4)	.372	.618
Prostate volume, n (%)							.355	.518
I (<30 mL)	25 (20.7)	19 (18.4)	22 (27.8)	20 (24.7)	47 (23.5)	39 (21.2)		
II (30-50 mL)	48 (39.7)	46 (44.7)	34 (43.0)	39 (48.1)	82 (41.0)	85 (46.2)		
III (51-75 mL)	31 (25.6)	21 (20.4)	17 (21.5)	12 (14.8)	48 (24.0)	33 (17.9)		
IV (>75 mL)	17 (14.0)	17 (16.5)	6 (7.6)	10 (12.3)	23 (11.5)	27 (14.7)		
Missing, n	69	80	18	7	87	87		
PSA value (ng/mL), mean (SD)	4.17 (5.5)	7.3 (14.2)	3.18 (2.2)	2.8 (2.0)	3.84 (4.7)	5.9 (11.9)	.812	**.022**
PSA value (ng/mL), median (P25, P75)	2.7 (1.4, 4.9)	3.0 (1.6, 5.3)	2.7 (1.5, 4.6)	2.6 (1.4, 3.7)	2.7 (1.4, 4.7)	2.8 (1.5, 4.9)		
PSA value, n (%)							.459	.435
PSA < 1.5 ng/mL	49 (27.2%)	40 (21.9)	20 (23.0%)	23 (26.1)	69 (25.8)	63 (23.2)		
PSA ≥ 1.5 ng/mL	131 (72.8%)	143 (78.1)	67 (77.0%)	65 (73.9)	198 (74.2)	208 (76.8)		
Missing, n	10	0	10	0	20	0		
Progression criteria, n (%)	81 (45.0)	97 (53.0)	41 (47.1)	40 (45.5)	122 (45.7)	137 (50.6)	.744	.244
Missing, n	10	0	10	0	20	0		

Abbreviations: IPSS, International Prostate Symptom Score; P25, percentile 25; P75, percentile 75; PSA, prostate-specific antigen; QoL, quality of life; SD, standard deviation.

The bold values indicate significant *P* values.

[a]Primary care versus urology clinics.

[b]Numbers can vary due to missing values and selected patients. Information has been calculated for nonmissing values.

3.4.2 | Monotherapy with 5ARI

At diagnosis and study visit, patients treated with 5ARI therapy showed similar profiles across healthcare settings, with no significant differences observed (Table 4). Most patients receiving monotherapy with 5ARI at diagnosis had moderate-to-severe symptoms (total diagnosis: 95.3% [20/21]) and a mean (SD) IPSS of 21.6 (5.5). In total at diagnosis, 100% (11/11) of patients had a prostate volume ≥30 mL, 73.7% (14/19) showed progression criteria and the median PSA value was 4.2 ng/mL. Similar results were observed at study visit (Table 4).

TABLE 4 Profile of patients treated with 5ARI at diagnosis and study visit, according to healthcare service

