Symptomatic comparison in efficacy on patients with benign prostatic hyperplasia treated with two therapeutic approaches

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Summary
Objectives: A randomised controlled trial was performed to compare the symptomatic effects on patients with benign prostatic hyperplasia (BPH) treated by two therapeutic approaches — the Western medicine (WM) and traditional Chinese medicine (TCM).
Methods: Four primary outcome measures, namely the quality of life (QOL), maximum urine flow ratio (UFR), International Prostate Symptom Score (IPSS) and prostate volumes, as well as four urethra-related and 35 non-urethra-related symptoms, were investigated to evaluate the effects on 31 BPH patients subjected to WM (Terazosin Hydrochloride Hytrin, THH) and 30 cases to TCM (herbal *Saxifrage* tablet, HST). The effects of both treatments are compared by the two-sample Kolmogorov—Smirnov test. The contributions of symptoms for four assessments are analysed by the logistic regression model and the Chow test.
Results: The effect of TCM is weaker than that of WM in the assessment of the IPSS score ($p < 0.05$), and both treatments are similar in the prostate volumes, the maximum UFR and the QOL assessments ($p > 0.05$), as well as in the effective number of urethra-related or non-urethra-related symptoms before and after treatment ($p > 0.05$). By comparing the linear regression models, different urethra-related and non-urethra-related symptom patterns associated with TCM and WM therapies are detected for four assessments, especially for the prostate volume assessment ($p < 0.01$).
Conclusion: TCM (HST) is a potentially effective treatment in improving the QOL, prostate volumes and maximum UFR for patients with BPH, though it is less effective in ameliorating the IPSS score when compared with WM (THH). The non-urethra-related symptoms experienced by BPH patients might be one of the parameters to further achieve the tailored diagnosis and treatment for BPH.

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Benign prostatic hyperplasia (BPH) is an almost universal occurrence in ageing men and is probably the most common benign human neoplasm.[1,2] Due to the increased ageing population and the expectations with regard to the quality of life (QOL), the demand for health care relating to BPH is urged. It has been recognised for a long time that the symptomatology of BPH is a complex issue, and the clear-cut indications for its therapeutic intervention are still few.[3] BPH is associated with different pathogeneses, clinical features and prognoses. It remains difficult to define it clinically or measure objectively[4], which causes trouble not only with regard to the treatment, but also with regard to the evaluation for therapeutic effects on patients with BPH.

Herbal products from traditional Chinese medicine (TCM) are considered as a powerful new trend in the development of novel pharmaceuticals,[5] and have gained increasing attention for their extensive applications in treatment of diseases. It is known that herbal medicines may also provide an attractive alternation to the conventional medicine for treating BPH.[6,7] BPH is usually attributed to the TCM category of 'Long-Bi', which encompasses difficulty in urination, pain and fullness in the lower abdomen and obstructed urination. More importantly, TCM treatment is characterised by not only the investigation of complex symptoms of disease, but also the differentiation of ZHENG (TCM Syndrome), a key concept in TCM with certain symptom patterns as its manifestations and biological network disturbances as its possible underlying mechanism.[8] From the view of TCM, 'Long-Bi' represents the main illness of dysuria resulting from the different ZHENG-related symptom patterns, such as the pathologic dampness—heat and/or the deficiency of Vital Qi.[9,10] Many Chinese herbal medicines based on the rich experiences of ZHENG differentiation are also found to be effective in treating patients with BPH.[5–7] Therefore, understanding empirical symptom patterns of 'Long-Bi' in TCM may benefit current therapeutic strategies for the management of BPH patients.

Symptomatic effects are also of great importance in the evaluation of treatments. The methodological progress in the field of evidence-based medicine (EBM)[11] may provide a means to reveal the symptom patterns, as well as the correlations between urethra-related and non-urethra-related changes in patients with BPH. The patient report outcome (PRO), which includes the functional or symptomatic index and QOL[12] index, has gained more and more appreciation along with the transformation of current medical paradigm.[13] Many questionnaires such as the Nottingham health profile,[14,15] the general health questionnaire[16] and the sickness impact profile[17] have been brought forward and used widely in clinical trials. The International Prostate Symptom Score (IPSS), originally known as the American Urological Association (AUA) Score, is the most commonly used scoring system for the quantification of BPH symptoms.[15] However, in clinical studies, it is still a persistent point as regards whether an evaluative system can entirely reflect the therapeutic effects or not, and then to guide the establishment of therapeutic schemes and the application of treatments. TCM devotes its attention to the self-reported symptoms of patients and the diagnostic methods of tongue and pulse, which is different from Western medicine (WM) that emphasizes on impersonal information such as laboratory data. Moreover, according to TCM observations, we found that clinical symptom patterns might provide a better understanding of the pathogenesis and diagnosis for the *Helicobacter pylori* infection in chronic gastritis[18] and the treatment of Severe Acute Respiratory Syndromes.[19] Thus, TCM may be a new avenue for further understanding the complex symptoms experienced by patients with BPH.

