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Application of Liver-Theory-Based Treatment for Post-infectious Cough in a Patient with Sacral Fracture Complicated by Chlamydia Pneumonia

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Abstract

This article summarizes the nursing experience of applying a liver-based treatment approach to improve post-infectious cough in a patient with sacral fracture complicated by chlamydia pneumonia. Internal injury cough induced by factors such as emotional disturbance primarily affects the lung, and this condition is mostly caused by the liver's failure to regulate qi flow, where liver fire invading the lung leads to qi mechanism disharmony between the liver and lung. According to the liver-based cough treatment theory, applying liver-clearing and liver-soothing methods, combined with TCM nursing assessment through comprehensive analysis of the four diagnostic methods, and coordinated with characteristic TCM nursing interventions, effectively alleviated the patient's post-infectious cough symptoms, thereby achieving the effect of addressing both the root and branch while managing urgency, which is worthy of clinical promotion.

Full Text

Application of Liver-Based Treatment Principle in Managing Post-Infectious Cough in a Patient with Sacral Fracture Complicated by Chlamydia Pneumonia

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Abstract

This article summarizes the nursing experience of applying liver-based treatment principles to alleviate post-infectious cough in a patient with sacral frac-

ture complicated by chlamydia pneumonia. Internal injury cough triggered by emotional distress primarily affects the lung, often arising from impaired liver dispersion, liver fire invading the lung, and subsequent disharmony of qi mechanism between the liver and lung. Based on the theory of treating cough from the liver, we employed liver-clearing and liver-soothing methods, combined with comprehensive analysis of the four traditional Chinese medicine (TCM) diagnostic methods in nursing assessment, and integrated characteristic TCM nursing interventions. This approach effectively relieved the patient's post-infectious cough symptoms and achieved the therapeutic goal of addressing both root and branch aspects according to clinical urgency, demonstrating value for broader clinical application.

Keywords: Liver-based treatment; chlamydia pneumonia; post-infectious cough; Traditional Chinese medicine nursing

Post-infectious cough (PIC) refers to persistent cough that continues after the acute phase of respiratory infection has resolved, with cough duration lasting 3–8 weeks or longer in adults, accounting for 30%–50% of subacute cough cases. PIC not only disrupts daily activities and sleep quality but may also trigger anxiety, tension, and depression. The pathogenesis remains unclear in Western medicine, which primarily employs symptomatic treatment such as expectorants, antitussives, and antihistamines—approaches that lack specificity and have uncertain long-term efficacy and safety, with some patients experiencing adverse reactions like drowsiness and dizziness. In contrast, TCM demonstrates distinct advantages in treating PIC by emphasizing holistic concepts and pattern differentiation to achieve both symptomatic and fundamental therapeutic effects. The *Huangdi Neijing* states that “all five viscera and six bowels can cause cough, not only the lung,” and emotional stagnation such as anger and anxiety can generate liver wind that ascends to invade the lung, causing liver-pattern cough. Liver-based treatment employs methods such as dispersing liver qi, clearing liver fire, calming liver wind, and nourishing liver yin to restore the normal ascending of liver qi and descending of lung qi, thereby regulating qi mechanism and arresting cough.

1 Clinical Data

1.1 Basic Information

The patient was a 29-year-old female admitted to the outpatient department on April 1, 2024, with a chief complaint of “cough-induced pain in the waist and left buttock with radiation to the posterior left lower limb for 3 weeks, exacerbated with right buttock pain for 4 days.” She was admitted with a diagnosis of “sacral fracture.” Past medical history revealed treatment for chlamydia pneumonia at the First Affiliated Hospital of Guangzhou Medical University on March 20, 2024, and right papillary thyroid carcinoma resection at Sun Yat-sen University Cancer Center on December 26, 2023, with satisfactory postoperative recovery and regular levothyroxine supplementation. Current symptoms included cough,

severe lumbosacral pain with left lower limb numbness and pain, significantly worsened lumbosacral pain during position changes severely affecting daily life, chest and abdominal band-like tightness, and no relief with rest.

1.2 Physical Examination

Specialized examination revealed forced posture and tenderness (+) in the lumbosacral region. Lumbar MRI showed abnormal signals and enhancement at S1-S3 vertebral bodies, suggesting multiple sacral edema with vertebral fractures. Chest CT demonstrated a small amount of exudative lesion in the left lower lung, with positive chlamydia IgM.

1.3 Diagnosis

Western Medicine Diagnosis: 1) Sacral fracture; 2) Chlamydia pneumonia; 3) Postoperative right thyroid carcinoma; 4) Anxiety state; 5) Vitamin D deficiency.

