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ORIGINAL PAPER

Serenoa repens extract additionally to quinolones in the treatment of chronic bacterial prostatitis. The preliminary results of a long term observational study

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Summary

Introduction: *Chronic prostatitis displays a variety of symptoms (mainly local pain exhibiting variability in origin and intensity). The purpose of this article is to briefly present the preliminary results of our study examining the role of phytotherapeutic agents in the treatment of chronic prostatitis patients.*

Materials and methods: *The study included in total fifty-six consecutive patients who visited the outpatient department. Subjects were randomized into two groups. Subjects in the first group (28 patients) received prulifloxacin 600 mg for 15 days, while subjects in the second group (28 patients) received prulifloxacin 600 mg for 15 days and Serenoa repens extract for 8 weeks. The response was tested using laboratory and clinical criteria.*

Results: *We found statistically significant differences between the two groups regarding pain regression and no statistically significant regarding bacterial eradication. Moreover however while sexual dysfunction improvement was equally achieved in both groups, improvement of urinary symptoms was more evident in the 2nd group especially after the completion of the antibiotic treatment.*

Conclusions: *Serenoa repens extract for 8 weeks seems to improve prostatitis related pain. Further randomized, placebo-controlled studies are needed to substantiate safer conclusions.*

KEY WORDS: *Chronic prostatitis, Phytotherapeutics; Quinolones; Pain; Serenoa repens.*

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INTRODUCTION

Prostatitis is a common urological disorder mainly affecting males 18-35 years of age, but also constitutes a frequent diagnosis in those aged over 65 primarily as a histological finding or in relation to benign prostatic hypertrophy symptoms (1-3). Between 1990 and 1994, more than 2 million outpatient visits in the USA related to chronic prostatitis cases, whereas currently 15% of men who visit a doctor due to urinary tract symptoms are diagnosed with prostatitis (4).

This particular disease has been characterized as a significant and developing clinical enigma given that its aetiopathogenesis remains to a great extent unclear. Its presentation is related to an infective focus in the distant (mainly) prostatic glandular element and ducts involving Gram-negative uropathogens and less frequently Gram-positive bacteria (5). It exhibits an array of symptoms, most notably pelvic pain (at various sites and of varying intensity), urinary symptoms (obstructive and irritative) as well as erectile and sexual dysfunction. Similar symptoms are also encountered in benign prostatic hypertrophy and are attributed to both obstruction and secondary inflammation. The effectiveness of phytotherapeutic agents used for symptoms related to benign prostatic hypertrophy justifies their use in the treatment of chronic prostatitis (6). The best known phytotherapeutic is *Serenoa repens*, a constituent of the acid-loving plant saw palmetto. It contains fatty acids, phytosterols and vitamins. Its mechanism of action has not been fully elucidated, however is attributed to hormonally and non-hormonally mediated anti-inflammatory activity (6).

The former is related to the inhibition of conversion of testosterone to the more potent antiandrogen dihydrotestosterone at the level of androgen receptors. This results in a reduction of the hormonal response of macrophages and leukocytes and the inhibition of their migration to the site of inflammation. As a consequence

there is a reduction in the release of myeloperoxidase which causes destruction of the inflamed tissue and of platelet-derived growth factor and growth factor-beta which induce inflammation. Existing evidence regarding *Serenoa repens*' antiandrogenical antiproliferative and/or antiapoptotic action through inhibition of 5-alpha reductase is probably conflicting (7, 8). There is experimental proof of inhibition of signaling of growth factors such as IGF-1 (*Insulin-like Growth Factor*) as well as cytokines such as MCP-1/CCL2 (monocyte chemotactic protein-1/chemokine CL2) a fact which interferes with inflammatory activity in human prostate epithelial cells (9, 10). The aim of the study is to assess the effectiveness of phytotherapeutics in the management of these symptoms.