	Primary care		Urology clinics		Total		*P* value[a]	
	Diagnosis (n = 19)	Study visit (n = 18)	Diagnosis (n = 2)	Study visit (n = 5)	Diagnosis (n = 21)	Study visit (n = 23)	Diagnosis	Study visit
Age (y), mean (SD)	70.1 (10.2)	72.9 (8.2)	68.0 (0.0)	70.0 (4.7)	69.86 (9.7)	72.3 (7.6)	—	.462
Age group, n (%)							.219	.402
<60 y	3 (15.8)	2 (11.1)	0 (0)	0 (0)	3 (14.3)	2 (8.7)		
60-65 y	3 (15.8)	1 (5.6)	0 (0)	1 (20.0)	3 (14.3)	2 (8.7)		
66-70 y	5 (26.3)	3 (16.7)	2 (100)	2 (40.0)	7 (33.3)	5 (21.7)		
>70 y	8 (42.1)	12 (66.7)	0 (0)	2 (40.0)	8 (38.1)	14 (60.9)		
Time since diagnosis, mean (SD)	—	3.9 (2.5)	—	4.3 (2.9)	—	4.0 (2.5)	—	.852
IPSS, mean (SD)[b]	21.6 (5.5)	14.5 (6.9)	0 (0)	18.8 (8.0)	21.6 (5.5)	15.4 (7.2)	—	.313
Symptom severity, n (%)							.310	.128
Mild	1 (5.3)	3 (16.7)	0 (0)	0 (0)	1 (4.8)	3 (13.0)		
Moderate	16 (84.2)	12 (66.7)	1 (50.0)	2 (40.0)	17 (81.0)	14 (60.9)		
Severe	2 (10.5)	3 (16.7)	1 (50.0)	3 (60.0)	3 (14.3)	6 (26.1)		
QoL (IPSS Item 8), mean (SD)	5.2 (0.8)	2.8 (1.4)	0 (0)	3.6 (1.1)	5.2 (0.8)	3 (1.4)	—	.222
Prostate volume, n (%)							.748	.195
I (<30 mL)	0 (0.0)	1 (11.1)	0 (0.0)	0 (0)	0 (0.0)	1 (7.1)		
II (30-50 mL)	4 (44.4)	4 (44.4)	1 (50.0)	1 (20)	5 (45.5)	5 (35.7)		
III (51-75 mL)	2 (22.2)	0 (0)	0 (0.0)	2 (40)	2 (18.2)	2 (14.3)		
IV (>75 mL)	3 (33.3)	4 (44.4)	1 (50.0)	2 (40)	4 (36.4)	6 (42.9)		
Missing, n	10	9	0	0	10	9		
PSA value (ng/mL), mean (SD)	6.8 (8.2)	9.4 (16.5)	1.8 (0.0)	2.6 (2.1)	6.5 (8.1)	7.9 (14.8)	—	.146
PSA value (ng/mL), median (P25, P75)	4.5 (1.5, 9.1)	4.1 (2.1, 7.3)	1.8 (1.8, 1.8)	1.8 (1.2, 2.5)	4.2 (1.5, 9.1)	3.9 (1.8, 6.1)	—	
PSA value, n (%)							.596	.132
PSA < 1.5 ng/mL	4 (22.2%)	2 (11.1)	0	2 (40.0)	4 (21.1)	4 (17.4)		
PSA ≥ 1.5 ng/mL	14 (77.8%)	16 (88.9)	1 (100%)	3 (60.0)	15 (78.9)	19 (82.6)		
Missing, n	1	0	1	0	2	0		
Progression criteria, n (%)	13 (72.2)	14 (77.8)	1 (100)	3 (60.0)	14 (73.7)	17 (73.9)	.539	.423
Missing, n	1	0	1	0	2	0		

Abbreviations: 5ARI, 5α-reductase inhibitor; IPSS, International Prostate Symptom Score; P25, percentile 25; P75, percentile 75; PSA, prostate-specific antigen; QoL, quality of life; SD, standard deviation.

[a]Primary care versus urology clinics.

[b]Numbers can vary due to missing values and selected patients. Information has been calculated for nonmissing values.

3.4.3 | Combination therapy with α1-blocker plus 5ARI

At diagnosis, patients treated with α1-blocker plus 5ARI therapy showed similar profiles across healthcare settings, with no significant differences observed (Table 5). Most patients treated with α1-blocker plus 5ARI therapy at diagnosis had moderate-to-severe symptoms (total diagnosis: 77.8% [56/72]) and a mean (SD) IPSS of 13.1 (6.0). In total at diagnosis, 92.2% (47/51) of patients had a prostate volume ≥30 mL, 61.4% (43/70) had progression criteria and the median PSA value was 3.7 ng/mL. Patient profiles at the study visit were generally similar between healthcare settings, with the exception that significantly more patients treated in primary care versus urology clinics had a longer time since diagnosis ($P = .049$) and the

TABLE 5 Profile of patients treated with α1-blockers and 5ARI combination therapy at diagnosis and study visit, according to healthcare service