TCM Diagnosis: 1) Fracture disease; 2) Cough.

Pattern Differentiation: Liver fire invading the lung with liver qi stagnation.

Pattern Differentiation Basis: The patient's prolonged illness caused emotional distress, leading to ascending liver fire and liver qi stagnation that scorched lung qi and yin, impairing lung qi diffusion and causing cough. The tongue appeared dark with scant fluid, presenting as a "white foam tongue" with a white foam line in the liver area, and a yellow-gray thick greasy coating, indicating liver qi stagnation signs. Due to chronic cough with unregulated liver qi, the liver's blood storage function was compromised, depriving the sinews of nourishment and triggering sacral fracture.

1.4 Treatment and Outcome

The patient received conservative treatment for sacral fracture with bed rest and symptomatic management. Since severe coughing triggered intense pain at the fracture site, addressing the cough became the primary concern. The therapeutic principle focused on clearing liver fire and purging lung heat while dispersing liver qi and ventilating the lung. From April 1–6, oral tramadol sustained-release tablets (100 mg) and intravenous mannitol injection (125 mg) were administered for lumbar pain, supplemented by wrist-ankle acupuncture at bilateral lower 5 and 6 zones for analgesia once daily. Oral Juhongtan oral solution (10 ml, three times daily) was prescribed. Auricular gua sha, ear apex bloodletting, and auricular point seed pressing were applied to clear liver fire once every three days, resulting in reduced cough and pain. From April 7–15, liver-soothing methods were implemented, including guiding the patient to pat the Liver Meridian of Foot Jueyin, emotional counseling, playing Jue-mode music once daily for 15 minutes, and guiding the patient through liver-qi-regulating dietary therapy 1–2 times weekly. On April 16, after hospitalization, the patient's cough and pain symptoms improved significantly.

2 Nursing Care

2.1 Nursing Assessment

2.1.1 TCM Four Diagnostic Methods Inspection: Spirit: listless and lethargic; Complexion: sallow; Body shape: emaciated; Posture: limited mobility; Tongue: dark, scant fluid presenting as “white foam tongue” with yellow-gray thick greasy coating.

Auscultation: Cough.

Inquiry: Fatigue, frequent waking with dreams, occasional chest tightness and fever, lumbosacral stabbing pain, hypochondriac dull pain, dry mouth and throat, cough exacerbated after arguments with husband.

Palpation: Wiry pulse.

2.1.2 Comprehensive Assessment The Cough Evaluation Test (CET) was used to assess the patient. This scale includes five items: daytime cough severity, nighttime cough impact on sleep, cough intensity, and cough impact on daily life and psychology, with each item scored 1–5 points (maximum total score 35, higher scores indicating more severe cough). The patient scored 27 points, indicating severely life-impacting cough. Visual Analogue Scale (VAS) was used for pain assessment (0 = no pain, 10 = severe pain). The patient scored 6 points, indicating moderate pain.

2.2 Nursing Diagnosis

The nursing diagnoses were: 1) Cough related to chlamydia pneumonia, liver qi stagnation, and liver fire invading the lung; 2) Pain related to sacral fracture, liver qi stagnation, and malnourishment of sinews and vessels.

2.3 Nursing Plan

Applying liver-based treatment principles to address both root and branch by regulating qi mechanism. The branch manifestation was fire pathogen, treated with liver-clearing method to purge fire. The root cause was liver qi stagnation, treated with liver-soothing method to regulate qi and resolve stagnation. Goals: 1) Improve cough symptoms with CET score \$ \$10; 2) Improve pain symptoms with VAS score \$ \$3, pain frequency \$ \$3 times/24h, and analgesic use \$ \$3 times/24h.

2.4 Nursing Measures

2.4.1 Liver-Clearing Method Auricular Holographic Copper Gua Sha: Following the massage sequence in *Auricular Point Diagnosis and Treatment*, the auricle’s large and small heavenly circuits were massaged to mobilize qi and blood. Basic gua sha was performed on the anterior and posterior auricular surfaces from top to bottom and outer to inner. Pattern-based point selection focused on scraping liver, lung, and triple burner points to purge

fire and regulate qi, supplemented by heart, shenmen, and sympathetic points to calm the mind. Final auricular massage lasted 5 minutes. Anterior and posterior auricular scraping each took 10 minutes with 5 minutes on key areas (total 25 minutes), performed once every three days.

