

Application of “State-Target Pattern Identification” in the TCM Diagnosis and Treatment of Cervical Cancer

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Abstract: Cervical cancer is a common gynecological malignant tumor. In recent years, its incidence and mortality rates have shown an upward trend, with the disease tending to affect younger women. Compared to the adverse reactions caused by Western medical treatments such as surgery, radiotherapy, and chemotherapy, Traditional Chinese Medicine (TCM) has unique advantages in controlling the disease progression and reducing the side effects of radiotherapy and chemotherapy. Based on the “State-Target Pattern Identification” (tài bǎ biàn zhèng) theory proposed by Academician Tong Xiaolin, which deeply integrates the pathological evolution patterns of modern medicine, this article summarizes the TCM pathogenesis of cervical cancer as “deficiency in origin and excess in manifestation” (běn xū biāo shí) and further divides it into four state-pattern types: “deficiency state” (xū tài), “dampness state” (shī tài), “stasis state” (yū tài), and “toxicity state” (dú tài). It systematically elaborates on their pathological characteristics and clinical manifestations to promote the standardized application of “State-Target Pattern Identification” in the TCM diagnosis and treatment of cervical cancer.

Keywords: State-Target Diagnosis and Treatment, Cervical Cancer, Traditional Chinese Medicine (TCM).

1. Introduction

Cervical cancer refers to a malignant tumor occurring at the junction of the squamous epithelium of the vaginal portion of the cervix and the columnar epithelium of the endocervical canal. It is a common gynecological tumor, particularly prevalent in developing countries. According to World Health Organization statistics, in 2018, approximately 57,000 people suffered from cervical cancer, with fatal cases accounting for about 40% [1]. Over the past 20 years, the incidence and mortality rates of cervical cancer in China have shown varying degrees of increase, and the age of onset tends to be younger. Therefore, the prevention and control of cervical cancer remains a severe challenge [2].

The main clinical manifestations of cervical cancer include contact vaginal bleeding, increased leucorrhea with odor, or long-term vaginal fluid discharge, irregular vaginal bleeding, etc. Surgery is the primary treatment. However, due to the lack of obvious specificity in its early symptoms, most patients are diagnosed when the disease has progressed to an intermediate or advanced stage, thus losing the opportunity for surgery [3]. Intermediate and advanced stages mainly employ comprehensive treatment methods such as radiotherapy or combined chemotherapy. Current Western medicine treatments still have shortcomings. For example, while surgery removes the cancerous focus, it may lead to related postoperative complications; radiotherapy and chemotherapy, while killing cancer cells, also indiscriminately attack normal cells, damaging the body's immune function and causing a series of adverse reactions such as radiation cystitis, radiation vaginitis, radiation enteritis, lower limb lymphedema, etc. [4], which severely affect the patient's quality of life and physical and mental health. TCM treatment for cervical cancer has unique advantages, with proven efficacy in controlling disease deterioration, reducing adverse reactions to radiotherapy and chemotherapy, and alleviating cancer pain [5].

The “State-Target Pattern Identification” theory was first proposed by Academician Tong Xiaolin as a new clinical diagnosis and treatment model for difficult and complicated diseases and chronic diseases in TCM, emerging from the collision and integration of traditional TCM pattern differentiation and treatment thinking and holistic concepts with modern medicine [6]. This system uses “disease” as the horizontal dimension to construct a cognitive framework of the entire disease picture, and uses “state” as the vertical axis to divide the stages of disease progression. By precisely locating the nodes where disease and state intersect, and combining targeted intervention with specific formulas and medicinals, it aims to achieve the diagnostic and therapeutic goal of preventing disease progression in already ill patients through a process of tracing the origin [7]. This article aims to explore the state types of cervical cancer under the theoretical system of state-target diagnosis and treatment, in order to promote its application in the diagnosis and treatment of cervical cancer.