In the present study, a randomised controlled trial (RCT) was performed and the self-reported symptoms associated with clinical effects of BPH patients subjected to TCM (herbal *Saxifrage* tablet) and WM (Terazosin Hydrochloride Hytrin) treatments were investigated. The patterns of the urethra-related and non-urethra-related symptoms in BPH patients for evaluating TCM and WM treatments, as well as the relationships between the symptom patterns and four primary outcome measures, were further analysed by several statistical methods, especially the Chow test.

Patients and methods

Patients

A total of 61 patients residing in China who agreed to participate in this study and who had not received androgen and radiation therapies were randomly selected. Ages of patients ranged from 55 to 76 years old with a mean of 62. All cases with symptomatic BPH, enlarged prostates and no evidence of prostate cancer were diagnosed by ultrasonography, history of dysuria, residual urine and urine flow ratio (UFR) measurements and urinary cystoscopy. All patients were investigated by the Institute of Basic Theory, Chinese Academy of Traditional Chinese Medicine and observed in randomised and controlled clinical trials with the scheme approved by the Medical Ethics Forum of China Academy of Traditional Chinese Medicine.

TCM and WM treatments

Patients were divided into two groups and subjected to the treatment of TCM or WM at random. Thirty-one cases of the patients with BPH were subjected to WM treatment. Terazosin Hydrochloride Hytrin (THH) was purchased from Abbott Ltd., USA (Product License: HK-28971) and administrated at a dose of 2 mg, once a day for 8 weeks. As many as 30 cases of the patients with BPH were subjected to TCM treatment. Herbal *Saxifrage* tablet (HST, Good Manufacturing Practice, Herbal Preparation Lab, Nantong Traditional Chinese Medical Hospital, China), was prepared with extraction from the Chinese herb *Saxifraga stolonifera* Meerb. It mainly contains bergenin, quercitrin, quercetin, protocatechic acid, gallic acid, succinic acid and mesoconic acid. Among them, the contents of bergenin (more than 36%) and protocatechic acid (more than 1.241%) were taken as the parameters for quality control. HST was administrated at a dose of $2 \, mg \, day^{-1}$. Both the THH and HST drugs had the same appearance due to the addition of excipients. The period of both treatments was 8 weeks.

Primary outcome assessments

Four primary outcome measures were employed to evaluate the curative effects of both TCM and WM treatments.

QOL[12]: All patients reported their symptoms by self-evaluation according to each item listed in the QOL questionnaire. An answer from delight to annoyance gained a score from 0 to 6.

Maximum urine flow ratio (*UFR*): The maximum UFR of 61 cases with BPH was determined by the DantecUro-System-2100 type of urodynamic instrument.

IPSS assessment[12]: The IPSS questionnaire was initially self-administered in 61 consecutive patients, and the self-reported scores for urinary symptoms were used to identify the effects of both TCM and WM treatments. The scores from 0 to 7 indicated mild symptoms, from 8 to 19 indicated moderate symptoms and from 20 to 35 indicated severe symptoms according to the American Urological Association Symptoms Index Score.

Prostate volume: The prostate volume was diagnosed by ultrasonography and calculated by the formula: prostate volume = 0.52 'light and right diameter' multiplied by 'top and bottom diameter', then multiplied by 'occipitofrontal diameter'.

Criterion of curative effects

According to the AUA score, the assessments of QOL, IPSS, maximum UFR and prostate volumes before and after treatment were compared and the results were divided into three degrees: excellent, good and inferior, with a value of (2), (1) and (0), respectively.[20] Since the scale used for four measures of the curative effects was ordinal from 0 to 2 in this investigation, the appropriate non-parametric statistics was required for further analysis.

