

Theoretical Origin and Application of the Method of Promoting Blood Circulation to Prevent Miscarriage in Recurrent Spontaneous Abortion Induced by Blood Stasis

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Abstract: *Recurrent spontaneous abortion (RSA) represents a significant reproductive health challenge affecting women of childbearing age, characterized by complex etiology and pathogenesis. In Traditional Chinese Medicine (TCM), RSA falls under the categories of “habitual abortion” and “recurrent miscarriage.” Beyond traditional pathological mechanisms such as kidney deficiency and qi-blood deficiency, the theoretical framework centering on “blood stasis” as a core pathological factor has evolved through long-term clinical practice and continues to be refined. This paper systematically reviews the historical development of the “blood stasis leading to miscarriage” theory, tracing its origins from the “administering treatment for a specific cause without inducing harm” concept in the Synopsis of the Golden Chamber to Wang Qingren’s “blood stasis occupying the uterine territory” theory, and further to its correlation with modern medical mechanisms including microcirculation disorders, thrombophilia, and ferroptosis. Furthermore, this study explores the modern mechanisms of the “promoting blood circulation to prevent miscarriage” method, including its roles in improving endometrial receptivity, regulating the maternal-fetal immune microenvironment, inhibiting trophoblast ferroptosis, and correcting hypercoagulable states. Clinical applications demonstrate that formulas such as Bushen Huoxue Decoction and Danggui Powder significantly improve coagulation function, uterine artery blood flow, and sex hormone levels, embodying the therapeutic principles of “treatment based on pattern differentiation” and “cessation upon symptom resolution.” Future research should focus on utilizing modern technological methods to further elucidate the specific targets and pathways through which blood-activating and miscarriage-preventing formulas regulate the maternal-fetal microenvironment, thereby providing more robust scientific evidence for this ancient therapeutic approach. This will not only benefit more RSA patients but also contribute to enriching the field of global reproductive medicine.*

Keywords: Recurrent Spontaneous Abortion, Blood Stasis, Promoting Blood Circulation to Prevent Miscarriage, Theoretical Origin and Development, Fu Qingzhu’s Gynecology, Bushen Huoxue Decoction, Danggui Powder.

1. Analysis of the Theoretical Origin of “Blood Stasis Leading to Miscarriage”

1.1 Theoretical Foundation: The Han and Tang Dynasties, Pioneering the Approach

The concept of “blood stasis leading to miscarriage” finds its roots in classical Chinese medical texts. Although the Yellow Emperor’s Inner Canon does not explicitly state it, its assertion that “imbalance of blood and qi gives rise to a hundred diseases” laid the theoretical groundwork for treating gynecological disorders by regulating qi and blood [1]. In the Han Dynasty, Zhang Zhongjing, in his Synopsis of the Golden Chamber, pioneered the method of “promoting blood circulation to prevent miscarriage.” The formulas he established, such as Guizhi Fuling Pill (for treating concretions and accumulations threatening the fetus) and Danggui Powder (for nourishing blood, clearing heat, fortifying the spleen, and resolving dampness), remain essential prescriptions for preventing miscarriage today. Particularly crucial is the principle of “administering treatment for a specific cause without inducing harm,” which clearly states that in the presence of a pathogenic factor like blood stasis or concretions, using blood-activating medicinals is not only harmless but key to eliminating the disease and stabilizing the pregnancy. This became the core guiding philosophy of the “promoting blood circulation to prevent miscarriage” method [2]. Traditional Chinese Medicine views

recurrent pregnancy loss as a condition characterized by root deficiency and tip excess. Kidney deficiency is the root, while blood stasis is the tip. Kidney deficiency leads to an inability to move blood effectively, resulting in blood stasis obstructing the uterus. This prevents the uterus from fulfilling its storage and containment functions, leading to repeated pregnancies and losses, which further depletes kidney qi. Blood stasis causes obstruction in the thoroughfare and conception vessels, impairing the generation of new blood and essential qi. Consequently, the fetal essence loses its nourishment, and the fetus cannot be anchored, making miscarriage likely [3].

