Correlation between Routine Parameters of Digital Rectal Examination and Expressed Prostatic Secretions and Traditional Chinese Medicine Syndromes of Chronic Prostatitis

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Key Words
Chronic prostatitis · Traditional Chinese medicine syndromes · Digital rectal examination · Expressed prostatic secretions

Abstract
Objective: To explore and analyze the correlation of routine parameters of digital rectal examination and expressed prostatic secretions (EPS) with traditional Chinese medicine (TCM) syndromes of chronic prostatitis (CP). Methods: According to features of TCM syndromes, 114 CP patients were divided into four groups: group A (syndrome of dampness-heat pouring downward), group B (syndrome of qi stagnation and blood stasis), group C (syndrome of yin deficiency with effulgent fire), and group D (syndrome of kidney yang deficiency). Data collected by digital rectal examination and EPS were divided into different grades according to different criteria. Finally, we performed a statistical analysis of the data. Results: The sizes of the prostates in group C were smaller than those in any other group (p < 0.05). The texture of the prostates in group B was harder than that in any other group (p < 0.05). The rates of tenderness in the prostate were higher in groups A and B than in the other two groups (p < 0.05). The rates of abnormal amounts of small particles of lecithin were higher in groups C and D than in the other two groups (p < 0.05). Finally, the rates of abnormal amounts of white blood cells were higher in groups A and B than in the other two groups (p < 0.05). Conclusion: There is a certain correlation of routine parameters of digital rectal examination and EPS with TCM syndromes of CP, which can provide effective instruction on the differentiation of TCM syndromes.
Introduction

Chronic prostatitis (CP) is one of the most common diseases of andrology, the incidence of which is about 2.5–16% in adult men [1]. CP is complex in its clinical manifestation, and it greatly affects the quality of patients’ daily life [2]. Pharmacological interventions are often prescribed to patients with CP. Drugs commonly prescribed for CP management include antibiotics, anti-inflammatories (NSAIDs), α-adrenergic blockers, and neuromodulatory drugs [3]. Given its complex etiology and pathogenesis, CP is still one of the least understood diseases in urology and can present a major challenge to health care providers due to its poor response to therapy [4].

Traditional Chinese medicine (TCM) treatment for CP has a certain advantage, since it can effectively alleviate patients’ suffering and improve their quality of daily life [5, 6]. In our daily experience, we find that some patients’ clinical symptoms are much reduced, which creates a certain difficulty regarding TCM syndrome differentiation. Aiming at tackling this problem, we performed a statistical analysis of data collected via digital rectal examination and expressed prostatic secretions (EPS) and explored and analyzed their relation to TCM syndromes in order to enhance TCM diagnosis of CP.

Subjects and Methods

General Data

In all, 114 (216 patients investigated, 114 met the requirements) CP outpatients from the Department of Andrology, Yancheng Hospital of Traditional Chinese Medicine affiliated to Nanjing University of Chinese Medicine, were included from June 2013 to June 2014 (tables 1, 2).

Standard for the Diagnosis

The CP diagnosis standard (types II and III) published by the National Institutes of Health (NIH) in 1995 was used [7].

Standard for TCM Syndrome Assessment

The TCM Syndromes of Chronic Prostatic Standard – Principles of Instruction for New Chinese Medicine published by the Ministry of Health (China) in 1997 was used. According to

| TCM syndrome | n  | %   |
|--------------|----|-----|
| A            | 40 | 18.52 |
| B            | 33 | 15.28 |
| C            | 23 | 10.65 |
| D            | 18 | 8.33  |
| A + B        | 35 | 16.20 |
| A + C        | 21 | 9.72  |
| B + D        | 18 | 8.33  |
| A + B + C    | 15 | 6.94  |
| A + B + D    | 13 | 6.02  |

A = Syndrome of dampness-heat pouring downward; B = syndrome of qi stagnation and blood stasis; C = syndrome of yin deficiency with effulgent fire; D = syndrome of kidney yang deficiency.