	Primary care		Urology clinics		Total		*P* value[a]	
	Diagnosis (n = 42)	Study visit (n = 95)	Diagnosis (n = 31)	Study visit (n = 65)	Diagnosis (n = 73)	Study visit (n = 160)	Diagnosis	Study visit
Age (y), mean (SD)	68.4 (8.6)	72.6 (8.8)	69.9 (7.0)	73.5 (7.1)	69.0 (8.0)	73.0 (8.1)	.413	.533
Age group, n (%)							.630	.672
<60 y	6 (14.3)	5 (5.3)	3 (9.7)	2 (3.1)	9 (12.3)	7 (4.4)		
60-65 y	9 (21.4)	15 (15.8)	4 (12.9)	8 (12.3)	13 (17.8)	23 (14.4)		
66-70 y	12 (28.6)	18 (18.9)	9 (29.0)	10 (15.4)	21 (28.8)	28 (17.5)		
>70 y	15 (35.7)	57 (60.0)	15 (48.4)	45 (69.2)	30 (41.1)	102 (63.8)		
Time from diagnosis, mean (SD)	—	4.1 (2.2)	—	3.4 (2.3)	—	3.8 (2.3)	—	**.049**
IPSS, mean (SD)[b]	12.6 (7.1)	12.3 (7.4)	14.0 (4.1)	14.1 (7.4)	13.1 (6.0)	13.0 (7.4)	.397	.087
Symptom severity, n (%)							.108	**.048**
Mild	13 (31.0)	27 (28.4)	3 (10.0)	10 (15.4)	16 (22.2)	37 (23.1)		
Moderate	25 (59.5)	54 (56.8)	23 (76.7)	37 (56.9)	48 (66.7)	91 (56.9)		
Severe	4 (9.5)	14 (14.7)	4 (13.3)	18 (27.7)	8 (11.1)	32 (20.0)		
Missing, n	0	0	1	0	1	0		
QoL (IPSS Item 8), mean (SD)	3.3 (1.1)	2.6 (1.4)	3.2 (0.6)	2.4 (1.5)	3.2 (1.0)	2.5 (1.5)	.591	.254
Prostate volume, n (%)							.134	.960
I (<30 mL)	3 (13.0)	4 (7.7)	1 (3.6)	3 (5.3)	4 (7.8)	7 (6.4)		
II (30-50 mL)	7 (30.4)	17 (32.7)	4 (14.3)	20 (35.1)	11 (21.6)	37 (33.9)		
III (51-75 mL)	4 (17.4)	17 (32.7)	12 (42.9)	19 (33.3)	16 (31.4)	36 (33.0)		
IV (>75 mL)	9 (39.1)	14 (26.9)	11 (39.3)	15 (26.3)	20 (39.2)	29 (26.6)		
Missing, n	19	43	3	8	22	51		
PSA value (ng/mL), mean (SD)	4.8 (3.0)	3.1 (3.0)	4.0 (3.7)	3.0 (2.9)	4.5 (3.3)	3.0 (2.9)	.090	.943
PSA value (ng/mL), median (P25, P75)	4.2 (2.6, 6.0)	2.3 (1.3, 4.0)	2.7 (2.3, 5.4)	2.3 (1.1, 3.6)	3.7 (2.3, 5.8)	2.3 (1.3, 3.8)		
PSA value, n (%)							.070	.598
PSA < 1.5 ng/mL	3 (7.5%)	27 (28.4)	7 (22.6%)	21 (32.3)	10 (14.1)	48 (30.0)		
PSA ≥ 1.5 ng/mL	37 (92.5%)	68 (71.6)	24 (77.4%)	44 (67.7)	61 (85.9)	112 (70.0)		
Missing, n	2	0	0	0	2	0		
Progression criteria, n (%)	23 (57.5)	46 (48.4)	20 (66.7)	34 (52.3)	43 (61.4)	80 (50.0)	.436	.629
Missing, n	2	0	1	0	3	0		

Abbreviations: 5ARI, 5α-reductase inhibitor; IPSS, International Prostate Symptom Score; P25, percentile 25; P75, percentile 75; PSA, prostate-specific antigen; QoL, quality of life; SD, standard deviation.

