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·Clinical Experience·

Factors influencing the diagnosis and treatment of chronic prostatitis among urologists in China

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Abstract

Aim: To identify the factors influencing diagnosis and treatment of chronic prostatitis (CP) among Chinese urologists. **Methods:** A sample of 656 urologists from 29 provinces of China were asked to complete a questionnaire that explored attitudes towards CP as well as diagnosis and treatment patterns in the management of CP. Both univariate and multivariate logistic regression analysis schemes were used to determine the factors that influence the diagnosis and treatment of CP. **Results:** A total of 656 questionnaires were given out. All were returned and 410 of those were included in the final univariate and multivariate analysis. Multivariate logistic regression analysis indicated that belief of bacterial infection in the etiology of CP (odds ratio [OR], 2.544; 95% confidence interval [CI], 1.650–3.923; $P < 0.001$) was the most significant factor influencing the routine performance of bacterial culture test. Using the same model, the type of hospital (OR, 2.799; 95% CI, 1.719–4.559; $P < 0.001$) and the routine use of the 4- or the 2-glass test (OR, 3.194; 95% CI, 2.069–4.931; $P < 0.001$) were determined to be significant factors influencing the use of the National Institutes of Health (NIH) new classification system. According to the same model, belief of bacterial infection in the etiology of CP (OR, 3.415; 95% CI, 2.024–5.762; $P < 0.001$) and the routine use of bacterial culture test (OR, 2.261; 95% CI, 1.364–3.749; $P < 0.01$) were important factors influencing the routine prescription of antibiotics. **Conclusion:** Our findings suggest that attitudes towards CP, and the characteristics of individual urologists' practices may influence the diagnosis and treatment of CP among Chinese urologists. *(Asian J Androl 2008 Jul; 10: 675–681)*

Keywords: chronic prostatitis; diagnosis; therapy; physicians' practice patterns; cross-sectional studies; multivariate analysis

1 Introduction

Chronic prostatitis (CP) is one of the most common entities encountered in urologic practice and represents an important international health problem [1]. Overall, 2%–10% of adult men suffer from symptoms compatible with CP at any time and approximately 15% of men suffer from symptoms of prostatitis at some point in their lives [1]. In the USA, the cost of prostatitis is approximately USD 84 000 000 annually, exclusive of pharmaceutical spending [2]. In cross-sectional studies, CP is associated with reductions in patients' quality of life, similar to or greater than those associated with angina, congestive heart failure, Crohn's disease and diabetes

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mellitus [3]. However, CP is generally acknowledged as a source of great confusion and frustration for physicians and patients alike [4]. Several surveys of physicians have been undertaken in order to examine the characteristics of their practice, attitude, diagnostics and treatment modalities applied in patients with CP [4–12]. These surveys demonstrate that physicians show large deficits in familiarity with and knowledge of CP along with significant variability in their approaches to diagnosis and treatment. However, surveys concerning factors influencing diagnosis and treatment of CP among urologists are rarely seen. To our knowledge, no such survey has been undertaken in China. In addition, the Chinese health insurance system is different from that in other countries and the practice patterns of Chinese urologists may have their own characteristics compared with that in other countries. With the goal of defining any influencing factors affecting the diagnosis and treatment patterns for cases of CP, we attempted to determine whether or not physicians' individual or practice characteristics have any influence on diagnostic and therapeutic patterns.

2 Materials and methods

We conducted this survey during the 13th China National Urology Academic Conference and the 8th Global Chinese Urology Academic Conference (CUA 2006), which was held in Shenyang, China on 13–15 October 2006. Study populations were drawn from the representatives attending the CUA 2006 meeting, and the questionnaires were sent to a sample of 656 urologists. All physicians were screened to ensure that their specialty was correct and they were in active clinical practice. The questionnaires were self-written and a draft questionnaire was piloted by the authors and a separate group of urologists in Hunan Province, China. The questionnaire was modified before being used at the national meeting. Demographic and professional data were collected from the urologists, including age, title of the respondents, years devoted to clinical practice, type of hospital they worked with and health-care level of working hospital. The questionnaire also requested information on etiology, diagnostic work-up and treatment practice. The questionnaires were returned anonymously on the spot.

