

Discussion on the Pericardium as the Meninges

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Abstract: *In traditional Chinese medicine (TCM), the visceral manifestation theory posits that the heart is the sovereign of the five zang and six fu organs. The pericardium acts as a minister, receiving pathogenic factors on behalf of the heart. Ye Tianshi proposed the concept of “reverse transmission to the pericardium.” If pathogenic factors were to invade the outer covering of the heart, why would it be termed “reverse”? Additionally, conditions such as “heat invading the pericardium” and “phlegm clouding the pericardium” both involve mental disturbances. While TCM speaks of five zang and six fu organs, there are twelve regular meridians, with the hand-shaoyang sanjiao meridian and the hand-jueyin pericardium meridian forming an exterior-interior pair. Thus, the pericardium, like the sanjiao, may be a membranous organ. Based on clinical manifestations, it should correspond to the meninges. However, unlike the anatomical essence of the blood-brain barrier [1], it should encompass the entire membranous structure dominated by the liver fascia. This article explores the historical evolution, theoretical analysis, pathology, and case studies to provide a feasible theoretical model for researching related diseases.*

Keywords: Pericardium, Meninges, Liver Fascia.

1. Introduction

The Ling Shu·Meridians refers to the pericardium as the “heart master,” while the Su Wen·Essential Subtleties on Pulse Theory describes the head as the “house of refined intelligence.” The Su Wen·Treatise on the Secret Canon of the Orchid Chamber mentions “twelve organs,” clearly including the brain as one. However, while TCM speaks of five zang and six fu organs, the twelve regular meridians suggest that the sanjiao fascia may extend from the meninges. The heart governs blood vessels, while the sanjiao transports nutrient qi, and the pericardium acts on behalf of the heart. The Ling Shu·Meridians states: “The heart master’s hand-jueyin pericardium meridian... the pericardium collateral.” The chest contains only the heart and lungs, and since the heart governs blood vessels, it is naturally the starting point. “Emerging from the pericardium collateral,” the vessels house the spirit. Only when the heart’s qi and blood ascend to the brain can the pericardium act on behalf of the heart, hence the saying, “The heart is the sovereign organ, from which divine intelligence emanates.” The Jin Gui Yu Han Jing states: “The head is the body’s supreme leader... the brain is a zang organ, called the Mud Ball Palace, where the spirit and marrow reside.” Li Shizhen proposed that “the brain is the house of the original spirit,” and Wang Qingren asserted that “intelligence and memory reside not in the heart but in the brain.” Modern anatomy’s understanding of brain function confirms that “the brain governs divine intelligence.”

Ye Tianshi proposed, “Warm pathogens ascend from above, first attacking the lungs, then reversely transmitting to the pericardium.” If the pericardium were merely the outer membrane of the heart, this should be considered “forward transmission.” Only if warm pathogens ascend along the sanjiao fascia could it be termed “reverse transmission.” Additionally, meningeal pathologies often present with coma and delirium, whereas pericardial diseases lack mental symptoms.

2. Historical Evolution

In pre-Qin and early texts, there was no mention of “pericardium” or “pericardium meridian.” Early works like the Foot-Arm Eleven Meridians Moxibustion Classic and the Yin-Yang Eleven Meridians Moxibustion Classic do not mention “pericardium collateral” or “hand-jueyin.” The “heart master meridian” first appeared in the twelve meridians, initially unrelated to the hand-jueyin or pericardium collateral. The Bai Hu Tong states, “The sanjiao is the enveloping fu organ...” but does not describe the pericardium. The Ling Shu notes, “All pathogens affecting the heart reside in the pericardium collateral. The pericardium collateral is the heart master’s meridian,” indicating its role in receiving pathogens but not its structure. The Nan Jing states, “The heart master and sanjiao form an exterior-interior pair, both having names but no form.” The Ling Shu details the pathway of the “heart master’s hand-jueyin pericardium meridian,” originating in the chest, emerging from the pericardium collateral, connecting internally to the heart meridian, traversing the sanjiao, and pairing with the hand-shaoyang sanjiao meridian.