2. Etiology and Pathogenesis

TCM classics do not contain records of the disease name “cervical cancer.” Modern TCM experts, based on its clinical manifestations such as irregular vaginal bleeding, abnormal vaginal discharge, abdominal mass, and chronic consumptive state, categorize it under TCM disease names such as “uterine bleeding” (bēng lòu), “vaginal discharge disease” (dài xià bīng), “abdominal mass” (zhēng jiǎ), and “consumptive disease” (xū láo) [8]. Ancient physicians had different understandings of the etiology and pathogenesis of cervical cancer. The Golden Chamber Treatise on Pulse Diagnosis and Treatment of Women's Diseases states: “Women's diseases are caused by deficiency, accumulated cold, and congealed qi, leading to various menstrual cessations,” discussing the characteristic pathogenesis of deficiency in origin and excess in manifestation in women's diseases. Fu Qingzhu's Gynecology Treatise on Vaginal Discharge states: “All

vaginal discharge is a dampness pattern... combined with deficiency of spleen qi, depression of liver qi, invasion of dampness qi, and pressurization of heat qi, how can it not become a vaginal discharge disease!” proposing that invasion by dampness pathogen is the main cause of vaginal discharge disease. Required Readings from the Medical Ancestors’ Accumulations and Gatherings states: “The formation of accumulation is due to insufficiency of righteous qi, after which pathogenic qi occupies [the body],” proposing that accumulations and gatherings are caused by weakness of the body’s righteous qi, making it susceptible to pathogenic invasion. The core pathogenesis is deficiency in origin and excess in manifestation. Based on this, the onset of cervical cancer can be summarized as follows: due to internal injury by the seven emotions, dietary imbalance, excessive sexual activity and childbirth, prolonged residence in damp and cold environments, etc., the body’s righteous qi becomes insufficient, and it is affected by external pathogens. As pathogens advance, the righteous becomes even more deficient. Over time, this leads to dysfunction of the liver, spleen, and kidney, disharmony of qi and blood, generating dampness, stasis, and toxic foul turbid pathogens. These pathogens invade the uterus, lodge in the cervical os, and if not cured for a long time, cause blood defeat and flesh decay, gradually forming an abdominal mass.

3. Staging by Disease

TCM uses patterns (zhèng hòu) to (tǒng líng - organize/command) symptoms, while Western medicine uses diseases to understand symptoms. Patterns and disease names represent a deeper understanding of diseases in TCM and Western medicine respectively. Traditional TCM classifies diseases based on main symptoms. The same symptom may be caused by different patterns, giving rise to a diagnostic and therapeutic approach of “taking symptoms as the framework and patterns as the items.” Given the broad extension of TCM disease names, integrated Chinese and Western medicine experts directly adopted Western medicine disease names, creating a diagnostic and therapeutic model of “taking disease as the framework and pattern as the item.” This can lead to situations where different diseases share the same pattern, or different symptoms share the same pattern. From the perspective of determining the severity and prognosis of a disease, Western medical diagnosis is superior to TCM pattern diagnosis. In cervical cancer patients, there is no direct correspondence between symptoms, patterns, and disease severity. Currently, patients with cervical cancer mainly present with symptoms such as uterine bleeding, postmenopausal bleeding, and increased vaginal discharge. However, these symptoms lack specificity, so the main means of confirming cervical diagnosis rely more on histopathology and imaging. Modern medicine recognizes that cervical cancer clearly has a development model of “persistent HR-HPV infection --- cervical intraepithelial neoplasia (CIN) --- cervical cancer” [9]. TCM can fully (jiè jiàn - use for reference) and absorb this to improve the overall understanding of the cervical cancer pathogenesis process. Therefore, clinically, the Western medical diagnosis should be confirmed by referring to cervical biopsy pathology results to determine the stage of disease development the patient is in.

4. Classifying and Identifying States

With the progress of the era and the advancement of science and technology, TCM is also showing new development trends. Traditional pattern differentiation and treatment focus on various pathological elements of a disease at a certain stage, such as cause, location, nature, and the relationship between healthy and pathogenic qi. It determines the disease’s pattern through differentiation, thereby clarifying the corresponding treatment principles and methods. This reflects the diagnosis and treatment of the patient’s immediate condition but ignores the fact that patterns can change over time and due to treatment, failing to reflect the overall disease process. Therefore, Academician Tong Xiaolin proposed that TCM needs to (chóng xīn rèn shí - re-recognize) the core pathogenesis at different stages of the disease process—the “state” (tài). By grasping the entire disease process through changes in state, which can be further divided into different patterns under each disease stage state, pattern differentiation and treatment can be applied.