To determine the factors influencing the diagnosis and treatment of CP, both univariate and multivariate logistic regression analysis schemes (criteria for entry $P < 0.05$ and removal $P < 0.1$) were used. Several independent variables (IV) (X_1 = title of the urologists, X_2 = practice duration as a urological specialist, X_3 = type of working hospital, X_4 = health-care level of working hospital, X_5 = beliefs in bacterial infection in the etiology of CP, X_6 = the routine performance of bacterial culture test, *and* X_7 = the routine performance of the 4- or the 2-glass test) and three dependent variables (DV) (Y_1 = whether urologists performed bacterial culture test routinely, Y_2 = whether urologists used the National Institutes of Health (NIH) new classification system routinely, Y_3 = whether urologists prescribed antibiotics against CP) were included in the univariate model (X_6 and X_7 are IV for Y_3 and Y_2, respectively). We stratified the title of the urologists into three groups: the junior title group, the intermediate title group and the senior title group, as a reference group. Because practice duration as a urological specialist did not constitute a normal distribution, we stratified this variable into three groups: 25th percentile and below, 75th percentile and above, and the middle remainder as a reference group. Only those that were clearly statistically significant ($P < 0.05$) in the univariate analysis were included in the multivariate logistic model to determine the independent factors, defined by the odds ratio (OR) and 95% confidence interval (CI). A 5% level of significance was used for all statistical test, and all tests were two sided. All statistical calculations were performed using SPSS 10.0 software (Windows version 10.0; SPSS, Chicago, IL, USA).

3 Results

Of the 656 returned questionnaires, 627 (mean age 37.0 years, with a range of 21–72 years) were active responses (95.6%) and 29 were inactive (4.4%). The active respondents came from 291 hospitals in 141 cities or counties of 29 provinces in China (including autonomous regions and municipalities, except Taiwan, Macao, Hong Kong, Tibet and Qinghai Provinces). Because some urologists did not answer all of the questions, the valid response number to each question varied. Among the respondents, 19.7% (98/498) had a junior title, 31.9% (159/498) had an intermediate title and 48.4% (241/498) had a senior title. Of the respondents, 62.5% (338/541) worked at general hospitals, and 37.5% (203/541) worked at university hospitals. Most urologists (74.8%; 442/591) came from tertiary hospitals, 25.2% (149/591) came from secondary hospitals. Most primary or secondary hospitals in China do not have urology departments, which

is why most of the respondents in the present study are based in tertiary hospitals. A total of 75.2% (440/585) were practicing urological specialists with more than 5 years of clinical experience.

When asked to identify etiology of CP, most urologists (64.6%; 394/610) considered nonbacterial infections the most important cause. For routine diagnosis assessment, the most commonly used tests were microscopic analysis of expressed prostatic secretions (EPS) (86.3%; 535/620) and bacterial culture (57.4%; 356/620). The simple culture of EPS (43.4%; 260/599) was performed more commonly compared with the 4 glass test (27.1%; 162/599) and the 2 glass test (29.5%; 177/599). Most urologists (62.3%; 372/597) used NIH new classification of types I, II, IIIa/IIIb and IV to classify their patients' disease. However, more than one-third (37.7%; 225/597) of the urologists still chose the traditional classification system of chronic bacterial prostatitis, chronic nonbacterial prostatitis and prostatodynia for diagnosis. The first choice of pharmaceutical therapy for CP was antibiotics (74.0%; 455/615) and the most frequent drug type was fluoroquinolones (79.0%; 480/608), followed by macrolides (45.7%; 278/608) and cephalosporins (35.2%; 214/608). The next most commonly used drug therapies were α-blockers (60.3%; 371/615), phytotherapy (38.7%; 238/615) and Chinese herbal medicine (37.2%; 229/615). The most commonly used non-pharmacological therapy were psychotherapy (60.7%; 379/324) and prostatic massage (54.2%; 338/624).