Materials and methods

The study was designed as a prospective randomized study and was conducted at *"Tzaneio" General Hospital of Piraeus*. Patients enrolled in the study had symptoms and signs of chronic prostatitis and visited the specialist clinic between 1 May 2011 and 30 May 2012. Patients suffering from neurological disorders, those with anatomic abnormalities of the urinary tract and immunosuppressed patients were excluded from the study, as these are all conditions which can affect the clinical manifestation of the disease and could alter the outcome of the study. Patients were randomized into two groups depending on the date of attendance (odd/even day of the month). Patients in the first group (Group A) received prulifloxacin 600 mg for 15 days and patients in the second group (Group B) received prulifloxacin 600 mg for 15 days and an extract of *Serenoa repens* for 8 weeks. Urine specimens from all patients were collected before and after prostatic massage and were cultured while, depending on the medical history, urethral discharge or urethral swabs were also sent to the laboratory for examination in a number of patients. All patients filled in questionnaires relating to chronic prostatitis (NHI-CPSI), urinary symptoms (IPSS) and sexual function (IIEF-5). Initial evaluation (1st and 2nd follow up visit) was performed 15 days after the completion of antimicrobial therapy and during the course of treatment with *Serenoa repens* Microbial response was assessed by urine culture before and after prostatic massage and the response to symptoms by questionnaires NHI-CPSI, IPSS, IIEF-5 at 4 weeks from the beginning of the study (1st follow up) and 8 weeks from the beginning of the study (2nd follow up). The final outcome was assessed 3-6 months later (3rd follow up visit).

Microbiological assessment: The Stamey-Meares test was deemed positive if: 1) bacteria were cultured in the prostatic secretion (EPS) and the VB3 urine specimens (or PPM) and were not cultured in the VB1 and VB2 (or PM) specimens, 2) bacterial colony count in the VB3 specimen was 10 times that in the VB1 and VB2 specimens, 3) leukocyte numbers in the EPS and VB3 were 10 times those in the VB1 and VB2. No lower cut-off value for the number of colonies was set. Cultures for gonococcus, mycoplasma and ureaplasma and the semi-quantitative assessment were performed using bioMerieux reagents. Chlamydia trachomatis was detected using direct immunofluorescence (Kallestad anti-membrane lipopolysaccharide monoclonal antibodies). Urine specimens were centrifuged and cultured in blood and MacConkey agar for aerobic and anaerobic Gram-positive and negative bacteria (bioMerieux culture media). All processing and final assessment of samples in this study were performed by the same specialist microbiologist to whom the medical history of the patients was not disclosed.

Questionnaires: The chronic prostatitis NHI-CPSI questionnaire includes 9 questions in 3 sections (character-site of pain, urinary symptoms, effect on quality of life). The resultant sum ranges from 0 to 43 (character-site of pain: 0-21, urinary symptoms: 0-10 and quality of life: 0-12). The greater the resulting sum the greater the disturbance. However, questions with the highest scores affect the final result as they contribute more to the total sum of the NIH-CPSI. The IPSS questionnaire includes 8 questions in 8 fields (incomplete bladder voiding, frequency, intermittency, urgency, poor urine flow, dribbling, nocturia and effect on quality of life) each question scoring 0-5 points. Results from the first 7 questions are used to assess urination. A final score of less than 7 indicates mild disturbance, a score of 8-19 indicates moderate disturbance and a score of 20-35 severe disturbance.
Finally, the IIEF-5 questionnaire includes 5 questions each scoring 0-5 points. A sum score of 1-7 points suggests serious erectile dysfunction, a score of 8-11 moderate dysfunction, a score of 12-16 suggests moderate to mild dysfunction, a score of 17-21 indicates mild erectile dysfunction, whereas a score of 22-25 does not indicate erectile dysfunction.

Statistical analysis: Analysis was performed using the SPSS 12 program and Fisher's exact test of significance was used. The accepted statistical significance cut-off value was 0.05 (P value < 0.05).

Table 1.

Difference between groups 1 and 2 with regard to age, prostatitis related history and baseline questionnaire scores.