Yang Shangshan’s Huang Di Nei Jing Tai Sudistinguishes between “pericardium” (a physical membrane) and “pericardium collateral” (its collateral vessels), which together perform functions. The San Yin Ji Yi Bing Zheng Fang Lun treats the pericardium collateral as a “zang” organ paired with the sanjiao, though the sanjiao’s status as a “solitary fu” remains unclear. Zhang Yuansu’s Medical Revelations links the pericardium collateral to the gate of life and sanjiao, emphasizing its role in qi transformation. Zhang Jingyue describes it as the “membrane enveloping the heart,” while Yu Tuan’s Medical Orthodoxy conflates membrane and collateral. The pericardium membrane and collateral connect to the heart via different pathways. Hua Shou’s Exposition of the Fourteen Meridians states, “Above the heart’s transverse membrane, below the vertical membrane, adhering to the transverse zang.” Fascia can be termed collaterals, with the membrane enveloping the heart and collaterals linking other organs. The Medical Principles states the pericardium “winds around the sanjiao,” while the First Book on Cold Damage notes it “connects below to the gate of life, ascends to the chest center, and pairs with the sanjiao,” indicating its role in distributing qi via the sanjiao’s web-like membrane.

Modern scholars like Jiang Yong [2] argue, based on Chen Chaozu's theory, that "the pericardium is the brain's membrane, governed by the liver fascia." Hata moto Hirao [3] anatomically identifies the pericardium as the fibrous serous sac enveloping the heart and autonomic nerves. Lin et al. [1] equate it with the blood-brain barrier, while Li et al. [4] propose it as the coronary arteries. Liu et al. [5] emphasize its functional, not morphological, significance in The Inner Canon, linking it to thoracic-cranial functional connectivity.

3. Theoretical Analysis

Before discussing the pericardium, distinctions must be made between the chest center (dan zhong), pericardium collateral, and pericardium membrane. This article classifies the pericardium as the sixth zang organ, given the Su Wen's "twelve organs" and the twelve meridians. The chest center, as the "sea of qi" in TCM, pairs with the sanjiao in the Ling Shu, while the Su Wen uses pericardium collateral acupuncture to treat chest center disorders, suggesting its inclusion in the pericardium zang. The pericardium collateral resembles the coronary arteries, while the pericardium membrane is the heart's fibrous serous sac. However, this interpretation conflicts with pathological observations. This article posits that the pericardium, like the sanjiao, is a formless, membranous organ. Based on Jin Yujing's "sanjiao nutrient-defense closed-loop" model [6], the sanjiao includes membranes, interstices, and structures like fibrous scaffolds, collagen fibers, and interstitial fluid. The Su Wen states, "The pathways of the five zang all emerge from the meridians to circulate qi and blood..." while "the liver governs the body's fascia," serving as conduits for qi and blood.

The twelve meridians correspond to twelve organs, with the pericardium pairing with the sanjiao. As the "ministerial envoy," it relays the heart's commands. The hand-jueyin meridian "descends through the diaphragm, connecting to the sanjiao," transmitting signals to organs. Modern medicine identifies the brain as the command center, suggesting the pericardium corresponds to the meninges, linked to the sanjiao via fascia. The Su Wen Treatise on the Secret Canon of the Orchid Chamber supports this: "The heart is the sovereign, governing divine intelligence; the liver is the general, governing strategy; the gallbladder is the impartial judge, governing decisions; the chest center is the ministerial envoy, governing joy; the kidneys are the laborer, governing skill." These mental activities stem from the brain's meningeal connections.

4. Physiological Functions of the Triple Burner

As stated in the Classic of Difficulties: "The Triple Burner acts as the envoy of the primordial qi, governing the passage of the three types of qi and circulating through the five zang and six fu organs." The Triple Burner does not correspond to a specific anatomical organ; rather, it is a collective term for the pathways of grain, fluids, and qi. In traditional Chinese medicine, the human body is divided into three levels: the upper, middle, and lower burners. Thus, the Triple Burner can be understood both as a "tangible" system of pathways (for fluids, grain, and qi) and as an "intangible" functional complex (serving as the pathway for the ascent and descent of qi).