Because of incomplete or inaccurate filling in of the various components of the questionnaire, 246 questionnaires were excluded from the univariate and multivariate analysis. Therefore, 410 were included in the final univariate and multivariate analysis. The average number of years devoted to clinical practice was 13.0 years, with a range from 1 to 50 years. The 25th and 75th percentiles of years devoted to clinical practice were 5 and 18 years, respectively. In the univariate analysis, type of working hospital (OR, 0.562; 95% CI, 0.373–0.845; $P < 0.01$), health-care level of working hospital (OR, 0.528; 95% CI, 0.323–0.863; $P < 0.05$) and belief of bacterial infection in the etiology of CP (OR, 2.382; 95% CI, 1.586–3.579; $P < 0.001$) were determined to be possible factors influencing the routine performance of bacterial culture test as a diagnostic tool in cases of CP. In addition, no significant difference was found in the performance of bacterial culture test between urologists with junior titles and those with senior titles (OR, 1.039; 95% CI, 0.631–1.711; $P > 0.05$). However, urologists with intermediate titles were significantly more likely than those with senior titles to perform bacterial culture tests (OR, 1.728; 95% CI, 1.119–2.670; $P < 0.05$). Moreover, no significant difference was found in the performance of bacterial culture test between urologists with 5 practice years and below and those with 5–18 years (OR, 1.417; 95% CI, 0.817–2.458; $P > 0.05$). However, urologists with 18 practice years and above were significantly less likely than those with 5–18 practice years to perform bacterial culture test (OR, 0.541; 95% CI, 0.340–0.863; $P < 0.05$). According to the same model, the type of working hospital (OR, 3.114; 95% CI, 1.979–4.899; $P < 0.001$), the health-care level of hospital (OR, 1.961; 95% CI, 1.243–3.094; $P < 0.01$) and the beliefs regarding the etiology of CP (OR, 0.619; 95% CI, 0.411–0.933; $P < 0.05$) and performing the 4- or the 2-glass test (OR, 3.442; CI, 2.262–5.237; $P < 0.001$), were possible factors influencing the routine use of the NIH new classification system to classify patients' disease. Using the same model, beliefs regarding the etiology of CP (OR, 3.923; 95% CI, 2.350–6.549; $P < 0.001$) and the routine performance of bacterial culture test (OR, 2.778; 95% CI, 1.707–4.519; $P < 0.001$) were revealed to be possible influencing factors on the routine prescription of antibiotics.

In the multivariate model used, belief regarding the etiology of CP was determined to be an independent factor influencing the routine performance of bacterial culture test as a diagnostic tool in cases of CP. According to the same model, the type of hospital and performing the 4- or the 2-glass test were the significant factors influencing the routine use of the NIH new classification system. Using the same model used, belief of bacterial infection in the etiology of CP and the routine performance of bacterial culture test were revealed to be independent factors influencing the routine prescription of antibiotics (Table 1).

4 Discussion

Chronic prostatitis is an important and common medical male health issue. However, little is known about the etiology of patients with CP and the treatment of patients with persistent prostatitis or related symptomatology is difficult and often unsuccessful [12]. In the present study, wide variation in the diagnosis and treatment of CP was demonstrated to exist among urologists in China.

Table 1. Multivariable logistic regression analysis of the practice patterns of chronic prostatitis (CP) among Chinese urologists. Dependent variables are as follows: [a]whether urologists performed bacterial culture test routinely; [b]whether urologists used the National Institute of Helth (NIH) new classification system routinely;[c]whether urologists prescribed antibiotics against CP. CI, confidence interval; OR, odds ratio.

Variables	β	SE	Wald	*P*-value	OR (95% CI)
Belief of bacterial infection in the etiology of CP[a]	0.934	0.221	17.859	< 0.001	2.544 (1.650–3.923)
Type of working hospital[b]	0.944	0.258	13.424	< 0.001	2.569 (1.551–4.256)
The routine performance of the 4- or the 2-glass test[b]	1.161	0.222	27.482	< 0.001	3.194 (2.069–4.931)
Belief of bacterial infection in the etiology of CP[c]	1.228	0.267	21.185	< 0.001	3.415 (2.024–5.762)
The routine performance of bacterial culture test[c]	0.816	0.258	10.007	< 0.01	2.261 (1.364–3.749)

Although bacterial culture was one of the most commonly used examinations for the evaluation of men who had symptoms suggestive of CP, a minority of urologists performed the Meares-Stamey 4 glass test lower urinary tract localization technique. This result is in agreement with findings in similar surveys of physicians in Canada, USA, Japan, Korea, Italy and France [4, 5, 8–10]. The simple culture of EPS is the most important method performed by Chinese urologists. The Meares-Stamey 4 glass test is the standard method used to assess inflammation and determine the presence of bacteria in the lower urinary tract in men presenting with the chronic prostatitis syndrome [13]. However, the test is considered expensive, not predictive of symptomatic treatment response, and has many false positive and false negative findings [8, 12, 13]. This is probably why Chinese urologists have turned with increasing frequency to use the simple culture of EPS, which is a simpler and less expensive screening technique. However, because of the contamination of normal flora located at the urethral orifice or pathogenic bacteria existing when urethritis occurs, the interpretation of the test results of simple culture of EPS can be ambiguous and often results in the abuse of antimicrobial agents. The confusion noted by others is certainly reflected in the confusion experienced by Chinese urologists in diagnosing this disease as well. Dai *et al.* [14] suggested that quantitative EPS endotoxin determination is a faster, cheaper and more easily attainable approach than EPS culture and some other special examinations. Kommu *et al.* [15] considered this conclusion plausible, and asserted there is a need to find novel biomarkers through the use of proteomics. Nickels *et al.* [13, 16] suggested a 2-glass test (the Pre and Post Massage Test), which has a positive predictive value and a false-negative rate similar to the Meares-Stamey 4-glass test. Clinicians who choose to perform the 4-glass test should consider using the 2-glass test to classify patients with CP [17].