Differences between study groups	N		Mean		p value
	Group 2	Group 1	Group 2	Group 1	
Age (years)	28	28	41,9643	45,5714	,223
Prostatitis related history	28	28	,4643	,5714	,415
Baseline NIH-CPSI score	28	28	26,96	26,64	,843
Baseline IPSS score	27	28	10,6296	14,70	,140
Baseline IIEF score	28	28	20,57	19,4643	,172

Results

In 16 of the 72 patients initially included in the study no pathogen was cultured and these patients were excluded from the study. The remaining 56 patients were equally assigned to the first group and the second group.

The average age in the first group was 45.5 years and in the second group was 41.9 years. No statistically significant difference was noted between groups 1 and 2 with regard to mean age (Table 1) and prior history of prostatitis (Table 1) upon introduction into the study.

The primary symptom for patients in both groups was pain, while urinary disturbances as a primary symptom were reported by 7 patients in group A and 6 in group B and erectile dysfunction as a primary symptom was reported by 2 patients in Group A and 2 patients in Group B (Tables 2, 3).

Assessment of the questionnaires revealed moderate to severe urinary symptoms (obstructive or irritative) in more than 50% of patients in both groups (17 patients in the 1st group and 14 in the 2nd group) and erectile or sexual dysfunction in less than 30% of patients in both groups (9 patients in the 1st group and 7 patients in the 2nd group). No significant difference was noted between groups 1 and 2 with regard to individual questionnaire fields upon introduction into the study (Table 1).

1st follow up visit: At the first follow-up 16/28 patients in the first group reported persistence of symptoms compared to 10/28 patients in the second group. Four patients in group 1 and 3 patients in group 2

Table 2.

Age, main symptoms and pathogens of patients of Group 1 (Prulifloxacin) at baseline.

Age	Main symptom	Microorganism
28	haemospermia, suprapubic pain	Chlamydia Trachomatis
53	dysuria, raised PSA	E. Coli
42	perineal pain	Proteus
52	suprapubic, perineal pain, LUTS	E. Coli
36	scrotal pain	CoNS
47	penile pain	E. Coli
52	suprapubic, scrotal pain	E. Coli
48	perineal pain	Proteus, CoNS
51	suprapubic, perineal pain, dysuria	Gonococcus
50	irritative LUTS	Chlamydia
49	febrile prostatitis, epididymitis	Proteus
39	perineal, testicular pain	4 types of Gram + cocci
41	scrotal, penile pain	E. Coli
44	perineal pain	E. Coli
56	penile pain, erectile dysfunction	E. Coli
56	dysuria, irritative symptoms of urination	3 types of Gram + cocci
35	perineal pain, raised PSA	CoNS
52	perineal pain, irritative LUTS	E. Coli
45	perineal pain, malaise	E. Coli
36	perineal, testicular pain	E. Coli
44	perineal pain	E. Coli
58	perineal, testicular pain	CoNS
56	LUTS, haemospermia, suprapubic pain	E. Coli, Proteus
43	testicular pain	CoNS
37	scrotal, perineal pain, LUTS	Proteus
44	perineal, penile pain	E. Coli
44	suprapubic, scrotal pain	Klebsiella, Staphylococcus
38	perineal pain, erectile dysfunction	E. Coli

Table 3.

Age, main symptoms and pathogens of patients of Group 2 (Prulifloxacin and Serenoa Repens) at baseline.

