DOI: 10.53469/jcmp.2025.07(11).12

A Case Report of Integrated Traditional Chinese and Western Medicine Treatment for Severe Pneumonia with Pyopneumothorax

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Abstract: ***Severe pneumonia combined with septic pneumothorax is a complex infectious disease with extremely critical clinical conditions and a high morbidity and mortality rate worldwide. Its pathological mechanism involves complex lung infection and fluid circulation disorders, and the combination of infectious shock can lead to multi-organ failure, in which timely and reasonable application of antibiotics, fluid resuscitation respiratory support and other symptomatic treatments are particularly critical. Chinese medicine starts from the symptomatic characteristics of lung carbuncle and provides targeted treatment at different stages of the disease by clearing heat and removing toxins, resolving phlegm and removing pus, and supporting Zhengzheng and fixing dehiscence. In the stage of lung carbuncle suppuration, classical prescriptions such as "Thousand Gold" Reed Stem Tang and Jiawei Platycodonopsis Tang can be used, and in the later stage, if the patient is weak after a long period of illness, Prof. Chao Enxiang, a master of Chinese medicine, can use his self-designed formula of diarrhea of the lungs and drinking, which promotes the recovery of lung function and the absorption of the lesions in the later stage of the disease, and strengthens the righteousness to get rid of the evil spirits, thus improving the prognosis of the patient, and demonstrating the great potential and significant advantages of the combination of Chinese and Western medicines to improve the quality of survival of the patient.***

Keywords: Severe Pneumonia, Septic Pneumothorax, Infectious Shock, Pulmonary Carbuncle, The Self-Proposed Formula for Diarrhea of the Lungs and Chasing Drinks**.**

1. Introduction

Severe pneumonia is a serious lung infection caused by pathogens such as bacteria, viruses, and fungi. It typically presents with high fever, multiple organ dysfunction, and circulatory failure. The condition progresses rapidly, often involving multiple organ systems, and is prone to complications such as sepsis and septic shock [1]. These patients often experience rapid deterioration, pose significant treatment challenges, and exhibit high mortality rates [2]. Sepsis represents a dysregulated immune response triggered by systemic infection, clinically characterized by elevated systemic inflammatory response syndrome and sequential organ failure scores, potentially leading to septic shock and multiple organ failure [3]. Infectious shock represents the severe stage of sepsis, characterized by circulatory failure, inadequate tissue perfusion, and lactic acidosis. Antimicrobial therapy is central to its management, requiring broad-spectrum antibiotics selected based on susceptibility testing with timely regimen adjustments. Concurrently, respiratory failure is managed with non-invasive or invasive mechanical ventilation to correct hypoxemia. For septic shock patients, early fluid resuscitation and vasoactive drug administration are critical to maintain effective circulation and tissue perfusion. Additionally, acid-base imbalances must be corrected, electrolyte stability maintained, and secondary infections prevented. Despite advances in medical technology, antibiotic resistance has become increasingly severe. The emergence of multidrug-resistant bacteria has created a bottleneck in developing new antibiotic treatment regimens, resulting in persistently high mortality rates for severe pneumonia complicated by septicemia and septic shock [4]. In traditional Chinese medicine theory, severe pneumonia complicated by empyema is classified under the category of "lung abscess." Pulmonary abscess refers to a disease where ulcers form in the lung lobes, leading to the formation of pus-filled sores. Its pathogenesis primarily involves the mutual entanglement of heat, phlegm, and blood stasis in the lungs, resulting in blood decay and pus formation. The earliest recorded mention of pulmonary abscess appears in the Essential Prescriptions of the Golden Cabinet, and traditional Chinese medicine has accumulated extensive experience in its pattern differentiation and treatment. Building upon classical traditions, contemporary TCM practitioners have integrated modern medical concepts and techniques to continuously refine and advance diagnostic and therapeutic approaches. This study reports the treatment process and efficacy analysis of a patient with a lung abscess complicated by empyema. Through syndrome differentiation and treatment, the patient received oral Chinese herbal decoctions to precisely regulate their pathological state, achieving favorable therapeutic outcomes. This case not only demonstrates the scientific validity and efficacy of TCM syndrome differentiation and treatment but also provides new insights and practical references for the TCM management of severe pneumonia complicated by empyema.