In the univariate analysis of the present study, contrary to our hypothesis, urologists practicing at university hospitals and tertiary hospitals were no more likely than urologists at non-university hospitals and secondary hospitals to perform the bacterial culture test, respectively. Additionally, in contrast to our expectation that urologists with longer practice duration as urological specialists (18 years and more than 18 years) and with senior titles would perform the culture test more often, we found that younger urologists (5–18 years) and urologists with intermediate titles performed the test more frequently. The multivariate logistic regression analysis indicated that belief regarding the etiology of CP was the most significant factor influencing the routine performance of bacterial culture test. These findings are similar to surveys of urologists in the USA and Korea [8, 18]. In the USA, urologists practicing at teaching institutions were no more likely than urologists at non-teaching institutions to perform the 4-glass test, and younger physicians (younger than 50 years) performed the 4-glass test more often than older urologists (older than 50 years) [8]. In Korea, the belief that bacterial culture test helped to differentiate or diagnose the various types of CP was a factor influencing the performance of EPS or other culture tests [18]. Urologists with senior titles or with longer practice duration may be more dependent upon their clinical experience to code a diagnosis of CP.

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Chronic Prostatitis Workshop held in 1995 resulted in a consensus working definition and classification of prostatitis syndromes [19], which has now been accepted by the urological community and appears to be useful in clinical practice [20]. However, our study shows poor use of the NIH new classification

system by Chinese urologists, and has been used by only 62% of urologists queried in the present study. Only 33% of British genitourinary medicine clinics use this new classification system and 65% of French urologists are unfamiliar with it [5, 7]. The potential reasons associated with this situation may include lack of further education about prostatitis and many urologists' greater interest in surgical operation than in prostatitis problems. The type of working hospital and the routine performance of the 4- or the 2-glass test were revealed, in this study, to be independent influencing factors with regard to the routine performance of the NIH new classification system. Interestingly, we also found that urologists who performed the 4- or the 2-glass tests routinely were significantly more likely to use the NIH new classification system to classify patients and code diagnosis as compared with those who did not performed these tests routinely. This finding confirms that the specific lower urinary tract culture (the 4- or the 2-glass test), in fact, is the foundation of the NIH new classification.

With regard to the treatment of CP, although most Chinese urologists consider CP to be nonbacterial in nature, a high degree of antibiotic usage was reported in the present study, as demonstrated in similar surveys of physicians in other countries. The high antibiotic usage in the treatment of CP might reflect a misunderstanding among urologists of the role of infection and also reflect confusion between the diagnosis of chronic bacterial prostatitis and chronic pelvic pain syndrome (CPPS) [7]. In addition, current reports suggest that bacteria may have a role in inflammatory prostatitis (NIH category III CPPS) [21, 22]. This new evidence indicates that the high usage of antibiotics appears to be justifiable. However, routine use of antibiotics is not supported by existing evidence and deserves further scrutiny [8, 17]. Moreover, the high antibiotic usage might result in tremendous economic waste, abuse of antibiotics, resistance of bacteria and severe side effects [2, 8, 17], all of which cannot be neglected.

Much like in a survey of Korean urologists [18], we found that belief regarding the etiology of CP and the routine performance of bacterial culture test were independent factors influencing the routine prescription of antibiotics in China. These findings confirm that beliefs regarding the etiology of CP not only influence the routine performance of bacterial culture test but also influence the routine prescription of antibiotics. However, in contrast to what we hypothesized, urologists who performed the culture test were no less likely to prescribe antibiotics for patients with CP than those who performed the tests less often, which is similar to surveys of physicians in Canada and the USA [4, 8]. In the USA, physicians who routinely perform the 4 glass test do not differ in antibiotic use from those who use the test less often [8]. In addition, a survey in Canada indicated that men diagnosed with prostatitis are treated with antibiotics regardless of laboratory findings [4]. These findings suggest that the specific lower urinary tract culture tests do not significantly affect antibiotic treatment patterns and they do not direct urologists toward more targeted therapy.