Age	Main symptom	Microorganism
27	haemospermia, suprapubic pain	3 types of gram + cocci
62	LUTS, perineal pain, raised PSA	CoNS
34	penile, scrotal pain	Mycoplasma
58	scrotal pain	E. Coli
45	perineal, scrotal pain	Mycoplasma
35	suprapubic, perineal pain, dysuria	Unknown
47	febrile prostatitis	E. Coli
32	febrile prostatitis	Proteus
28	febrile prostatitis	Enterococcus
34	perineal pain	E. Coli
25	perineal pain, irritative LUTS	E. Coli
47	penile pain, erectile dysfunction	Enterococcus
32	scrotal pain	Streptococcus mitis oralis
61	perineal pain	CoNS
25	irritative LUTS	Enterococcus
52	dysuria, irritative symptoms of urination	E. Coli, CoNS
49	suprapubic, perineal pain	E. Coli
38	haemospermia	E. Coli
48	testicular pain	CoNS, Staphylococcus aureus
31	perineal pain	E. Coli
21	scrotal, testicular pain	Enterococcus
27	penile, scrotal pain	E. Coli
56	suprapubic pain	Proteus
65	perineal pain, LUTS	CoNS, Enterococcus
37	suprapubic, perineal pain	E. Coli
61	penile, suprapubic pain,	E. Coli erectile dysfunction
64	haemospermia	Enterococcus
34	febrile prostatitis	E. Coli

Table 4.

Outcome at follow-up in group 1.

	1st	2nd	3rd
1	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
2	symptomatic bacterial eradication	asymptomatic bacterial eradication	Symptomatic bacterial eradication
3	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
4	symptomatic bacterial eradication	symptomatic bacterial eradication	asymptomatic bacterial eradication
5	asymptomatic bacterial eradication	asymptomatic bacterial eradication	did not attend
6	symptomatic bacterial eradication	asymptomatic bacterial eradication	Symptomatic morganella
7	symptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
8	symptomatic Proteus	asymptomatic bacterial eradication	asymptomatic bacterial eradication
9	symptomatic bacterial eradication	asymptomatic bacterial eradication	symptomatic bacterial eradication
10	symptomatic CoNS	symptomatic bacterial eradication	symptomatic bacterial eradication
11	symptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
12	symptomatic bacterial eradication	symptomatic bacterial eradication	asymptomatic bacterial eradication
13	asymptomatic bacterial eradication	asymptomatic bacterial eradication	did not attend
14	symptomatic Proteus	symptomatic Enterococcus	asymptomatic bacterial eradication
15	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
16	symptomatic bacterial eradication	symptomatic bacterial eradication	symptomatic bacterial eradication
17	symptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
18	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
19	asymptomatic bacterial eradication	did not attend	did not attend
20	symptomatic bacterial eradication	symptomatic bacterial eradication	asymptomatic bacterial eradication
21	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
22	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
23	symptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
24	asymptomatic bacterial eradication	asymptomatic bacterial eradication	did not attend
25	symptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
26	asymptomatic bacterial eradication	symptomatic bacterial eradication	asymptomatic bacterial eradication
27	symptomatic Chlamydia	asymptomatic bacterial eradication	asymptomatic bacterial eradication
28	asymptomatic bacterial eradication	did not attend	did not attend

had positive cultures. Bacterial eradication was achieved in 24 patients in group 1 and 25 patients in the second group (Tables 4, 5).
Comparison of culture results before and after treatment as well as symptoms questionnaire analysis revealed not statistically significant differences between the two groups with regard to outcome (Table 6).
In contrast, symptoms questionnaire analysis revealed statistically significant differences between the two groups with regard to symptoms regression (Table 6).

2nd follow up visit: At the second follow-up 7/26 patients in the first group and 1/25 in the second group (5 patients did not attend) reported persistence of symptoms. Of note, two of these patients (one in each group) reported recurrence of the symptoms despite being asymptomatic at the first follow-up. Since, only one patient from each group had a positive culture, bacterial eradication was achieved in 25/26 patients of the first group and 24/25 patients of the second group (Tables 4, 5). Comparison of culture results before and after treatment as well as symptoms questionnaire analysis revealed not statistically significant differences between the two groups with regard to outcome (Table 7). In contrast, symptoms questionnaire analysis revealed statistically significant differences between the two groups with regard to symptoms regression (Table 7).