The bold values indicate significant *P* values.

[a]Primary care versus urology clinics.

[b]Numbers can vary due to missing values and selected patients. Information has been calculated for nonmissing values.

incidence of mild, moderate and severe symptom severities was different between settings ($P = .048$) (Table 5).

3.4.4 | Combination therapy with α1-blocker and antimuscarinic

For patients receiving combination therapy with α1-blockers and antimuscarinic therapies, no significant differences in patient profile were observed at both diagnosis and study visit, other than lower IPSS Item 8 in primary care than in urology clinics at study visit (mean [SD] 2.5 [1.59] vs. 3.45 [1.39], respectively; $P = .017$) (Table S2).

Evolution of LUTS from diagnosis to study visit according to therapeutic management in patients that did not change treatment assessed at diagnosis and study visit.

Most patients appeared to remain in the same symptom category at study visit, irrespective of symptom severity and treatment received at diagnosis. There appeared to be a trend for more patients experiencing worsening symptoms when not receiving α1-blocker plus 5ARI combination therapy; however, no statistical analysis was performed (Table 6 and Figure S1). Overall, most patients tended to maintain or improve in symptom severity when assessed by IPSS at diagnosis. Conversely, those that were assessed by clinical criteria at diagnosis showed a tendency to maintain or worsen in symptom severity. However, no statistical comparison was performed (Table 6).

4 | DISCUSSION

This was a real-world, observational study in men with LUTS/BPH consulting primary care and urology clinics in Spain. This study was

TABLE 6 Evolution of symptoms according to symptoms and method of assessing severity at diagnosis

Symptoms at diagnosis	n	Treatment at diagnosis	Symptoms at study visit, n (%)[a]		
			Mild	Moderate	Severe
IPSS					
Mild (n = 26)	10	α1-blocker	7 (70.0)	3 (30.0)	0
	4	α1-blocker + 5ARI	3 (75.0)	1 (25.0)	0
	10	No treatment	7 (70.0)	3 (30.0)	0
	2	Phytotherapy	2 (100.0)	0	0
Moderate (n = 99)	49	α1-blocker	7 (14.3)	37 (75.5)	5 (10.2)
	19	α1-blocker + 5ARI	5 (26.3)	14 (73.7)	0
	19	No treatment	2 (10.5)	14 (73.7)	3 (15.8)
	5	Other treatment	0	4 (80.0)	1 (20.0)
	7	Phytotherapy	0	6 (85.7)	1 (14.3)
Severe (n = 47)	38	α1-blocker	3 (7.9)	12 (31.6)	23 (60.5)
	4	α1-blocker + 5ARI	0	1 (25.0)	3 (75.0)
	3	No treatment	0	2 (66.7)	1 (33.3)
	2	Other treatment	0	0	2 (100.0)
Clinical criteria					
Mild (n = 249)	78	α1-blocker	28 (35.9)	41 (52.6)	9 (11.5)
	12	α1-blocker + 5ARI	6 (50.0)	6 (50.0)	0
	125	No treatment	46 (36.8)	70 (56.0)	9 (7.2)
	3	Other treatment	1 (33.3)	2 (66.7)	0
	31	Phytotherapy	7 (22.6)	20 (64.5)	4 (12.9)
Moderate (n = 227)	127	α1-blocker	22 (17.3)	78 (61.4)	27 (21.3)
	34	α1-blocker + 5ARI	4 (11.8)	24 (70.6)	6 (17.7)
	37	No treatment	7 (18.9)	25 (67.6)	5 (13.5)
	10	Other treatment	1 (10.0)	8 (80.0)	1 (10.0)
	19	Phototherapy	8 (42.1)	8 (42.1)	3 (15.8)
Severe (n = 20)	12	α1-blocker	1 (8.3)	2 (16.7)	9 (75.0)
	6	α1-blocker + 5ARI	0	4 (66.7)	2 (33.3)
	2	No treatment	2 (100.0)	0	0

Abbreviations: 5ARI, 5α-reductase inhibitor; IPSS, International Prostate Symptom Score.