Clinical symptom observations

With regard to TCM, a total of 39 symptoms related to BPH were selected, according to the clinic terminology of traditional Chinese medical diagnosis and treatment — ZHENGs,[9] and the criteria of diagnosis and therapeutic effect on diseases and ZHENGs in TCM.[10] These symptoms were divided into two categories of urethra-related and non-urethra-related and investigated on 61 patients suffering from BPH. The urethra-related symptoms included the following four symptoms: dysuria, oliguria, anuria, and deep-coloured urine with burning sensation during urination. The non-urethra-related symptoms contained the following 35 symptoms: depressed or irritability, dizziness and tinnitus, dry throat and polydipsia, dry throat and restlessness, thirst but do not desire drink, bitter taste, loss of appetite, fatigue and weak, heat sensation on the palm and sole, aversion to cold and cold limbs, distention in the lower abdomen and difficulty in defecation, distention or urgent pain in the lower abdomen, distention and pain in the lower abdomen, bearing-down sensation and pain in the lower abdomen, distending fullness in the hypochondrium and abdomen, cold-pain in the lumbar region and knees, soreness and weakness of the lumbar region and knees, timid and weak mind, hectically flushed cheeks, pale complexion, pale tongue with thin fur, naked red tongue, yellowish and greasy fur, red tongue with thin and white fur, red tongue with thin and yellow fur, dark purple tongue, sunk and thready pulse, sliding and rapid pulse, hesitant pulse, rapid pulse, faint pulse, thready and rapid pulse, stringy pulse, rapid breathing, and shortness of breath and low voice.

Statistical analysis

By using SPSS 11.0 software, the two-sample Kolmogorov—Smirnov test was used for the comparison of the curative effects resulting from four assessments between the TCM treatment and the WM treatment. For the 39 symptoms related to BPH, we also created a count variable that represented the number of either urethra-related or non-urethra-related symptoms before and after treatment; the difference in the number of symptoms before and after was analysed using the two-sample Kolmogorov—Smirnov test across the TCM and WM groups. The level of significance was set at $\alpha = 0.05$.

We further analysed the correlation between the effects derived from four assessments and the 39 symptoms by the following procedures. First, we normalised the degrees of curative effects, that is (0), (1) and (2), of each assessment to three classes as (0, not 0), (1, not 1) and (2, not 2). Second, by using the logistic regression analysis, we selected the symptoms that affected each assessment with a statistical significance ($p < 0.05$), respectively. Third, by using these statistically significant symptoms, we employed the Chow test[21] to evaluate two linear regressions between the TCM treatment and the WM treatment.

The Chow test is a commonly used econometric test of whether the coefficients in two linear regressions on different data are equal. It is calculated by three steps in the present work. To begin, we suppose the model of data is $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \xi$, where y denotes the dependent factor such as the prostate volumes, the maximum UFR, the IPSS assessment and the QOL scores respectively, and x indicates independent factors such as different symptoms. Then, we split the data into two groups of TCM and WM and hence have $y = \beta_{0TCM} + \beta_{1TCM} x_1 + \beta_{2TCM} x_2 + \xi$ and $y = \beta_{0WM} + \beta_{1WM} x_1 + \beta_{2WM} x_2 + \xi$. Under the assertion that $\beta_{0TCM} = \beta_{0WM}$, $\beta_{1TCM} = \beta_{1WM}$ and $\beta_{2TCM} = \beta_{2WM}$, the Chow test statistic is calculated by $((S - S_{TCM} - S_{WM})/k)/((S_{TCM} + S_{WM})/(N_{TCM} + N_{WM} - 2k))$, where S, S_{TCM} and S_{WM} are the sum of squared residuals from the combined data, the TCM group and the WM group, respectively. N_{TCM} and N_{WM} are the number of observations in each group and k is the total number of parameters. The test statistic follows the F distribution with k and $N_{TCM} + N_{WM} - 2k$ degrees of freedom.

Results

Effects on patients with BPH by TCM and WM treatments

There were no significant differences between the randomly selected TCM and WM treatment groups in age, course of diseases, and the before-treatment scores of QOL, the maximum UFR, IPSS and prostate volumes ($p > 0.05$). After 8 weeks' treatments, the effects of TCM (HST) are found to be weaker than that of WM (THH) in the assessment of the IPSS score ($p < 0.05$) by using the two-sample Kolmogorov—Smirnov test (Table 1). However, there are no

Table 1 Curative effects on the patients with benign prostate hyperplasia under the TCM (HST) and WM (THH) treatments.