1.2 Formula Analysis and Mechanism of Bushen Huoxue Decoction

Bushen Huoxue Decoction serves as a prime example of the therapeutic approach that combines kidney tonification with blood activation to prevent miscarriage. Its composition is strategically designed to address the root (kidney deficiency) and the tip (blood stasis) simultaneously. Kidney Tonification & Miscarriage Prevention: Cuscuta Seeds and Chinese Taxillus Herb form a core pair for tonifying the kidney, stabilizing the thoroughfare and conception vessels, and preventing miscarriage, with their effects being mutually enhancing [4]. Eucommia Bark further strengthens this kidney-tonifying and anti-abortive action. Qi and Yin Supplementation & Essence Stabilization: Stir-fried Chinese

Yam boosts qi nourishes yin, and tonifies the spleen, lung, and kidney, while also stabilizing essence and stopping leukorrhea. Its combination with Himalayan Teasel Root, which frees vessel flow, synergistically invigorates yang, boosts yin, and stabilizes essence [5].

1.3 Integration with Modern Medicine and Demonstrated Efficacy

Modern medical understanding identifies abnormal coagulation function and insufficient placental perfusion as significant contributors to recurrent pregnancy loss, often accompanied by endocrine dysfunction affecting sex hormone levels [6]. Pharmacological research provides a scientific basis for the efficacy of Bushen Huoxue Decoction: Endocrine Regulation: Cuscuta Seeds promote the expression of estrogen and luteinizing hormone receptors, enhancing luteal function and improving sex hormone levels (β -hCG, P, E2). Coagulation and Hemodynamics Improvement: Cuscuta Seeds and Cornus Fruit inhibit platelet aggregation, improving coagulation parameters (e.g., reducing D-dimer) [7]. Chinese Taxillus Herb and Salvia Root promote vasodilation, reducing uterine artery blood flow resistance (RI, PI, S/D) and improving placental perfusion. Clinical studies confirm that treatment with Bushen Huoxue Decoction results in significantly improved coagulation profiles, uterine artery blood flow indices, and sex hormone levels, correlating with a higher pregnancy success rate [8].

2. Clinical Application of the Method of Promoting Blood Circulation to Prevent Miscarriage

The method of “promoting blood circulation to prevent miscarriage” is an advanced therapeutic strategy guided by pattern differentiation [9]. It specifically addresses the pattern of “blood stasis obstructing the interior and fetal origin instability.” Based on the foundational principles of tonifying the kidney, fortifying the spleen, and nourishing blood, it incorporates blood-activating and stasis-dispelling medicinals in a rational formula to achieve the goal of “dispelling stasis to generate new blood, and eliminating stasis to stabilize the fetus. [10]”

2.1 Core Principles

Pattern Differentiation and Strict Indications: Application requires clear signs of the “blood stasis” pattern. These may include: stabbing pain in the lower abdomen during pregnancy with a fixed location; possible scant, dark-red vaginal bleeding; a dark-red tongue possibly with ecchymosis or petechiae, and tortuous sublingual collateral veins; ultrasound evidence of intrauterine fluid or hematoma; or laboratory findings suggesting thrombophilia (e.g., inherited thrombophilias like Factor V Leiden).”Administering Treatment for a Specific Cause Without Inducing Harm, and Stopping When the Pathogen is Mostly Eliminated”: These are the two cardinal rules for applying this method. Firstly, one must have the confidence to use blood-activating medicinals when blood stasis is definitively present [11]. Secondly, treatment must cease once the condition improves significantly, avoiding excessive or prolonged use [10].

2.2 Primary Treatment Methods and Formula Application

Clinical practice never involves promoting blood circulation alone. Instead, it employs a combined strategy of attack and supplementation within a compound formula [12]. Method: Tonifying the Kidney and Activating Blood Circulation Indication: Kidney deficiency with blood stasis pattern, one of the most common clinical presentations in recurrent pregnancy loss [12]. Representative Formula: Bushen Huoxue Decoction, composed of Stir-fried Chinese Yam, Cornus Fruit, Eucommia Bark, Cuscuta Seeds, Chinese Taxillus Herb, Himalayan Teasel Root, Stir-fried Atractylodes Macrocephala Rhizome, Scutellaria Root, Salvia Root, etc [13].