3.1 Upper Burner Governs Reception

The upper burner is responsible for receiving and containing the essence of water and grain sent upward from the middle burner, as well as the clear qi inhaled through respiration (referred to in the Inner Canon as "inhaling the essence of qi"). It nourishes the zang-fu organs and distributes defensive qi throughout the body to protect the exterior. This aligns with the statements: "Clear yang ascends to the upper orifices" (Plain Questions: The Great Treatise on the Correspondences of Yin and Yang) and "The movement of heaven is exemplified by the sun's brilliance; thus, yang ascends to protect the exterior" (Plain Questions: Treatise on Vitality and Communication). In other words, "The upper burner opens and disseminates, distributing the flavors of the five grains to warm the skin, nourish the body, and moisten the hair, like the irrigation of mist and dew" (Spiritual Pivot: On Qi). This ensures that "disease cannot enter the interstices" (the interstices are where the Triple Burner communicates with the primordial truth and where qi and blood infuse; the textures refer to the patterns of the skin and zang-fu organs) (Synopsis of the Golden Chamber: On the Patterns and Treatments of Zang-Fu and Meridian Diseases). Hence, it is said that "the upper burner is like a mist."

3.2 Middle Burner Governs Offering, Controlling, and Transforming

The functions of the middle burner include offering nutrients to the upper burner, controlling the lower burner, and transforming the essence of water and grain into qi, blood, and body fluids. As mentioned, the middle burner sends the essence of water and grain upward, where it combines with the clear qi of respiration to form qi, blood, and body fluids. These are then distributed by the upper burner to the zang-fu organs and throughout the body. The middle burner decomposes and absorbs the essence of water and grain, transforming it into qi, blood, and body fluids. These are then offered to the upper burner for distribution to nourish the body. The Spiritual Pivot: On Qi states: "The middle burner receives qi and extracts fluids, which transform and turn red—this is called blood". The Spiritual Pivot: On the Production and Circulation of Nutritive and Defensive Qi adds: "The middle burner receives qi, separates the waste, steams the fluids, and transforms the essence, which is then sent upward to the lung vessel to become blood and nourish the body". Under the regulating influence of the stomach qi in the middle burner, clear qi and fluids ascend, while turbid qi, waste fluids, and dregs descend. This ensures the normal physiological functions of generation, growth, transformation, harvest, and storage.

3.3 Lower Burner Governs Free Flow and Discharge

The lower burner ensures free flow and unimpeded movement, providing a pathway for the descent of turbid qi, waste fluids, dregs, impurities, and metabolic waste. This allows for normal excretion of urine and feces. Other functions, such as the discharge of menstrual flow, postpartum lochia, and the opening and closing of the seminal orifice in men, also rely on the free flow of the lower burner. The Spiritual Pivot: On the Production and Circulation of Nutritive and Defensive Qi states: "The lower burner separates [fluids] from the

intestines and directs them into the bladder, where they seep in. Thus, water and grain, after residing together in the stomach, become dregs and descend into the large intestine. The lower burner then separates and filters the fluids, directing them downward to seep into the bladder.” The Synopsis of the Golden Chamber: On the Patterns and Treatments of Women’s Diseases mentions: “Women’s diseases arise from deficiency, accumulated cold, and congealed qi, leading to the cessation of menses over years, with cold and blood accumulation in the uterine gate.” The Synopsis of the Golden Chamber: On the Patterns and Treatments of Blood Bi and Deficiency Fatigue states: “Those who frequently lose essence have tense and rigid lower abdomens, cold glans, dizziness (or pain around the eyes), hair loss, and extremely weak and slow pulses, indicating clear diarrhea, blood loss, and essence depletion.” Hence, it is said that “the lower burner is like a ditch.”

In summary, only when the functions of the Triple Burner—reception, offering, controlling, transforming, and free flow—are normal can the body achieve the state described: “When fluids enter the stomach, the essence overflows and is transported to the spleen. The spleen spreads the essence upward to the lung, which regulates the waterways and sends them downward to the bladder. Thus, water essence is distributed throughout the four directions, and the five meridians flow in parallel,” thereby nourishing and sustaining the body.

5. Pathological Connections

Pathologically, direct pericardial involvement is rare; most effects occur via fascial transmission. Six excesses or emotional factors disrupt meridian tension and sanjiao fluid-qi dynamics, affecting meningeal fascia and manifesting as symptoms. The Treatise on Cold Damage attributes “half-exterior-half-interior, half-deficiency-half-excess, half-cold-half-heat” to the shaoyang and jueyin meridians, implicating the sanjiao in orifice-focused conditions. Lung system: External cold contracts meridians, causing neck stiffness, fever, chills, and sweating. Spleen system: Meridian tension disrupts fluid-qi flow, causing abdominal distension and vomiting. Liver system: Meridian tension leads to palpitations, hypochondriac pain, convulsions, stroke, or depression. Heart system: Meridian tension causes dizziness, forgetfulness, insomnia, or delirium. Kidney system: Meridian tension results in thirst, urinary retention, or nocturnal emissions.