Assessment	Treatment	Number of patients	Mean ± SD[a]	Asymp. Sig. (2-tailed)[b]
Quality of life	TCM (HST)	30	0.37 ± 0.61	0.271
	WM (THH)	31	0.81 ± 091	
Maximum UFR	TCM (HST)	30	0.50 ± 0.82	0.475
	WM (THH)	31	0.90 ± 0.94	
IPSS	TCM (HST)	30	0.83 ± 0.87	0.026
	WM (THH)	31	1.42 ± 0.89	
Prostate volumes	TCM (HST)	30	1.03 ± 0.89	0.107
	WM (THH)	31	1.48 ± 0.85	

Abbreviations: HST = herbal *Saxifrage* tablet; IPSS = International Prostate Symptom Score; UFR = urine flow ratio; SD = standard deviation; TCM = traditional Chinese medicine; THH = Terazosin Hydrochloride Hytrin; WM = Western medicine.
[a] The variable for each of the four assessments is the difference between baseline and follow-up scores and recorded as 0, 1 or 2, i.e. inferior, good, or excellent.
[b] Comparison between the TCM treatment and the WM treatment is calculated by the two-sample Kolmogorov–Smirnov test.

significant differences between both treatment groups when evaluating by prostate volumes, QOL and the maximum UFR, respectively ($p > 0.05$, see Table 1), as well as evaluating by the number of either urethra-related or non-urethra-related symptoms before and after treatments ($p > 0.05$, see Table 2), suggesting that TCM (HST) has a WM (THH)-comparative effect on improving the clinical features of patients with BPH.

Symptomatic comparison for QOL assessment

Then we calculated the correlation between the effects derived from four assessments and the 39 symptoms by following the steps of regression analysis. Table 3 summarises all the logistic regression models, F-statistic as well as the results of the Chow test for four assessments and their relationships with related symptom patterns between the TCM treatment and the WM treatment.

As shown in Table 3, symptom patterns related to the evaluation of the QOL scores for the TCM and WM treatments are as follows: oliguria, red tongue with thin and yellow fur, dark purple tongue, bitter taste, deep-coloured urine with burning sensation during urination, dry throat and polydipsia and pale complexion. Thus, two urethra-related symptoms coupled with five non-urethra-related symptoms are included in the equation of the regression analysis.

Such symptom patterns may reflect QOL changes. Among them, the symptom of dark purple tongue is selected in the regression model of QOL for WM treatment but eliminated from the model regarding TCM treatment. When the two sets of coefficients in linear regression models are compared, there is no significant difference ($p > 0.05$) in the contribution of symptom patterns for QOL scores between both treatment groups.

Symptomatic comparison for maximum UFR assessment

As presented in Table 3, symptom patterns associated with the evaluation of the maximum UFR for the TCM and WM treatments include oliguria, red tongue with thin and yellow fur, dark purple tongue, thready and rapid pulse, distention in the lower abdomen and difficulty in defecation. The first three symptoms are shared by both equations for the QOL and the maximum UFR assessment. Likewise, the symptom patterns are similar to those for the QOL scores between TCM and WM therapies. When the two sets of coefficients in linear regression models from both treatment groups were compared, the Chow test resulted in $p > 0.05$, suggesting no significant difference in the contribution of symptom patterns for the maximum UFR assessment between TCM and WM therapies.

Table 2 Comparison for the number of urethra-related or non-urethra-related symptoms before and after treatments between the TCM and WM groups.

Number of symptoms	Treatment	Number of patients	Number of symptoms	Mean ± SD	Asymp. Sig. (2-tailed)[a]
Urethra-related symptoms	TCM (HST)	30	4	2.27 ± 0.83	0.974
	WM (THH)	31	4	2.03 ± 0.80	
Non-urethra-related symptoms	TCM (HST)	30	35	8.10 ± 1.99	0.660
	WM (THH)	31	35	8.74 ± 2.08	

Abbreviations: HST = herbal *Saxifrage* tablet; SD = standard deviation; TCM = traditional Chinese medicine; THH = Terazosin Hydrochloride Hytrin; WM = Western medicine.
[a] Calculated by the two-sample Kolmogorov–Smirnov test.