Ear Apex Bloodletting: After alcohol disinfection, the ear apex point at the top of the ear helix (located by curling the ear forward) was pricked once with a 28G disposable lancet, 5–6 drops of blood were expressed, then absorbed with alcohol cotton swabs.

Auricular Seed Pressing: According to *National Standard of the People's Republic of China GB/T13734-2008: Nomenclature and Location of Auricular Points*, vaccaria seeds were applied to liver, lung, triple burner, heart, shenmen, and sympathetic points. Patients were instructed to press the points with thumb and index finger for 20–30 seconds until soreness and distension were felt, 3–5 times daily. Precautions: moderate gua sha pressure without 强求出痧; alternate ears every three days; maintain local skin cleanliness to prevent infection.

2.4.2 Liver-Soothing Method Lifestyle Regulation: The patient's illness occurred during the spring equinox when weather transitions from cold to warm with large diurnal temperature variations. Guidance included maintaining body warmth with appropriate clothing adjustments, opening windows for ventilation during sunny daytime, ensuring sleep during the liver's corresponding time period (1–3 AM), and avoiding late nights with early rising.

Dietary Therapy: The diet emphasized liver-qi-soothing foods such as tangerine peel, celery, crown daisy, tomato, radish, orange, pomelo, citron, and Buddha's hand. Recommended recipes included tangerine peel stewed chicken, spinach pork liver porridge, and Buddha's hand porridge. Herbal teas included rose and chrysanthemum teas, consumed 2–3 times weekly.

Emotional Regulation: Among the seven emotions, anger causes qi to ascend and damages the liver. For this patient's irritable temperament, breathing techniques were taught to stabilize emotions. Since cough worsened after marital arguments, family psychological care was also provided, guiding family members to offer companionship, understanding, and patient listening to jointly alleviate negative emotions and maintain family harmony.

Music Therapy: Patients were guided to listen to Jue-mode music such as *Jiangnan Silk and Bamboo Music*, *Breaking Cocoon*, and *Eighteen Songs of a Nomad Flute* to regulate liver qi, with optimal listening time between 19:00–23:00.

Exercise Guidance: Patients were instructed to pat along the Liver Meridian of Foot Jueyin from bottom to top. **Meridian Patting:** In sitting position with knees bent and hollow fists, pat from the medial side of the great toe (Dadun) upward along the medial foot dorsum (Xingjian, Taichong), one cun from the medial malleolus (Zhongfeng), up the medial lower leg (meeting

Sanyinjiao; passing Ligou, Zhongdu, Xiguan), up the medial knee popliteal fossa (Ququan), along the medial thigh (Yinbao, Wuli, Yinlian), to the lower abdomen (Jimai; meeting Chongmen, Fushe, Qugu, Zhongji, Guanyuan), and finally to Zhangmen and Qimen. Each session lasted 15 minutes, performed morning and evening. **Key Acupoint Tapping:** Focus on Yinbao, Yinbao, Ququan, and Taichong points, tapping each point for 30 minutes with hollow fists. Patting should be gentle yet firm with measured intensity, avoiding brute force to allow therapeutic effects to penetrate through the skin to the acupoints and unblock the meridians.

2.5 Nursing Evaluation

After two intervention cycles, the patient's cough symptoms decreased with occasional nighttime cough, lumbosacral pain reduced, and nursing care was markedly effective (see). Tongue coating progressed from yellow-gray thick greasy coating (see [Figure 1: see original paper]) to white greasy coating (see [Figure 2: see original paper]), and finally to thin white coating (see [Figure 3: see original paper]). The entire nursing process was safe and effective without adverse events. The patient expressed satisfaction with TCM methods and was discharged after 16 days. Seven days post-discharge, WeChat follow-up revealed essentially resolved cough and pain symptoms with near-normal daily life resumption.

Discussion

Post-infectious cough falls under TCM categories of “cough,” “wind cough,” and “stubborn cough,” and can be divided into externally contracted cough and internal injury cough. Internal injury cough results from dietary irregularities and visceral disease progression. The TCM holistic view holds that the five viscera and six bowels are interconnected and mutually restrictive. The “harmony between general and minister” concept reflects how the liver and lung jointly maintain qi ascending/descending and blood circulation. When liver dispersion is impaired, liver fire flares upward, and liver qi stagnates, lung qi becomes compromised and lung metal scorched. Liver-based treatment, guided by the core TCM theory of “differentiating patterns to seek causes and treating according to causes,” employs methods to disperse, clear, calm, and nourish the liver—dispersing excess liver qi and supplementing deficient liver substance to resolve liver wood stagnation. Only when liver dispersion and blood storage functions are restored can the lung's qi governing and diffusion/purification functions rebalance. Research confirms the definitive efficacy of liver-based cough treatment.