From persistent HR-HPV infection to the development of cervical cancer is a continuum of lesions with clear etiology and patterns of occurrence. TCM believes that “deficiency” (xū) is the fundamental pathogenesis of cervical cancer, present throughout the entire course of the disease, while “toxicity” (dú) is an important causative factor. If the body’s righteous qi is abundant, the toxic pathogen will be cleared naturally, and the disease ceases. If the body’s righteous qi is deficient, then the healthy qi cannot overcome the pathogen, and the disease progresses, potentially involving deficiency, dampness, stasis, and toxicity, ultimately leading to the occurrence of cervical cancer. Based on the “State-Target Pattern Identification” theory, combined with the modern medical pathological evolution process of cervical cancer “persistent HR-HPV infection → cervical intraepithelial neoplasia (CIN) → invasive cancer,” its core TCM pathogenesis can be summarized as “deficiency in origin and excess in manifestation.” Among these, the “deficiency state” is the internal basis for onset, present throughout the disease; while at different stages of disease evolution, different excess manifestation states such as “dampness state,” “stasis state,” and “toxicity state” respectively appear. These states intertwine, collectively forming the entire pathogenesis pattern of cervical cancer.

4.1 Deficiency State - Present Throughout

The scope of the deficiency state spans the entire process from HPV susceptibility and persistent infection to carcinogenesis and late-stage exhaustion. The Supplementary Treatise to the Basic Questions·Discourse on Needling Techniques states: “When righteous qi exists within, pathogenic factors cannot interfere.” If the human body’s righteous qi is strong, external pathogens cannot easily invade. Basic Questions·Discourse on Evaluating Heat Diseases states: “Where pathogens gather, the qi [there] must be deficient.” If righteous qi is insufficient, and healthy and pathogenic qi contend with each other, the disease condition lingers and does not heal, which can lead to invasion by external pathogens. The deficiency state includes spleen deficiency and kidney deficiency. The spleen is the

root of the acquired constitution, governing transportation and transformation. Women may damage spleen qi and spleen yáng due to preferences for rich, sweet, greasy foods, or raw and cold foods, or due to worry and depression, leading to dysfunction of the transportation and transformation functions, resulting in internal generation of damp turbidity. Damp pathogens stagnate, easily transform into heat, and damp-heat flows downward to pour into the uterus, damaging the Conception and Belt Vessels. Therefore, HR-HPV infection can present clinically as increased leucorrhea. The kidney is the root of the innate constitution. “The kidney is the water organ, it governs fluids.” Women may have kidney qi deficiency due to constitutional kidney deficiency, chronic disease causing kidney deficiency, or due to sexual activity and overexertion, leading to kidney qi deficiency, insecurity of the Conception Vessel, and failure of the Belt Vessel to restrain, thus causing vaginal discharge disease. Furthermore, the menstruation, pregnancy, childbirth, and lactation that women experience throughout their lives consume and damage qi and blood, injuring righteous qi, thereby easily leading to HR-HPV infection and increasing the risk of cervical cancer [10].

Zhang Xueling’s [11] research showed reduced immune function in cervical cancer patients with HR-HPV infection. After changes in the vaginal environment, damage to the cervical barrier, and reduced immune function, local righteous qi becomes weak, hindering the body’s ability to clear the virus promptly after HPV infection; meanwhile, the chronic non-resolving inflammation caused by persistent HPV infection can trigger immune suppression, thereby promoting the occurrence and progression of cervical cancer [12]. Consumption and damage of qi and blood lead to deficiency of righteous qi; insufficiency of righteous qi makes it difficult to resist pathogens. Therefore, at this stage, supporting righteous qi, fortifying the spleen and supplementing the kidney, and improving the body’s immunity are the foundations for treating HR-HPV infection. The deficiency state is the internal factor for persistent high-risk HPV infection and simultaneously becomes the background and soil for the occurrence and progression of cervical cancer, determining the disease’s outcome and prognosis.