Table 3 Chow test for the logistic regression models of four assessments and their relationships with related symptom patterns between the TCM treatment and the WM treatment.

Assessment	Symptom	Standardised beta	
		TCM (HST)	WM (THH)
Quality of life	Oliguria	−0.373	−0.527
	Red tongue with thin and yellow fur	−0.264	−0.117
	Dark purple tongue	NA	0.347
	Bitter taste	0.302	0.252
	Deep-coloured urine with burning sensation during urination	−0.366	−0.111
	Dry throat and polydipsia	−0.176	−0.387
	Pale complexion	−0.345	−0.171
	F-Statistic	0.715	
	p value	0.659	
Maximum UFR	Oliguria	−0.137	−0.509
	Red tongue with thin and yellow fur	−0.089	0.154
	Dark purple tongue	NA	0.337
	Thready and rapid pulse	0.488	0.469
	Distention in the lower abdomen and difficulty in defecation	0.209	0.108
	F-Statistic	1.455	
	p value	0.221	
IPSS	Oliguria	−0.505	−0.115
	Bitter taste	0.107	0.109
	Loss of appetite	−0.127	−0.327
	Distention and pain in the lower abdomen	0.038	−0.565
	Shortness of breath and low voice	0.21	−0.038
	Rapid breathing	−0.207	0.018
	Cold-pain in the lumbar region and knees	−0.049	−0.06
	Aversion to cold and cold limbs	−0.257	0.036
	Soreness and weakness of the lumbar region and knees	0.435	0.103
	F-Statistic	1.968	
	p value	0.0687	
Prostate volumes	Anuria	0.198	0.051
	Bitter taste	0.126	0.138
	Loss of appetite	0.093	−0.391
	Distention and pain in the lower abdomen	−0.048	−0.538
	Shortness of breath and low voice	0.586	0.07
	Depressed emotion or irritability	0.116	0.078
	Naked red tongue	−0.22	−0.21
	Faint pulse	−0.166	−0.095
	Heat sensation on the palm and sole	0.256	0.189
	F-statistic	3.328	
	p value	0.006	

Abbreviations: HST = herbal *Saxifrage* tablet; NA = not available in the regression model; IPSS = International Prostate Symptom Score; UFR = Urine flow ratio; TCM = Traditional Chinese medicine; THH = Terazosin Hydrochloride Hytrin; WM = Western medicine.

Symptomatic comparison for IPSS assessment

As shown in Table 3, the IPSS assessment of both treatments is associated with one urethra-related symptom, oliguria, as well as eight non-urethra-related symptoms of bitter taste, loss of appetite, distention and pain in the lower abdomen, shortness of breath and low voice, rapid breathing, cold-pain in the lumbar region and knees, aversion to cold and cold limbs and soreness and weakness of the lumbar region and knees. Among these symptoms, three non-urethra-related symptoms, that is, distention and pain in the lower abdomen, shortness of breath and low voice and aversion to cold and cold limbs, are diverse in TCM and WM treatments. Further, the results show that there is no significant difference ($p > 0.05$) in the contribution of non-urethra-related symptoms in the IPSS assessment between TCM and WM therapies.

Symptomatic comparison for prostate volumes

As shown in Table 3, the prostate volume assessment of both treatments is related to the following symptom patterns: one urethra-related symptom of anuria, as well as eight non-urethra-related symptoms such as bitter taste,

loss of appetite, distention and pain in the lower abdomen, shortness of breath and low voice, depressed emotion or irritability, naked red tongue, faint pulse and heat sensation on the palm and sole. The first four non-urethra-related symptoms overlap with those for IPSS assessment. Thus, not only the urethra-related symptoms, but also the non-urethra-related symptoms are associated with IPSS assessment and prostate volumes and could be worthy of further analysis. Moreover, other than the models about three assessments above, a significant difference is detected in the contribution of symptom patterns for the prostate volume assessment between TCM and WM therapies, as indicated by the Chow test ($p < 0.01$). This result suggests that in view of the prostate volume assessment, the non-urethra-related symptoms experienced by BPH patients are valuable for distinguishing the effects of TCM from those of WM.