2. Case Details

Patient X, male, 41 years old, presented to Ankang Municipal Hospital of Traditional Chinese Medicine on February 14, 2024, with a chief complaint of "fever for one week." One week prior to the visit, while visiting relatives in Baoji City, the patient contracted a chill and developed intermittent coughing, accompanied by copious yellow, viscous sputum and fever. His highest recorded temperature was 39.0°C (102.2°F). Influenza screening during this period was negative. He reported that symptoms did not improve after

taking oral azithromycin. Over the past two days, symptoms have significantly worsened. He coughed up copious amounts of yellow-green viscous sputum, intermittently mixed with blood (approximately 10 ml per episode, 1-2 mouthfuls). He reported dizziness, fatigue, palpitations, chest tightness, dyspnea, left chest and flank pain, decreased appetite, poor sleep, and normal bowel and bladder function. Past medical history includes gallstone surgery and left zygomatic bone fracture repair. On admission, the patient appeared lethargic with an acute, seriously ill appearance and slight cyanosis of the lips. Breathing was rapid. Physical examination revealed: slight pharyngeal hyperemia, no tonsillar enlargement bilaterally, no chest deformity, clear percussion sounds bilaterally, numerous moist rales audible in both lungs, negative cardiac examination, no tenderness, rebound tenderness, or muscle guarding in the abdomen. A surgical scar measuring approximately 2.5 × 0.5 cm was visible in the upper abdomen. No significant edema in both lower limbs. Chest CT scan without contrast revealed patchy and extensive high-density opacities in both lower lung lobes, suggestive of infectious lesions. Admitted for systematic diagnosis and treatment. Vital signs on admission: T: 39.1°C, Pulse: 144 bpm, Respiratory rate: 32 bpm, Blood pressure: 83/56 mmHg. Laboratory findings: WBC 1.46 × 10^9/L, Platelets 40.00 × 10^9/L, C-reactive protein 51.01 mg/L; Procalcitonin 17.1 ng/ml; Myoglobin 138.8 ng/ml; Electrolytes: K 3.42 mmol/L, Na 136.0 mmol/L, Ca 1.94 mmol/L; Arterial Blood Gas Analysis (on supplemental oxygen): pH 7.51, PCO_2 24 mmHg, PaO_2: 46 mmHg, HCO_3^-: 19.5 mmol/L, La C: 3.9 mmol/L. Arterial blood gas analysis revealed hypoxemia ($PaO_2/FiO_2 \leq$ 250 mmHg). The patient maintained persistent hypotension requiring vasoactive agents for blood pressure support. During hospitalization, the patient's laboratory tests showed a peak white blood cell count of 11.3 × 10^9/L, C-reactive protein peaked at 227.85 mg/L, and procalcitonin reached 17.1 ng/mL. Based on vital signs, laboratory results, imaging studies, and meeting criteria for severe pneumonia [5] and septic shock [6], the Western medical diagnosis was severe pneumonia, type I respiratory failure, sepsis, septic shock, and electrolyte imbalance. Upon admission, the patient's vital signs remained unstable. Non-invasive ventilation was initiated (ST mode, FiO_2 90%, F 18 BPM, IPAP 18 cmH_2O, EPAP 6 cmH_2O), vital sign monitoring and meropenem for infection control. Moxifloxacin was added to cover atypical pathogens. Subsequently, treatment was switched to meropenem, combined with vancomycin, to target the positive bacterial cultures. Concurrently, therapies include anti-infective agents, bronchodilators, expectorants, anti-shock measures, and maintaining electrolyte balance. Influenza testing confirmed H3N2 positivity, initiating oseltamivir antiviral therapy. Following stabilization of vital signs, fiberoptic bronchoscopy with alveolar lavage was performed for NGS analysis, revealing: Staphylococcus aureus and Herpes simplex virus type 1 (HSV-1). Blood culture results confirmed the presence of Staphylococcus aureus, prompting the administration of vancomycin. Therapeutic interventions included fiberoptic bronchoscopic suction and chest drainage. Thoracentesis drained hemorrhagic pleural fluid, which revealed: Elevated LDH and protein levels. Thoracic fluid culture identified Staphylococcus aureus, prompting vancomycin-based antimicrobial therapy. Sputum culture yielded positive results for Staphylococcus aureus and Klebsiella pneumoniae, leading to combined ceftazidime/ceftriaxone and levofloxacin, piperacillin-sulbactam for infection control. Thoracic drainage and expectorant therapy were continued. Continuous oxygen therapy at 2 L/min was maintained with close monitoring of blood pressure, oxygen saturation, and heart rate. Given the patient's high fever, coughing up yellow-green viscous sputum, occasional hemoptysis, chest fullness pain with dyspnea, red tongue with thick yellow coating, and slippery rapid pulse, Traditional Chinese Medicine (TCM) diagnosed the condition as the suppurative stage of lung abscess—a critical turning point in the disease. Therefore, the herbal decoction Qianjin Weijing Tang, combined with Jiagui Tang, was administered to clear lung toxins, resolve stasis, and expel pus. On March 17, the patient's fever subsided, with significant improvement in coughing and sputum production. Vital signs remained stable. A follow-up chest CT showed partial absorption of the right lung infection focus and reduced pleural effusion level on the left side, though fluid drainage from the pleural cavity was not achieved. Appetite and sleep were satisfactory, with normal bowel and bladder function. The patient was discharged on March 19.