[a]Percentages use the row n value as the denominator.

aimed at assessing therapeutic management according to progression criteria and to inform on patient clinical characteristics in response to medical treatment in addition to assessing the evolution of symptom severity.

A significant difference in the management of patients between healthcare settings was noted, at both diagnosis and study visit, with a trend for primary care to include more patients on watchful waiting as well as more monotherapy and less combination therapy prescription. Over 70% to 80% of patients received pharmacological treatment at diagnosis and study visit, respectively, confirming this as a standard of care for men with LUTS/BPH. The most frequently used pharmacological treatment in both healthcare services was α1-blocker monotherapy, with 62% at diagnosis and 51% at study visit. Although being the second most prescribed pharmacological treatment, combination therapy with α1-blocker plus 5ARI was used at a much lower rate than α1-blocker monotherapy (15% at diagnosis and 29% at study visit vs. 62% at diagnosis and 51% at study visit, respectively). These results are similar to those recently published from a population-based cohort in the United Kingdom.[21] 5ARI monotherapy (5%), PDE5I (1%) and α1-blocker plus antimuscarinics (6-10%) comprised a much lower proportion of pharmacological treatment used at both diagnosis and study visit.

This study also looked at the therapeutic management of men with LUTS/BPH according to the presence of progression criteria, that is, moderate-to-severe symptom severity, prostate volume ≥30 mL and/or PSA ≥ 1.5 ng/mL[19] at diagnosis and study visit. As recommended by clinical guidelines, LUTS/BPH men at risk of disease progression should be receiving a disease-modifying pharmacological therapy (5ARI in monotherapy or in combination).[8,13,15,16] However, α1-blockers as monotherapy were still the most prescribed pharmacological treatment at both diagnosis (60%) and study visit (51%) in men with progression criteria. In fact, only 27% (at diagnosis) and 36% (at study visit) of patients at risk of disease progression receiving pharmacological treatment were prescribed with 5ARI in monotherapy or in combination. Therefore, these findings indicate that despite a marginal increase in the proportion of patients with progression criteria receiving a 5ARI-based treatment from diagnosis to the study visit, the majority of patients are still receiving suboptimal treatment.

This study showed that 40% of men changed treatment between diagnosis and study visit (average duration roughly 3.5 years). The factors affecting treatment change from diagnosis to study visit were mainly linked to disease progression (ie, increasing time since diagnosis, prostate volume and symptom severity), rather than the healthcare service attended. These findings indicate that therapeutic approach is, in part, governed by the patient profile as opposed to level of care. Similarly, in a previous study, medication changes were reported to be similar in patients managed by primary care physicians and those managed by urologists.[10]

Overall, patient profiles were similar between primary care and urology clinics for each therapy. Focusing on α1-blocker monotherapy as the most frequently used treatment, about half of patients (46% at diagnosis and 51% at study visit) had progression criteria. According to clinical guidelines, patients would have been most appropriately treated with a 5ARI in monotherapy or in combination due to their progression profile risk. It is interesting to note that 24% (6/25) of men receiving 5ARI monotherapy and 50% (80/160) of men receiving combination therapy with α1-blocker plus 5ARI at study visit did not have progression criteria as defined in the study protocol. Therefore, this study shows that the medical treatment recommendations by clinical guidelines are not closely followed by either primary care or urology clinics, demonstrating suboptimal medical management of patients with LUTS/BPH.