Pattern differentiation is the fundamental principle of TCM disease recognition and treatment. Through comprehensive four diagnostic methods, the patient's tongue presentation showed “white foam line on tongue edge”—a line of condensed foam-like bubbles approximately 5 mm from both lateral edges, extending about one cun inward from both sides of the tongue tip. As Master Zhu

Liangchun states, “white foam on tongue edges signifies phlegm-dampness coagulation and obstruction with qi mechanism stagnation,” representing phlegm-qi stagnation closely related to liver-gallbladder emotional disorders. Combined with inquiry findings of frequent waking with dreams, occasional chest tightness and fever, lumbosacral stabbing pain, hypochondriac dull pain, and dry mouth and throat, the pattern indicated ascending fire pathogen requiring liver-clearing method for the branch manifestation. The root cause of liver qi stagnation, exacerbated by chronic illness and marital conflict, required liver-soothing method for fundamental treatment.

This case applied liver-clearing and lung-purging methods combined with liver-soothing and lung-regulating methods based on liver-based treatment principles. The liver-clearing method employed triple-sequence auricular therapy: first, auricular copper gua sha elevated local temperature to disperse stasis, unblock orifices, and expel pathogenic toxins; qi and blood transported to the ear apex were released through ear apex bloodletting to clear heat, dispel wind, and calm liver yang; finally, auricular seed pressing provided sustained stimulation. These three methods progressed sequentially to clear liver fire and ventilate lung heat. Selected points included liver, lung, triple burner, heart, shenmen, and sympathetic points, where liver, lung, and triple burner points regulate qi, resolve stagnation, and transform phlegm, while heart, shenmen, and sympathetic points calm the mind and unblock blood collaterals. The liver-soothing method encompassed five aspects: “nurturing, diet, emotion, music, and exercise.” As *Suwen* states: “In the three months of spring, this is called ‘letting flourish’—heaven and earth generate life and all things prosper. Retire late and rise early, stroll leisurely in the courtyard with hair unbound to allow aspirations to develop. This corresponds to spring qi and the way of nurturing life; violation injures the liver.” Therefore, we advised opening windows for fresh air, avoiding staying awake during the liver’s time period, and utilizing medicinal foods. Tangerine peel, bitter and pungent with warm properties, enters the spleen and lung meridians to regulate qi, strengthen the spleen, and dry dampness to transform phlegm. Rose, sweet and slightly bitter with warm properties, enters the liver and spleen meridians to disperse liver qi, move qi, and activate blood to relieve pain. The liver corresponds to anger in the five emotions, and excessive anger damages the liver, often causing liver qi to ascend excessively or even blood to follow qi upward. This case identified the root cause while addressing both patient and family emotions to avoid cough triggers. *Suwen* states “the liver corresponds to azure color and Jue tone.” In five-element music, Jue tone connects to the liver, with representative pieces like *Eighteen Songs of a Nomad Flute* and *Jiangnan Silk and Bamboo Music* promoting liver qi dispersion and lung qi descent. The Liver Meridian of Foot Jueyin, one of the twelve regular meridians, connects interiorly-exteriorly with the Gallbladder Meridian of Foot Shaoyang, connecting superiorly with the Gallbladder Meridian and inferiorly with the Lung Meridian of Hand Taiyin. Among its points, Yinbao benefits the lower burner, Taichong (the source point) drains heat and disperses liver qi, Yinbao protects the liver and dissipates qi stagnation, and Ququan (the sea

point) nourishes liver qi. Daily meridian patting unblocks collaterals, expels toxins, and soothes the liver to regulate the lung.

In summary, this case integrated TCM holistic concepts with pattern differentiation principles, embodying the ancient concept of unity between heaven and humanity. Applying liver-based treatment theory to guide PIC management through accurate pattern differentiation using the four diagnostic methods, nursing care followed the principle of “treating both root and branch.” The individualized nursing plan utilizing characteristic TCM therapies proved safe, simple, and effective. This case employed only two liver-based treatment principles, yet clinical practice requires pattern differentiation and individualized approaches. As a single case report, this study has limitations, necessitating further research.

Patient Informed Consent: Publication of this case report was approved with informed consent from the patient and family.

Conflict of Interest Statement: The authors declare no conflicts of interest.

Note: Figure translations are in progress. See original paper for figures.

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