4.2 Dampness State - Core of Progression

Dampness state: Mostly seen in cervical low-grade/high-grade intraepithelial neoplasia (CIN I-II, CIN III), i.e., the precancerous lesion stage. It is the key link in the disease’s transformation from “deficiency” to “excess,” from functional dysfunction to substantial pathological change. The core of this state is spleen deficiency failing in transportation, with damp turbidity pouring downward, soaking and infesting the uterus and cervical. The formation of dampness pathogen is closely related to qi deficiency of the lung, spleen, kidney, and other organs, as well as dysfunction of the ascending and descending mechanisms. Since the spleen governs transportation and transformation, is located in the middle burner and connects to the four sides, and is the pivot for the movement of qi, there is also the saying “vaginal discharge is all attributed to the spleen.” Fu Qingzhu’s Gynecology states: “All vaginal discharge is a dampness pattern... combined with deficiency of spleen qi, depression of liver qi, invasion of dampness qi, and pressurization of heat qi, how can it not

become a vaginal discharge disease!” establishing the theoretical foundation of dampness pathogen as the primary cause of this disease. “All dampness, swelling, and fullness belong to the spleen.” The spleen governs the transportation and transformation of water-dampness. If spleen qi becomes weak due to dietary irregularities, excessive contemplation, etc., leading to dysfunction of the transportation and transformation function, then water-dampness accumulates and pools, flows downward to the lower burner, and soaks the uterus [13]. The spleen prefers dryness and dislikes dampness; spleen deficiency makes it susceptible to dampness pathogens. Dampness pathogens have the characteristics of “stickiness and stagnation,” “heaviness and turbidity,” and “lingering and lingering,” which make the condition protracted and difficult to cure. The dampness state is not static; it is a “catalyst” for disease progression and can evolve into more severe states through two main pathways:

Dampness stagnating and transforming into heat, creating damp-heat: When dampness pathogens stagnate for a long time, they depress qi movement; qi stagnation then transforms into heat, forming a situation of intermingled dampness and heat. Damp-heat scorches the blood vessels of the cervix, leading to symptoms such as blood streaks in leucorrhea and contact bleeding, exacerbating the inflammatory response.

Dampness obstructing qi movement, over time forming stasis: Dampness pathogens are heavy and turbid pathogens, (jí yì - extremely easy to) obstruct the normal movement of qi. Qi is the commander of blood; qi stagnation leads to impeded blood flow, ultimately resulting in internal retention of static blood. Dampness and stasis combat and bind together, attaching to the uterus, causing cervical tissue hyperplasia, roughness, forming Nabothian cysts, polyps, and even gradually developing into high-grade CIN lesions, the initial form of “abdominal mass”.

Therefore, at the dampness stage, it often manifests as a complex situation where dampness, heat, and stasis are intermingled, but with dampness as the core. This state is a key link in disease progression; prolonged lingering of dampness pathogens can provide conditions for transforming into stasis and brewing toxicity. Thus, fortifying the spleen and dispelling dampness is the key treatment method for blocking disease progression at this stage.

4.3 Stasis State - Key from Progression to Carcinogenesis

Stasis state: Particularly prominent from the high-grade intraepithelial neoplasia (CIN III) stage to the early invasive cancer stage, marking the substantial transformation of the disease from “exuberance of pathogenic qi” to “damage of form and substance.” “When righteous qi decreases by one part, toxic qi must advance inward by one part.” When the body’s righteous qi is deficient, combined with internal disturbance by dampness pathogens, it further leads to impeded movement of qi and blood, forming static blood (yū xuè), which combats and binds in the vessels and collaterals of the uterus. Static blood is both a product of the previous pathological process and a key pathogenic factor pushing the condition towards cancer development. Specifically, on one hand, qi deficiency can lead to blood stasis. “Qi is the commander of blood; blood is the mother of qi.” Qi deficiency

lacks the strength to propel blood flow, resulting in stasis. When qi and blood are harmonized, the five zang organs are peaceful and harmonious. “Women take the liver as their innate constitution; their yin nature is congealing and (níng jié - congealing), easily leading to depression” (Case Records as a Guide to Clinical Practice). If a woman’s liver qi is not free-flowing, and qi movement is obstructed, it can also generate static blood. Patients with persistent HR-HPV infection, after prolonged illness with contention between healthy and pathogenic qi, have deficient righteous qi and lingering pathogens, leading to deficiency of the body’s righteous qi. Qi deficiency leads to blood deficiency, and lack of strength to transport and transform leads to sluggish blood circulation, thus generating stasis and causing disease. Once static blood is generated, it causes blockage and obstruction of the channels and collaterals, hindering the movement of qi and blood, thereby affecting the five zang organs, and all diseases arise from this. On the other hand, damp-toxicity stagnates, prolonged illness leads to stasis. Dampness pathogens are sticky and stubborn, difficult to resolve. Prolonged stagnation within the body generates toxicity. Stagnant damp-toxicity fails to transform, over time accumulates heat, and the movement of qi and blood is obstructed, leading to stasis [14]. At this stage, cervical cancer patients may clinically present with bleeding, pain, and masses. Bleeding occurs because static blood obstructs [the vessels], preventing new blood from returning to its pathways, coupled with the fragility of cancerous tissue, causing damage to vessels and collaterals and extravasation of blood with even slight touch. Pain occurs due to obstruction by static blood—if there is obstruction, there is pain. Masses refer to palpable tumors on the cervix with hard texture and uneven surface during gynecological examination, or fixed masses palpated in the pelvic cavity; this indicates that “abdominal mass” has already formed. The stasis state is a sign that the condition has entered a severe stage. Once static blood forms, it not only aggravates pain and bleeding but also becomes a carrier and shelter for “toxic pathogens,” binding together and forming a vicious cycle.