As interconnected systems, single-organ diseases manifest beyond their domains, making the pericardium’s classification as a cardiac appendage inadequate. Ye Tianshi’s Treatise on Warm Diseases states, “Warm pathogens ascend, first attacking the lungs, then reversely transmitting to the pericardium.” Heat pathogens, being inflammatory and fluid-consuming, easily form phlegm. If heat is excessive or the patient is weak, pathogens invade the pericardium, causing agitation, delirium, fever, crimson tongue, and rapid pulse. “Forward transmission” follows the Cold Damage six-meridian progression, while “reverse transmission” ascends via the sanjiao, forming phlegm that clouds the mind, akin to CNS dysfunction in severe infections.

6. Case Study

Female, 32 years old. Insomnia for 4 months following emotional stress. Difficulty falling asleep, light sleep, waking easily, sleeping only 2–3 hours nightly, irritability, hot flashes, nocturnal palpitations, dry stools (once every 3–4 days), poor appetite, no dry mouth or bitterness. Pulse: Right wiry-slippery-thin, left deep (especially faint at the cun position).

Tongue: Red tip, pale body, thin yellow-greasy coating. Diagnosis: Insomnia. Pattern: Liver depression with blood deficiency, phlegm-fire harassing the spirit. Treatment: Soothe the liver, resolve depression, drain fire, and calm the spirit. First Prescription: Modified Chai Hu Jia Long Gu Mu Li Tang (Bupleurum Plus Dragon Bone and Oyster Shell Decoction) and Dan Zhi Xiao Yao San (Moutan and Gardenia Free Wanderer Powder). Ingredients: Bupleurum (12g), Scutellaria (10g), Pinellia (10g), Poria (15g), Angelica (10g), White Peony (15g), Atractylodes (12g), Moutan (10g), Gardenia (10g), Dragon Bone (30g), Oyster Shell (30g), Acorus (12g), Polygala (12g), Polygonum multiflorum Vine (20g), Platycladus Seed (10g), Radish Seed (15g). Outcome: No improvement after 7 days. Second Prescription: Modified Wen Dan Tang (Gallbladder-Warming Decoction) and Lian Mei Yin (Coptis and Mume Beverage). Ingredients: Coptis (8g), Gardenia (10g), Cinnamon (6g), Mume (10g), Phellodendron (6g), Pinellia (10g), Coix Seed (30g), Poria (15g), Citrus (10g), Tangerine Peel (10g), Bamboo Shavings (10g), Rehmannia (20g), Red Peony (15g), Angelica (15g), White Peony (15g), Chuanxiong (10g), Radish Seed (30g), Areca Seed (15g), Peach Seed (15g), Apricot Seed (10g), Platycladus Seed (20g), Capillaris (20g), Oyster Shell (30g). Outcome: Improved sleep after 5 days, occasional constipation. Follow-up: Two weeks later, the patient reported sustained sleep improvement without sedatives.

Analysis: Lian Mei Yin, derived from Wu Mei Wan (Mume Pill), treats jueyin disorders like “thirst, upward rushing qi, and heartburn,” mirroring acute anxiety symptoms. Wu Mei Wan addresses cold-heat complexity, but for anxiety, warming and qi-tonifying herbs are omitted. Anxiety arises from damp-heat obstructing the pericardium, with jueyin blood deficiency allowing ministerial fire to disturb the brain. Insomnia stems from yang failing to enter yin, with the spleen-stomach as the key pivot. Damp-heat in the middle burner or phlegm-damp-heat in the jueyin pericardium disrupts sleep. Wen Dan Tang is thus commonly used. This formula combines bitter herbs (Coptis, Phellodendron) to drain pericardial heat, sour herbs (Mume, Oyster Shell) to nourish blood and subdue fire, and aromatic herbs (Pinellia, Acorus) to resolve phlegm and open orifices.

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