Efficacy and Mechanism: Modern research confirms that this formula, especially when combined with conventional Western medicine (e.g., dydrogesterone + dalteparin sodium), can significantly improve coagulation function (reducing D-dimer), optimize uterine artery blood flow (lowering RI, PI, S/D values), and enhance sex hormone levels (β -hCG, Progesterone, Estradiol), ultimately increasing the rate of successful pregnancy with a good safety profile [14].

2.3 Medicinal Selection and Contraindications

Commonly Used Medicinals: Preference is given to substances with mild properties that activate blood without causing reckless movement of blood. Examples include Salvia Root, Chinese Angelica, Sichuan Lovage Rhizome, Caulis Spatholobi, and Red Peony Root [13]. Medicinals to Use with Extreme Caution or Contraindicated: Potent blood-breaking and stasis-expelling medicinals with drastic properties, such as Rhizoma Sparganii, Rhizoma Curcumae, Leech, Gadfly, and Peach Kernel, should be used with extreme caution or are strictly contraindicated during pregnancy [15].

3. Analysis of the Modern Mechanism of the Method of Promoting Blood Circulation to Prevent Miscarriage in Intervening with RSA

Modern pharmacological and molecular biology research has provided a solid scientific basis for the use of the method of promoting blood circulation to prevent miscarriage in the treatment and prevention of Recurrent Spontaneous Abortion (RSA). This therapeutic approach regulates the microenvironment at the maternal-fetal interface through multi-target and multi-level mechanisms, primarily manifested in the following four aspects [16].

3.1 Improving Endometrial Receptivity and Promoting Angiogenesis

Successful embryo implantation relies on good endometrial receptivity. Studies have found that active components in formulas that promote blood circulation and prevent miscarriage (such as tanshinone and tetramethyl pyrazine) can significantly upregulate the expression of key endometrial receptivity markers—integrin $\alpha\beta 3$ and leukemia inhibitory

factor (LIF). Simultaneously, by promoting the expression of vascular endothelial growth factor (VEGF) and its receptors, they effectively facilitate the remodeling of endometrial spiral arteries and angiogenesis, reducing the uterine artery resistance index (RI) and pulsatility index (PI), thereby improving the “soil” environment for embryo implantation. Clinical research has confirmed that Bushen Huoxue Decoction can significantly optimize uterine artery blood flow parameters, providing adequate blood supply and nutritional support for early embryonic development [17].

3.2 Regulating the Immune Microenvironment at the Maternal-Fetal Interface

A normal state of immune tolerance at the maternal-fetal interface is crucial for maintaining pregnancy. RSA patients often exhibit an imbalance in T helper 1 (Th1) and Th2 cytokines, as well as inadequate function of regulatory T cells (Tregs). The method of promoting blood circulation to prevent miscarriage (e.g., Bushen Huoxue Decoction) can effectively downregulate pro-inflammatory Th1 cytokines (such as TNF- α and IFN- γ), while upregulating anti-inflammatory Th2 cytokines (such as IL-4 and IL-10), and promote the proliferation and function of Treg cells, thereby reshaping the immune balance at the maternal-fetal interface. Experimental studies have shown that Danggui Powder can significantly regulate the number and function of endometrial NK cells, improving the immune microenvironment at the maternal-fetal interface [18].

3.3 Inhibiting Ferroptosis in Placental Trophoblasts

Ferroptosis is a newly discovered form of iron-dependent, lipid peroxidation-driven cell death, highly relevant to the TCM pathogenesis of “blood stasis stagnating and transforming into heat, damaging yin and blood.” Research indicates that placental tissues of RSA patients exhibit significant characteristics of ferroptosis. Formulas that promote blood circulation and prevent miscarriage can inhibit this process through multiple pathways: activating the System Xc--GSH-GPX4 antioxidant axis, upregulating the expression of solute carrier family 7 member 11 (SLC7A11), and promoting the synthesis of glutathione (GSH) and the activity of glutathione peroxidase 4 (GPX4); regulating key iron metabolism proteins (such as ferritin and transferrin receptor 1), reducing the level of the intracellular unstable iron pool, and decreasing the production of hydroxyl radicals. Studies on Modified Shoutai Pill show that it can significantly reduce the level of lipid peroxide MDA and increase GPX4 activity, effectively inhibiting trophoblast ferroptosis [19].