The patient presented for an initial outpatient visit on April 22, 2024, following discharge. The patient reported occasional coughing, postnasal drip accompanied by wheezing, and experiencing shortness of breath and fatigue after climbing three flights of stairs. Chest CT revealed: patchy and extensive high-density opacities in the left upper lobe and both lower lobes, with poorly defined margins and partial consolidation, most prominent in the left lower lobe; the Left pleural cavity showed an arcuate fluid shadow and air density shadow, with partial hypoventilation in the left lower lobe. Based on the chest CT, the pleural effusion had not fully resolved, yet chest drainage failed to evacuate the fluid. The patient's symptoms persisted, causing significant inconvenience in daily life, prompting the patient to seek Traditional Chinese Medicine treatment. Physical examination revealed: pharyngeal hyperemia, no tonsillar enlargement bilaterally, decreased breath sounds in the left lung on auscultation, pale tongue with thin white coating, and a thready pulse. TCM diagnosis: Lung abscess. Considering the patient's prolonged illness, weakened constitution, and persistent pathogenic toxins, treatment focuses on resolving stasis, expelling pus, tonifying qi, and eliminating abscesses. Prescribed: Professor Chao Enxiang's proprietary decoction "Lung-Draining and Fluid-Expelling Formula" (Xie Fei Zhu Yin Fang), with the following ingredients: Ephedra sinica 10g, 30g Tienli Seed, 15g Honey-processed White Mulberry Bark, 10g Jujube, 15g Soapberry Thorns, 15g Fried Semen Semen Cnidii, 30g Chicken Blood Vine, 15g Salt-processed Alisma Rhizome, 15g Poria, 15g Fried Bitter Apricot Kernel, 10g Prepared Pinellia Rhizome, 15g Curcuma, Leeches 10g, Fried Licorice 10g, decocted with Astragalus. Lung abscess arises when pathogenic heat obstructs the lung collaterals, steaming fluids into phlegm. Excessive heat invades the nutritive level, injuring blood vessels and causing blood stasis—that is, heat-induced blood stasis. Therefore, treatment should clear lung heat, resolve phlegm, drain dampness, and expel pus. "When an abscess forms in the lung, why wait to drain it?" Therefore, combining Tienli seeds with jujube—one urgent, one gentle—descends qi to relieve asthma, promotes water metabolism to reduce swelling, and drains phlegm-heat from the middle jiao. This restores the lungs' functions of