Table 1. TCM syndrome distribution among all the 216 investigated CP patients
different clinical manifestations, TCM syndromes were divided into four groups: group A (syndrome of dampness-heat pouring downward: frequent urination; heavy body trapped; yellow and greasy coating of the tongue; soft and rapid pulse), group B (syndrome of qi stagnation and blood stasis: bulging and pain of the lower abdomen, testes, and perineum; dark purple tongue; uneven pulse), group C (syndrome of yin deficiency with effulgent fire: dry mouth; polydipsia; soreness and weakness of the waist and knees; thready and quick pulse), and group D (syndrome of kidney yang deficiency: fatigue; mental sluggishness; hypaphrodisia; chills; pale tongue; deep and thready pulse).

Exclusion Criteria
Excluded were patients who (1) suffered from serious diseases of the heart, brain, liver, or kidney, (2) suffered from mental or psychological diseases, (3) suffered from acute or chronic diseases of infection or tumors of the urinary or reproductive system, (4) were unwilling to cooperate, or (5) had 2 or more TCM syndromes.

Observational Data
Data from Digital Rectal Examination
Data on size, texture, and tenderness were divided into different grades according to their different criteria. Size, as synthesized from digital rectal examination and transrectal ultrasonography, was divided into three different categories: (1) larger than normal, (2) normal (left-right diameter × up-down diameter × anteroposterior diameter = 24 cm³ ± 15%), and (3) smaller than normal [8]. Texture, as compared to the texture of the tip of the nose, was divided into three different categories: (1) harder than normal, (2) normal (texture of the tip of the nose), and (3) softer than normal [9]. Tenderness was assessed as present or absent.

Data from Routine Parameters of EPS [8]
Small particles of lecithin (SPL) were grouped into (1) normal (≥+++ / high-power field (HPF)) and (2) abnormal (<+++ / HPF). White blood cell (WBC) counts were classified as (1) normal (<10 / HPF) and (2) abnormal (≥10 / HPF).

Statistical Analysis
The SPSS 16.0 statistical software package was used for data processing. Analysis of variance was used for comparison of multiple groups. Least significant difference or Tukey multiple comparison methods were used for homogeneity of variance, and Tamhane’s T2 multiple comparison method was used for inhomogeneity of variance.

| Group | n   | Age, year | Syndrome duration, months | Weight, kg | Height, m | BMI       |
|-------|-----|-----------|---------------------------|------------|-----------|-----------|
| A     | 40  | 31.28 ± 6.38 | 40.03 ± 20.07          | 75.08 ± 8.77 | 1.73 ± 0.05 | 24.94 ± 2.40 |
| B     | 33  | 32.03 ± 6.12 | 34.55 ± 15.79          | 75.64 ± 8.01 | 1.74 ± 0.06 | 25.05 ± 1.96 |
| C     | 23  | 30.35 ± 5.04 | 40.43 ± 18.88          | 77.30 ± 7.33 | 1.73 ± 0.05 | 25.89 ± 2.29 |
| D     | 18  | 30.39 ± 4.74 | 36.67 ± 12.27          | 75.28 ± 8.65 | 1.73 ± 0.04 | 25.04 ± 2.43 |

p value >0.05 >0.05 >0.05 >0.05 >0.05

Values are presented as means ± SD unless specified otherwise.
Results

Distribution of TCM Syndromes

Of the 114 patients, 40 (35.09%) were in group A (syndrome of dampness-heat pouring downward), 33 (28.95%) in group B (syndrome of qi stagnation and blood stasis), 23 (20.18%) in group C (syndrome of yin deficiency with effulgent fire), and 18 (15.79%) in group D (syndrome of kidney yang deficiency).

Correlation of Digital Rectal Examination Data with TCM Syndromes

Among the total of 114 patients, the number of patients with a normal size of the prostate was 78 (68.4%). In group A the number of patients with a normal size of the prostate was 35 (87.5%), in group B it was 25 (75.8%), in group C it was 4 (17.4%), and in group D it was 14 (77.8%). The rate of prostates of abnormal size (smaller than normal) in group C (syndrome of yin deficiency with effulgent fire) was higher than in any of the other groups; the difference was significant (p < 0.05) (tables 3, 4).