3.4 Anticoagulation and Improvement of Uteroplacental Circulation

This mechanism directly corresponds to the core effect of “removing stasis” in TCM. Blood-activating and miscarriage-preventing herbs such as Salvia miltiorrhiza, Chuanxiong, and Red Peony Root have demonstrated clear antiplatelet aggregation, anticoagulant, and profibrinolytic activities. They can significantly reduce plasma D-dimer levels and regulate the coagulation-fibrinolysis system balance. Clinical studies have shown that patients treated with Bushen Huoxue Decoction experienced a significant decrease

in D-dimer levels and improved uterine artery blood flow resistance, effectively preventing the formation of placental microthrombi. Tetramethyl pyrazine from Chuanxiong has been confirmed to inhibit platelet aggregation induced by platelet-activating factor (PAF) and improve microcirculation disorders.

4. Clinical Application of the Method of Promoting Blood Circulation to Prevent Miscarriage

4.1 Core Application Principles

Clinical application must strictly adhere to two key principles: pattern differentiation and identifying the cause and stop when the pathogen is mostly eliminated. Diagnosis must be based on clear signs of the “blood stasis” pattern (such as stabbing pain in the lower abdomen, dark-colored bleeding, a dark tongue with ecchymosis) combined with modern medical indicators (such as elevated D-dimer, ultrasound suggesting intrauterine hematoma). During treatment, the principle of “stop when the pathogen is mostly eliminated” must be observed, adjusting the medication promptly after symptoms improve [20].

4.2 Main Treatment Methods

4.2.1 Method of Tonifying the Kidney and Activating Blood Circulation

Indicated for kidney deficiency with blood stasis pattern, with Bushen Huoxue Decoction as the representative formula. This formula combines kidney-tonifying and stabilizing agents (Cuscuta Seeds, Chinese Taxillus Herb) with blood-activating medicinals (Salvia Root, Sichuan Lovage Rhizome). Clinical studies show it can significantly improve uterine artery blood flow and sex hormone levels [21].

4.2.2 Method of Nourishing Blood and Activating Blood Circulation

Indicated for blood deficiency complicated by blood stasis pattern, with Danggui Powder as the representative formula. This formula uses Chinese Angelica and Sichuan Lovage Rhizome to nourish blood and activate blood circulation, combined with Atractylodes Macrocephala Rhizome and Scutellaria Root to fortify the spleen and clear heat. Its nature is relatively mild, focusing on regulating qi and blood [22].

4.3 Medicinal Selection and Contraindications

Commonly used medicinals include Salvia Root, Chinese Angelica, and Sichuan Lovage Rhizome, which have relatively mild properties. The use of potent blood-breaking and stasis-expelling substances such as Rhizoma Sparganii, Rhizoma Curcumae, and Leech should be strictly avoided to prevent harming the fetus [23].

5. Conclusion

This paper systematically examines the historical origins and modern developments of the theory of “blood stasis leading to

miscarriage,” providing a comprehensive analysis of the mechanisms and clinical applications of the method of promoting blood circulation to prevent miscarriage. Research demonstrates that this theory has evolved into a complete system, from the concept of “administering treatment for a specific cause without inducing harm” in the Synopsis of the Golden Chamber to modern medical pathological mechanisms such as microcirculation disorders and thrombophilia. The method of promoting blood circulation to prevent miscarriage exerts its therapeutic effects through multiple mechanisms, including improving endometrial receptivity, regulating the immune microenvironment at the maternal-fetal interface, and inhibiting trophoblast ferroptosis. Clinical applications show that formulas such as Bushen Huoxue Decoction and Danggui Powder are significantly effective in improving coagulation function, uterine artery blood flow, and sex hormone levels, embodying the treatment principles of “pattern differentiation and identifying the cause” and “stopping when the pathogen is mostly eliminated.” However, current research still faces several challenges: the diagnosis of “blood stasis syndrome” lacks objective criteria, the active components and mechanisms of compound formulas remain unclear, high-quality clinical evidence is insufficient, and the safety evaluation system for medication during pregnancy requires urgent improvement. Future research should focus on deepening mechanistic exploration, establishing standardized diagnosis and treatment systems, and promoting the in-depth integration of Chinese and Western medicine to provide new strategies for the prevention and treatment of recurrent spontaneous abortion.

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