Overall, most patients appeared to remain in the same symptom category at study visit, irrespective of the symptom severity and treatment received at diagnosis. Despite the low sample size, an increase in patients with worsening in symptoms when not receiving α1-blocker plus 5ARI combination therapy was observed. The proportion of patients with worsening symptoms from diagnosis to study visit appeared to be lower when IPSS was used instead of clinical criteria. It is possible that clinical criteria, which are a more subjective assessment of severity compared with IPSS, may be less accurate in evaluating severity. Despite the known limitations of IPSS, such as reproducibility of responses,[22] it remains the consensus approach to evaluate LUTS/BPH severity. Previous work has suggested that objective variables such as IPSS and PSA (as recommended by European Urology Association guidelines)[8] enable the accurate diagnosis of patients with LUTS/BPH in primary care.[4] In another study, a high correlation was observed between diagnoses using medical history, serum PSA, digital rectal examination and IPSS and those based on a full battery of tests including ultrasonography and uroflowmetry.[23] Therefore, the initial evaluation of LUTS/BPH using simple diagnostic tools available in the primary care setting is an appropriate strategy to facilitate the diagnosis. Furthermore, this approach might minimise delays in the management of LUTS/BPH and inform on the appropriate referral to specialised care.[23,24]

As this study utilised real-world clinical data, important information, which may help address the study objectives, could have been missing; this is a well-known limitation of real-world studies.[25] To mitigate this, feasibility tests helped ensure investigators could provide the required study data, as described previously.[19] An important limitation to recognise is the low number of patients when evaluating the management by progression criteria or the evolution of symptoms by method of assessing severity, as such limiting robust interpretations and conclusions derived from this study. A strength of using real-world data is that the results are generalisable to a wide patient population. Additionally, as patient baseline demographics are similar to other studies in patients with LUTS/BPH,[12,26] the patient population is likely to be representative of the wider population and results are therefore applicable to other countries.

5 | CONCLUSION

This study demonstrates a significant difference in the overall management of patients with LUTS/BPH according to healthcare service and progression criteria. Most patients received pharmacological treatment with similar profiles between primary care and urology clinics for each therapy. α1-Blockers were the most used treatment across healthcare settings, and the majority of patients with progression criteria did not receive disease-modifying pharmacological therapy (ie, 5ARI in monotherapy or in combination), with this pattern persisting throughout the study observation period. Overall, most patients did not change treatment, and there was a general trend of symptom worsening when not receiving α1-blocker plus 5ARI combination therapy.

Therefore, this study shows that the clinical guideline recommendations for patients with LUTS/BPH are not closely adhered by either primary care or urology clinics. As such, a significant proportion of patients with LUTS/BPH receive inadequate medical management. Moreover, this reveals a need to further emphasise existing guideline criteria for the use of 5ARI combination therapy in both healthcare settings.

ACKNOWLEDGEMENTS

Medical writing support was provided by Gillian Wallace, MSc, and Lisa Auker, PhD, of Fishawack Indicia Ltd, UK, and funded by GSK.

DISCLOSURES

BM has participated in advisory boards and speaker's bureaus and has received compensation for travel expenses and for being a trial investigator from GSK, Janssen, Astellas, Werfen, Bayer, Sanofi and IPSEN. JMM has received financial compensation from GSK for scientific advice on the design and development of the study protocol and from IQVIA for participating as a researcher. JMM has also participated in advisory boards for GSK and Astellas and in speaker's bureaus for GSK and has received compensation from GSK and Pierre Fabre for being a trial investigator. AAR, RCP, DLM and JMP-M are employees of GSK and hold shareholder status in the company. MTM-F received financial compensation from GSK for travel expenses and for being trial investigator. AC is an employee of IQVIA.

DATA AVAILABILITY STATEMENT

Anonymised individual participant data and study documents can be requested for further research from www.clinicalstudydatarequest.com.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the Supporting Information section.

How to cite this article: Miñana B, Molero JM, Agra Rolán A, et al. Real-world therapeutic management and evolution of patients with benign prostatic hyperplasia in primary care and urology in Spain. *Int J Clin Pract*. 2021;75:e14250. https://doi.org/10.1111/ijcp.14250