Discussion

In the present study, we conducted a symptomatic comparison in efficacy on patients with BPH treated with two therapeutic approaches, in which herbal *Saxifrage* is considered as a typical treatment of TCM and THH as a typical treatment of WM. Herbal *Saxifrage*, a commonly used herbal medicine for the treatment of BPH, mainly consists of bergenin, quercetinic acid 3, quercitrin, acid pyrogallol and succinate, and is reported to possess an efficacy of anti-inflammation and detoxification.[22] Moreover, bergenin and its derivatives have moderate antioxidant activities[23] and hepatoprotective effects.[24] In WM, THH acts as an adrenoceptor retardant and is a generally acknowledged effective drug, which can remit the prostatic obstruction of BPH patients,[20,25] whereas side effects of THH are detected and include postural hypotension, confused state of mind, tachycardia and circulatory disorders. In our study, there are no significant differences in QOL and the maximum UFR between both TCM (HST) and WM (THH) treatment groups (Table 1), which indicate that herbal *Saxifrage* may serve as a potentially efficient medicine for BPH and may contribute to the therapy of BPH. In the meantime, by the IPSS assessment ($p < 0.05$), the effect of HST was weaker than that of THH.

Interestingly, by introducing the comprehensive TCM symptomatic observations, we found that the symptom patterns are helpful for interpreting the curative effects of QOL, the maximum UFR, IPSS and prostate volume assessments from the linear regression analysis (Table 3). Moreover, we employed the Chow test for roughly evaluating the two linear regression models about TCM and CM. Analysis showed that there are significant differences in the contributions of non-urethra-related symptoms for the prostate volume assessment between TCM and WM therapies (Table 3), suggesting that the different non-urethra-related symptom patterns might have a certain relation to the assessment of treatment, for example, prostate volumes of BPH. In this sense, symptom patterns could be worthy of further understanding the complex manifestations of BPH. As we have known, the treatments of BPH in TCM are based on the rule of differentiation of ZHENG.[9,10] Therefore, the effects of TCM and WM, which are associated with different symptom patterns, might indicate different strategies for the treatment of patients with BPH.

The complexity and diversity of clinical manifestations lead to a diagnostic and therapeutic dilemma for BPH. BPH causes significant pathologic changes in the urethra of some patients and symptoms in others.[26] The symptoms and/or pathologic effects of BPH are the results of its secondary effects on the bladder and kidneys. Finally, the principal symptoms that draw attention to a significant urethra problem from BPH may be due to the secondary phenomena such as chronic or recurrent bacterial urethra infection or to symptoms resulting from impaired kidney function.[26] The stimulus to seek an evaluation of voiding dysfunction possibly caused by BPH has traditionally been the presence of lower urethra symptoms. The results indicate that BPH may have the same pathologic change with diverse clinical manifestations and the integrity dysfunction could not be reflected entirely by the objective measurements alone. Thus, we should be well aware of the psychological and the integrative impacts of BPH for the diagnostic and therapeutic evaluations of BPH. The current criteria might be incapable of evaluating the integrative function in BPH patients and the corresponding effects of TCM.

As for the methodology used in the present study, the analysis results for the first time demonstrated that the Chow test is suitable to capture the symptomatic differences associated with both TCM and WM treatments. Since the Chow test can evaluate equality between sets of coefficients in two linear regression models based on small samples, it has gained increasing use in many econometric and non-econometric fields as well as recent medical studies and comparative studies.[27,28] The Chow test, on the other hand, is not robust in the presence of heteroscedastic disturbance terms,[29] so more powerful and state-of-art methods, such as bioinformatics and systems biology approaches,[30] are still required to facilitate the establishment of an evaluative system for symptomatic effects.

In summary, the present work provides preliminary evidence that the symptom patterns might be of benefit to the diagnosis and treatment of BPH in practicality and in methodology. We believe that the creation of an efficient outline for clinical evaluations of BPH, which pays close attention to both urethra-related and non-urethra-related symptoms, will help to design a tailored management for patients with BPH in the future.

Conclusion

Our investigation indicates that TCM had a similar efficacy in improving the prostate volume, the QOL and the maximum UFR scores for BPH, though it was less effective in the IPSS assessment when compared with Western medicine. We further find the statistically different contributions of non-urethra-related symptoms accounting for the prostate volume assessment between TCM and WM therapies, and that the non-urethra-related symptoms experienced by BPH patients might be a potential parameter for differentiating both therapies. These findings may also be helpful for further comprehending the symptom patterns, as well as the correlations between urethra and non-urethra-related changes in patients with BPH.

Acknowledgements

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