dispersing and descending, as well as regulating water metabolism. Li Linxian's research [7] found that Tienli-Jujube Lung-Draining Decoction promotes the absorption of pleural effusion. Zhao Ji of the Song Dynasty proposed adding mulberry root bark to this formula, enhancing its ability to resolve phlegm, relieve asthma, promote diuresis, and reduce swelling. The combination of Tienli seeds with mulberry root bark and bitter apricot kernels not only strengthens the formula's effects in purging the lungs, relieving asthma, promoting diuresis, and reducing swelling, but also enhances its ability to descend qi, resolve phlegm, stop coughing, and relieve asthma. Ephedra is used for its diaphoretic, lung-dispersing, asthma-relieving, and diuretic properties to expel pathogenic factors through sweating. The synergistic action of Ephedra's dispersing and Apricot Kernel's descending properties enhances asthma relief. This dual action achieves tonification: when lung qi flows freely, all meridians open. Restoring the lungs' dispersing and descending functions facilitates recovery. "When yin-yang qi channels are obstructed, the four seas become blocked, the triple burner fails to drain, and body fluids stagnate. When lung qi disperses and descends, accumulated pathogenic factors in the lungs are dispersed. The lungs' dispersing and descending movements aid in phlegm expulsion. Smooth lung qi and blood circulation also help repair damaged lung tissue and inhibit disease progression. Body fluids and blood share the same origin; phlegm and stasis are interrelated. Smooth blood circulation is crucial for body fluid metabolism. Therefore, treatment should focus on removing stagnant substances and residues. Employing Hirudo and Curcuma to break blood stasis and resolve stagnation. Hirudo, dwelling in water with agile movement, possesses diuretic properties. Its diet of animal blood endows it with blood-activating effects, excelling in breaking blood stasis, unblocking meridians, and eliminating masses. Administer potent herbs cautiously to expel stagnant blood accumulated from prolonged debility. Curcuma breaks blood stasis and promotes qi circulation, expelling stasis and resolving masses. When qi flows, blood flows; when blood flows, stasis is eliminated. With stasis gone, new blood is generated. Qi movement generates blood. While eliminating pathogenic factors, it also aids in new blood production, thereby enhancing the body's resistance to pathogens. Concurrently, Chicken Blood Vine supplements blood and invigorates blood circulation. "Without yang, yin cannot transform." Therefore, it is combined with Astragalus root to tonify qi and elevate yang, enhancing the propulsive force for water metabolism. Chicken Blood Vine, with its "blood-like" appearance, synergizes with Astragalus root to promote new blood generation, enabling normal qi and blood circulation. "Phlegm arises from dampness... Resolving dampness is the fundamental approach to treating disease." Therefore, concurrently incorporating diuretic and dampness-draining actions enhances the removal of phlegm-damp pathogenic factors and facilitates the expulsion of pus toxins. Impaired water metabolism leads to internal accumulation of water qi. Combining Poria cocos (Poria) with Alisma orientale (Alisma) leverages their diuretic and dampness-draining properties. Alisma excels at downward movement, providing an escape route for pathogens and guiding them out through urination. This clears the pathways for the lungs' dispersing and descending functions, promoting fluid metabolism. Strengthening the spleen earth and drying spleen dampness addresses the root cause. Therefore, Pinellia ternata is combined to clear dampness, dry phlegm, and resolve dampness. Research [8] has found that Pinellia ternata and its processed preparations significantly reduce cough frequency and alleviate occasional cough symptoms in patients. Further research [9] indicates components in Pinellia exhibit significant anti-inflammatory effects and can inhibit mucus secretion by regulating interleukin-4 (IL-4) and interferon-gamma (IFN-γ) levels. "Phlegm accumulates from fluid retention; pus transforms from decayed blood." Soapberry thorns possess the efficacy of expelling toxins and draining pus. Their spiny, branched appearance reflects their potent ability to reduce swelling, expel toxins, drain pus, and kill parasites. Their sharp exterior can "pierce" the toxins within boils and abscesses, aiding in the rupture and drainage of pus. Sapindus fruit promotes blood circulation to resolve abscesses while also acting as a diuretic to clear urinary stasis. It not only aids in expelling lung abscesses but also facilitates urination to regulate water pathways, restoring normal fluid metabolism. Combined with Astragalus root to expel pus while tonifying qi and consolidating the exterior, this formula balances drainage and tonification. It is suitable for the recovery phase of lung abscess, where qi deficiency impairs pus expulsion. Finally, the addition of Fried Licorice Root tonifies the spleen and harmonizes the stomach, generates metal to benefit the lungs, and moderates the potent effects of the other herbs.

Second Consultation on May 10: After taking the medication, the patient's symptoms improved compared to previous visits. Today, the patient reports dry mouth and persistent throat discomfort, with no further complaints of postnasal drip. Appetite is acceptable, and bowel movements and urination are normal. Physical examination reveals pharyngeal hyperemia, no enlargement of bilateral tonsils, negative auscultation of heart and lungs, red tongue with thin white coating, and a fine, rapid pulse. Therefore, the previous prescription is continued.

May 20, Third Consultation: After continuing the previous formula, symptoms like shortness of breath and fatigue have lessened. No complaints of coughing or postnasal drip. Appetite and sleep are satisfactory; bowel movements and urination are normal. Throat, heart, and lung examinations show no abnormalities. Pale tongue with thin yellow coating; fine and rapid pulse. To accelerate the absorption and expulsion of lung abscess, add 15g of Lulu Tong to the formula. Lu Lutong dispels wind, activates collaterals, promotes diuresis, and unblocks meridians. When urination is unimpeded, yang qi flows freely, ascending and descending functions are orderly, and qi transformation is effective. Lu Lutong's surface features sharp spines and beak-like blunt spines, endowing it with potent efficacy in traversing all twelve meridians. The human body's fluid metabolism forms a continuous cycle. The scattered honeycomb-like pores on its surface provide pathways for stagnant pathogenic factors to disperse, creating a metabolic breakthrough for lung pus to be expelled.