Among the total of 114 patients, the number of patients with no tenderness in the prostate was 67 (58.8%). In group A the number of patients with no tenderness in the prostate was 21 (52.5%), in group B it was 9 (27.3%), in group C it was 21 (91.3%), and in group D it was 16

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Table 3. Correlation of digital rectal examination data with TCM syndromes

| Parameters | Group A | Group B | Group C | Group D | Total, n |
|------------|---------|---------|---------|---------|----------|
| Size       |         |         |         |         |          |
| Larger     | 3       | 3       | 1       | 2       | 9        |
| Normal     | 35      | 25      | 4       | 14      | 78       |
| Smaller    | 2       | 5       | 18      | 2       | 27       |
| Texture    |         |         |         |         |          |
| Harder     | 0       | 0       | 23      | 0       | 24       |
| Normal     | 37      | 8       | 19      | 16      | 80       |
| Softer     | 3       | 2       | 3       | 2       | 10       |
| Tenderness |         |         |         |         |          |
| Yes        | 19      | 24      | 2       | 2       | 47       |
| No         | 21      | 9       | 21      | 16      | 67       |

* p < 0.05 compared with group A; # p < 0.05 compared with group B; ∆ p < 0.05 compared with group C.

Table 4. Differences in digital rectal examination data by comparison of the four groups

| Parameter     | Group A | Group B | Group C | Group D |
|---------------|---------|---------|---------|---------|
| Size          | ∆       | ∆       | *,#     | ∆       |
| Texture       | #       | *,∆     | #       | #       |
| Tenderness    | #,∆     | *,∆     | *,#     | #       |

* p < 0.05 compared with group A; # p < 0.05 compared with group B; ∆ p < 0.05 compared with group C.
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(88.9%). The rates of patients with tenderness in the prostate in groups A (syndrome of dampness-heat pouring downward) and B (syndrome of qi stagnation and blood stasis) were higher than in the other two groups; the difference was significant (p < 0.05). Compared to group A, the rate in group B was significantly higher (p < 0.05).

**Correlation of Routine Parameters of EPS with TCM Syndromes**

Among the total of 114 patients, the number of patients with a normal amount of SPL in EPS was 63 (55.3%). In group A the number of patients with a normal amount of SPL in EPS was 33 (82.5%), in group B it was 22 (66.7%), in group C it was 3 (13.0%), and in group D it was 5 (27.8%) (tables 5, 6).

The rate of patients with a lower amount of SPL in EPS in group C (syndrome of yin deficiency with effulgent fire) was higher than in groups A and B; the difference was significant (p < 0.05). The rate of patients with a lower amount of SPL in EPS in group D (syndrome of kidney yang deficiency) was also higher than in group A (p < 0.05) and group B (p < 0.05).

Among the total of 114 patients, the number of patients with a normal amount of WBC in EPS was 57 (50.0%). In group A the number of patients with a normal amount of WBC in EPS was 8 (20.0%), in group B it was 15 (45.5%), in group C it was 19 (82.6%), and in group D it was 15 (83.3%). The rates of patients with a higher amount of WBC in EPS in groups A (syndrome of dampness-heat pouring downward) and B (syndrome of qi stagnation and blood stasis) were higher than in the other two groups; the difference was significant (p < 0.05). Compared to group B, the rate in group A was significantly higher (p < 0.05).

**Table 5. Correlation of routine parameters of EPS with TCM syndromes**

| Parameters | Group A | Group B | Group C | Group D | Total, n |
|------------|---------|---------|---------|---------|----------|
|            | n  | %   | n  | %   | n  | %   | n  | %   | n  | %   |
| SPL        |     |      |     |      |     |      |     |      |     |      |
| Normal     | 33  | 82.5 | 22  | 66.7 | 3   | 13   | 5   | 27.8 | 63  |
| Abnormal   | 7   | 17.5 | 11  | 33.3 | 20  | 87   | 13  | 72.2 | 51  |
| WBC        |     |      |     |      |     |      |     |      |     |      |
| Normal     | 8   | 20   | 15  | 45.5 | 19  | 82.6 | 15  | 83.3 | 57  |
| Abnormal   | 32  | 80   | 8   | 54.5 | 4   | 17.4 | 3   | 16.7 | 57  |

**Table 6. Difference in EPS parameters by comparison of the four groups**

| Parameter | Group A | Group B | Group C | Group D |
|-----------|---------|---------|---------|---------|
| SPL       | ∆       | ∆       | *, #    | *, #    |
| WBC       | #, ∆    | *, ∆    | *, #    | *, #    |

* p < 0.05 compared with group A; # p < 0.05 compared with group B; ∆ p < 0.05 compared with group C.