Admittedly, the present study has some limitations. First, the physicians report on their own behavior, and their answers might reflect a more idealized version of their practices than what actually takes place. Therefore, the findings must be interpreted with caution. Second, the study population is not a random sample. However, with a relatively high valid response number (more than 500), which is much higher than that in similar studies in Canada, the Netherlands, the UK, Korea and France (n = 151, 136, 145, 275, 124, respectively) [4–7, 12] and data from almost all administrative regions of China, the demonstrated data are deemed representative and do indeed reflect the current management of CP in China.

The findings provide a picture of current practices in terms of the management of CP in China. Our findings suggest that personal attitudes towards CP, and the characteristics of individual urologists' practice might have an influence on the patterns of routine treatments for cases of CP. The survey also suggests that continuing education on the management of CP should focus on urologists from non-university hospitals. Therefore, The right attitude towards and a sound knowledge of CP will result in rational actions in physicians' clinical practice.

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Appendix

Questions Used in Analyses

1. How old are you?
   _____ years old
2. Where do you come from?
   _____ city or county; _____ province (including autonomous region and municipality)
3. Where do you work?
   (a) General hospital
   (b) University hospital
   (c) Military hospital
4. What is the level of your hospital?
   (a) Primary hospital
   (b) Secondary hospital
   (c) Tertiary hospital
5. How many years have you practiced urology?
   ____ years
6. What do you think is (are) the main cause(s) of chronic prostatitis (CP)? (Multiple answers are possible.)
   (a) Bacterial infection
   (b) Nonbacterial infection
   (c) Bladder and pelvic floor dysfunction
   (d) Psychosomatic factors
   (e) Others
7. Which of the following tests do you use or order in your evaluation of the patients who have symptoms suggestive of CP? (Multiple answers are possible.)
   (a) Physical examination (including digital rectal

examination)
(b) Blood examination (e.g. prostate specific antigen, blood routine)
(c) Urinalysis
(d) Microscopic analysis of expressed prostate secretions
(e) Semen examination
(f) Uroflowmetry
(g) Bacterial culture
(h) Biopsy of prostate gland
(i) Ultrasonography
(j) X-ray (e.g. flat plate of the abdomen, intravenous urography)
(k) Psychological assessment

8. If you perform bacterial cultures, which test do you choose?
(a) Simple culture of expressed prostate secretions
(b) 2-glass test
(c) Meares and Stamey's 4-glass test

9. Which classification system of prostatitis do you use to classify your patients' disease?
(a) The traditional classification system of chronic bacterial prostatitis, chronic nonbacterial prostatitis and prostatodynia
(b) The NIH new classification of chronic bacterial prostatitis, chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS) and asymptomatic inflammatory prostatitis

10. Should CP be treated or not in your opinion?
(a) Yes
(b) No
(c) Not always

11. Which of the following treatments do you prescribe for CP? (Multiple answers are possible.)
(a) Pharmaceutical therapy
(b) Prostate massage
(c) Biofeedback
(d) Local drug injection
(e) Physical therapy (including thermotherapy)
(f) Psychotherapy
(g) Surgical operation
(h) General therapy (e.g. sitz bath)
(i) Others

12. Which pharmaceutical therapy do you choose for CP? (Multiple answers are possible.)
(a) Antibiotics
(b) Chinese medicine
(c) Phytotherapy
(d) α-blockers
(e) 5α-reductase inhibitors
(f) Others

13. If you use antibiotics for CP, which antibiotics do you use? (Multiple answers are possible.)
(a) Fluoroquinolones
(b) Macrolides
(c) Sulfonamides
(d) Cephalosporins
(e) Others

14. What is the primary indication to use antimicrobial agents in your practice? (Multiple answers are possible.)
(a) When bacterial culture is positive
(b) When excessive leukocytes or pyocytes are present in EPS
(c) Use antibiotics routinely even with normal laboratory findings

15. In what situation do you use α–blocker?
(a) When the patients have obstructive voiding symptoms
(b) Even when the patients do not have obstructive voiding symptoms

16. What's your opinion of psychotherapy for CP? (Multiple answers are possible.)
(a) It is highly necessary
(b) It is not always necessary
(c) Lacking assistance from psychologists or psychiatrists
(d) Lacking experience and techniques
(e) Willingness to follow this therapy is poor, because it always needs a long course of treatment
(f) The effect of this therapy used for patients with severe CP alone is not always satisfactory
(g) Others

(All questions were asked in Chinese)