3rd follow up visit: At the third follow-up, 5/23 patients in the first group (5 patients did not attend) reported persistence of symptoms (3 of these patients were asymptomatic at the 2nd follow-up) whereas only 1/22 patients in the second group (6 patients did not attend) reported persistence of symptoms. Only one patient from the 1st group had a positive culture (Tables 4, 5). Comparison of symptoms questionnaire results before and after treatment analysis revealed statistically significant differences between the two groups with regard to outcome while comparison of culture results not (Table 8).
Notably, in most cases the microorganism grown was different to that of the initial culture. Comparison of the IPSS and IIEF-5 questionnaire scores revealed statistically significant differences with regard to improvement of urinary symptoms ($p < 0.05$) and no statistically significant differences with regard to erectile and sexual dysfunction ($p > 0.05$).

Table 5.

Outcome at follow-up in group 2.

	1st	2nd	3rd
1	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
2	asymptomatic bacterial eradication	asymptomatic bacterial eradication	did not attend
3	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
4	symptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
5	asymptomatic bacterial eradication	asymptomatic bacterial eradication	symptomatic bacterial eradication
6	symptomatic Proteus	asymptomatic bacterial eradication	asymptomatic bacterial eradication
7	asymptomatic CoNS	asymptomatic CoNS	asymptomatic bacterial eradication
8	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
9	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
10	asymptomatic bacterial eradication	did not attend	asymptomatic bacterial eradication
11	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
12	asymptomatic bacterial eradication	asymptomatic bacterial eradication	did not attend
13	symptomatic Enterococcus	symptomatic bacterial eradication	asymptomatic bacterial eradication
14	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
15	symptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
16	asymptomatic bacterial eradication	did not attend	did not attend
17	symptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
18	symptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
19	asymptomatic bacterial eradication	symptomatic bacterial eradication	asymptomatic bacterial eradication
20	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
21	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
22	symptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
23	symptomatic bacterial eradication	asymptomatic bacterial eradication	did not attend
24	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
25	asymptomatic bacterial eradication	asymptomatic bacterial eradication	asymptomatic bacterial eradication
26	asymptomatic bacterial eradication	did not attend	asymptomatic bacterial eradication
27	symptomatic bacterial eradication	asymptomatic bacterial eradication	did not attend
28	symptomatic bacterial eradication	asymptomatic bacterial eradication	did not attend

Table 6.

Statistical evaluation of outcomes at 1st follow up.

	N		Mean		p value
	Group 2	Group 1	Group 2	Group 1	
Differences in symptom regression between group 1 and 2	28	28	,64	,46	,022
Differences in bacterial eradication between group 1 and 2	28	28	,1429	,1071	,326

Table 7.

Statistical evaluation of outcomes at 2nd follow up.

	Ranks	N	p value
Differences in symptom regression between group 1 and 2	Negative Ranks	5(a)	,025
	Positive Ranks	0(b)	
	Ties	20(c)	
	Total	25	
Differences in bacterial eradication between group 1 and 2	Negative Ranks	0(a)	,317
	Positive Ranks	1(b)	
	Ties	24(c)	
	Total	25	

Table 8.
Statistical evaluation of outcomes at 3rd follow up.

	Ranks	N	p value
Differences in symptom regression between group 1 and 2	Negative Ranks	4(a)	,046
	Positive Ranks	0(b)	
	Ties	18(c)	
	Total	22	
Differences in bacterial eradication between group 1 and 2	Negative Ranks	1(a)	,317
	Positive Ranks	0(b)	
	Ties	21(c)	
	Total	22	

Discussion

The most widely known phytotherapeutic is saw palmetto. Its fruit are rich in fatty acids and phytosterols and its extract known as *Serenoa repens* is prescribed in many countries (mainly in Europe) under different brand names (*Permixin, Prostamol uno, Permixon etc*). It has been the object of intense research into the treatment of symptoms of benign hypertrophy and (lately) of infections of the urinary tract, having been used as a sole agent, in combination with or in comparison to other phytotherapeutics, combined with antibiotics, with alpha-blockers, anti-inflammatory agents and 5-alpha reductase inhibitors. Results are conflicting given that in these studies the outcomes measured as well as the materials and methods used differ. On the other hand, conditions such as chronic bacterial and chronic non-bacterial prostatitis and prostatic hypertrophy overlap, many of the symptoms are common, while conditions and diseases of organs other than the prostate can contribute towards the presentation or deterioration of these symptoms.