**Discussion**

Syndrome differentiation is a thinking process of analyzing and compositing information by four diagnostic methods and then attributing it to a specific syndrome, according to the tenets of the basic theory of TCM. The concept of wholism is the main characteristic of
TCM; as a result, traditional syndrome differentiation can also be called macroscopic syndrome differentiation. Microscopic syndrome differentiation is now more and more widely used in all fields of TCM; it was first proposed by Shen [10]. With the development of science and technology, more and more advanced and modern diagnostic methods have been widely applied and developed, which may serve the modernization and standardization of TCM. For the patients whose clinical symptoms are more reduced, microscopic syndrome differentiation is an effective approach to improve the veracity of syndrome differentiation [11].

Generally speaking, we ascertained that the outcome of our research can be explained by some theory or disquisitional conclusion. According to yin-yang theory, the prostate lies in the underpart of the body, so its nature belongs to yin. Neijing posits that yin forms the shape and yang changes into qi. As a result, a smaller size of the prostate can be attributed to the syndrome of yin deficiency. The kidney administers reproduction, and the prostate belongs to the reproductive organs, so it can be further attributed to the syndrome of kidney yin deficiency. Our research showed that the rate of smaller-sized prostates in group C (syndrome of yin deficiency with effulgent fire) was much higher than in any of the other groups (p < 0.05), which fits the above-mentioned theory.

Regarding the syndrome of qi stagnation and blood stasis, qi stagnation is the pathogenic factor, whereas blood stasis is the mechanism of the disease. The characteristic of ‘pathogenic factor-static blood’ is hard and immovable. Our research showed that the rate of prostates with abnormal texture (harder than normal) in group B (syndrome of qi stagnation and blood stasis) was higher than in any of the other groups (p < 0.05), which again confirms the above-mentioned theory.

Heat belongs to the category of yang pathogens, which are famous for hot and painful features of pathopoiesis. Pain is also the feature of the pathopoiesis of blood stasis; furthermore, it is fiercer and the painful position is immovable. Our research showed that the rates of patients with tenderness in the prostate in groups A (syndrome of dampness-heat pouring downward) and B (syndrome of qi stagnation and blood stasis) were much higher than in the other two groups (p < 0.05); besides, the rate in group B was higher than in group A (p < 0.05), which reflects the features of the two above-mentioned pathogenic factors.

There is a certain effect of SPL in maintaining the quality of semen [12]; its quality is one of the most important parameters for appraising the reproductive level of adult men. As a result, a decline in the amount of SPL may affect the reproductive level. The kidney administers reproduction, so kidney deficiency may result in a decline in the function of reproduction. Therefore, there is a correlation between abnormal amounts of SPL and the syndrome of kidney deficiency. The rates of patients with lower amounts of SPL in EPS in groups C (syndrome of yin deficiency with effulgent fire) and D (syndrome of kidney yang deficiency) were higher than in groups A and B (p < 0.05), which was demonstrated by our research and fitted the explanation above.

Related research by other scholars showed that the nature of the dampness and heat syndrome is associated with viral or bacterial infection [13]. Hyperemia may give rise to obstruction of the circulation in the prostate and let infectious cells invade the prostate [14], which is familiar to the theory of TCM (obstruction due to stasis). The rates of patients with higher amounts of WBC in EPS in groups A (syndrome of dampness-heat pouring downward) and B (syndrome of qi stagnation and blood stasis) were higher than in groups C and D (p < 0.01), which was shown by our research and fits the viewpoint of the scholars mentioned above.
Conclusion

We may conclude that there is a certain correlation of digital rectal examination data and routine parameters of EPS with TCM syndromes of CP, which may effectively advance TCM syndrome differentiation of CP. However, the following limitations still apply to our research: (1) the number of patients was not large enough, so that further analysis and research with greater samples is warranted; (2) we only chose patients with a simple TCM syndrome, while there are still some patients with 2 or more TCM syndromes, and (3) the targets we chose for observation were subjective ones, which is why we should choose objective targets to increase the veracity of our research.

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Disclosure Statement

The authors declare no competing interests.

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