4.4 Toxicity State - Core of Carcinogenesis

The stage of the toxicity state is: invasive cervical cancer, especially intermediate / advanced stages or recurrent / metastatic stages. Persistent infection with high-risk human papillomavirus (HR-HPV) is currently an important precursor factor leading to the development of malignant cervical tumors in women. Studies have shown that 13 types of high-risk HPV are closely related to the occurrence and development of cervical cancer in women [15]. HR-HPV is a virus, which from a TCM perspective can be categorized under “toxicity” (dú). The Yellow Emperor’s Inner Classic·Basic Questions·Great Treatise on the Five Constant Policies states: “Toxicity is qi that harms people. Toxicity arises from pathogens; when pathogens are extremely exuberant, they become toxicity.” This state is no longer a simple accumulation of pathological products; it is the final result of the interweaving and intensification of all previous pathological factors. It is where pathogenic qi reaches extreme exuberance, undergoes qualitative change, and transforms into a kind of “cancer toxin” (ái dú) with strong invasiveness, consumptive nature, and migratory tendency. Its core pathogenesis is that pathogens such as dampness, stasis,

and heat, after prolonged exuberance, brew cancer toxin. Toxic and stasis factors bind together, corroding flesh and blood, and consuming and damaging righteous qi. Once cancer toxin forms, it becomes the dominant factor of the disease; its development and outcome determine the patient’s prognosis. Cancer toxin has characteristics such as ferocity, corrosiveness, consumptive nature, and migratory tendency. Therefore, at this stage, the disease develops rapidly, eroding surrounding tissues, leading to (jí jù è huà - rapid and drastic deterioration) of the condition, causing tissue necrosis, ulceration, and the formation of ulcerated cavities. Simultaneously, cancer toxin has a strong characteristic of “consuming qi and damaging yin,” capable of plundering the body’s essence qi in large quantities, leading to extremely emaciated (cachexia), fatigue, anemia, and other deficient and (shuāi jié - declining/exhausted) states in a short period. Cancer toxin does not remain in its place; it easily migrates along the channels, collaterals, qi, and blood to distant places, forming new cancerous foci in other organs—this is “metastasis.” This is the most fatal characteristic of cancer toxin. Treating the “toxicity state” is a difficulty in TCM oncology. A delicate balance must be found between “eliminating pathogens (attacking toxicity)” and “supporting the healthy” (fú zhèng). Attacking too aggressively will immediately collapse the righteous qi, while supporting the healthy too much will appease and nurture the villain (gū xī yǎng jiān).

5. Conclusion

Based on the “State-Target Pattern Identification” theory, the TCM pathogenesis of cervical cancer can be systematically divided into four state-pattern types: “deficiency state,” “dampness state,” “stasis state,” and “toxicity state,” corresponding to different stages of disease occurrence and development. The deficiency state is present throughout, serving as the basis for onset; the dampness state is commonly seen in precancerous lesions and is key to disease transformation; the stasis state marks damage to form and substance, commonly seen in the progressive stage; the toxicity state is the core of carcinogenesis, commonly seen in advanced and metastatic stages. This classification system integrates modern medicine’s understanding of the pathological evolution of cervical cancer, highlighting the dynamic and stage-specific nature of TCM pathogenesis, providing new ideas for clinical pattern differentiation and treatment. Future work should involve further clinical research to verify targeted formula and medicinal treatment plans for each state, promoting the precise and standardized application of TCM in the prevention and treatment of cervical cancer.

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