A prospective multi-centre double-blind randomized trial by *Debruyne et al.* compared tamsulosin (0.4 mg/24 h) to Permixon (320 mg/24 h) in a substantial number of patients (542) suffering from symptomatic prostatic hypertrophy (IPSS ≥ 10). After 12 months of follow-up no differences in IPSS were noted (average reduction of 4.4 in each group, with a respective improvement in both irritative and obstructive symptoms) and the improvement in Q_{max} (1.8 ml/s Permixon vs. 1.9 ml/s tamsulosin) and PSA fluctuations were similar in both groups. By contrast, a small reduction in prostate size was noted in the Permixon group. Both treatments were well tolerated (11). A multicenter trial by the *Italian Society of Oncological Urology* studied the effectiveness of *Serenoa repens* in patients with chronic non-bacterial prostatitis comparing it to a combination of *Serenoa repens* and alpha-blocker. After a 6 month follow-up, similar changes in the uroflowmetry parameters of both groups were found and no changes were noted in the IIEF-5 sexual function questionnaire (a fact which may be related to both the lack of antiandrogen activity as well as reduced effectiveness in erectile dysfunction). A notable improvement in findings relating to inflammation was reported (on digital rectal examination, ultrasound and prostate biopsy) (12). *Aliaev et al.* retrospectively studied the effectiveness of Prostamol uno (320 mg/24 h) as complementary treatment in the prevention of relapses of chronic bacterial prostatitis. After 5 years the improvement in both subjective (IPSS) and objective (reduction in percentage of relapse and progression, improvement in sexual function) measures of the study was greater with the addition of Prostamol uno to the standard therapy consisting of anti-inflammatory and antimicrobial agents (13). Similar results are reported by *Reissigl et al.* with Permixin used for chronic pelvic pain syndrome, while the safety profile noted was equivalent to studies mentioned above (14).

In addition to the findings of the above mentioned studies, we demonstrated the early onset of the effect of *Serenoa repens* on symptoms regression as well as the maintenance of this effect during the study period. Of note, *Barry et al.* researched any potential clinical benefit in increasing the dose administered to patients with lower urinary tract symptoms. According to their results a gradual increase in the dose administered (3 times the standard dose in 16 months) does not reduce urinary symptoms more than placebo. Interestingly, no negative effects were observed which could distinctly be attributed to *Serenoa repens* (15).

On the other hand, *Kaplan et al.* in a prospective study comparing the extract of saw palmetto against finasteride found no appreciable long term improvement (at 1 year follow-up) in type III prostatitis symptoms (16), while *Pavone et al.* noted a greater reduction in pain and irritative symptoms (albeit with no changes in flow rate and prostate volume) using combinations of phytotherapeutic agents (*Serenoa repens*, Urtica dioica and Pinus pinaster) (17). Based on the above we expect the effectiveness of *Serenoa repens* in an array of symptoms related to prostatitis to depend on the type of prostatitis, the presence of prostatic hypertrophy, any preexisting obstruction, co-administered treatments and the duration of treatment. This hypothesis explains the differences between the present study and what has been discussed above. However, the small number of patients included in the above mentioned studies as well as differences in methodology and outcomes render the drawing of conclusions problematic.

Conclusions

Serenoa repens extract is effective in the treatment of pain symptoms in chronic bacterial prostatitis. An adminis-

tration period of 8 weeks appears to improve the effect of antibacterial therapy on pain while a longer duration of administration possibly alleviates the remaining symptoms. More randomized placebo-controlled studies are required to substantiate safer conclusions.

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