July 9th, Fourth Consultation: The patient reported significant relief from dry mouth after taking the previous formula, occasional sweating, good appetite, adequate sleep, and regular bowel movements. Physical examination of the throat, heart, and lungs was negative. The tongue was pale red with a

thin white coating, and the pulse was fine. The formula was adjusted by replacing 10g of Ephedra with 10g of Cinnamon Twig. Compared to ephedra, cinnamon twig excels in promoting sweating to resolve exterior syndromes, dispersing lung qi to relieve asthma, and draining water to reduce swelling. Its sweating effect is more potent, making it a commonly used key herb for inducing sweating and resolving exterior syndromes. Cinnamon twig excels at inducing sweating to release muscle tension, warming and unblocking meridians, and assisting yang to transform qi. Its diaphoretic action is milder than ephedra's. Therefore, replacing ephedra with cinnamon twig serves two purposes: first, to reduce the sweating effect; second, to utilize cinnamon twig's ability to warm and unblock meridians, assist yang, and transform qi to aid the elimination of water-dampness and phlegm-fluid retention. "To treat phlegm-fluid retention, one should harmonize with warming herbs." Here, the warming herb Cinnamomum cassia invigorates yang qi, opens the pores, and promotes water passage. Once yang qi is restored, fluid retention ceases to accumulate. Cinnamomum cassia disperses yang qi and resolves stagnation, moving without stagnation, achieving both warming and dispersing effects. Modern medical research indicates [10] that Cinnamomum cassia essential oil may reduce pathological damage caused by acute pneumonia.

Fifth Consultation on October 28: After continuing the above formula, the patient reported no cough, postnasal drip, dry mouth, bitter taste, throat discomfort, shortness of breath, or fatigue. Appetite was good, sleep was sound, and bowel movements and urination were normal. A follow-up chest CT scan conducted at Ankang City Hanbin District First Hospital on October 21, 2024, revealed linear shadows in the middle and lower lobes of the right lung. The left lung lesion had completely resolved compared to previous imaging. The costophrenic angles were sharp, with no evidence of pleural effusion or pneumothorax. The patient was advised to maintain a light diet, ensure adequate rest, regulate emotional well-being, and engage in appropriate exercise.

3. Discussion

Severe pneumonia complicated by pyopneumothorax poses significant risks to human health. Untreated, it may lead to fatal outcomes, and if the condition persists, it could progress to a lung abscess. Although this patient was relatively young, the disease progressed rapidly with multiple complications, making treatment relatively challenging. Initial integrated Chinese and Western medicine effectively controlled disease progression and prevented critical conditions like shock and death. However, during the later treatment phase, prolonged antibiotic use yielded poor results in Western medicine for lesion absorption and symptom relief, prolonging recovery time and increasing the patient's suffering. From a TCM perspective, during the recovery phase of lung abscess, pathogenic toxins gradually dissipate while vital energy remains deficient, allowing pathogens to linger. The water, dampness, phlegm, and stasis formed by abnormal fluid metabolism do not exist independently. Thus, the late-stage treatment focused on three key approaches: First, promoting blood circulation and resolving stasis to break up blood stasis and eliminate abscesses; Employing potent diuretic and detoxifying agents like Curcuma, Hirudo, Gleditsia thorn, and Lulu Tong, which share similar properties and potent nature, to eliminate stubborn pathogens within the viscera. Second, promote diuresis, resolve dampness, and eliminate phlegm, adhering to the principle of promoting yang. This clears waterways and respiratory passages, simultaneously nourishing organ deficiencies and removing stagnation in meridians to eliminate pus and resolve phlegm. Third, emphasize protecting spleen qi by "nourishing the child to strengthen the mother" — tonifying the spleen, boosting qi, and generating blood. Employ both attacking and nourishing methods to address both symptoms and root causes. Herbs like red astragalus and astragalus ensure pathogens are expelled without harming the body's defenses, while also aligning with the lung's physiological functions of dispersing and descending. The formula achieves balance through dispersion and consolidation, opening and closing, ascension and descent, integrating both attacking and tonifying actions. Treated patients experienced significant relief from coughing, postnasal drip, and wheezing. Chest CT scans revealed absorption of pleural effusion and pneumothorax in the left hemithorax. In summary, the successful treatment of this patient resulted not only from early effective empirical therapy, subsequent targeted medication selection, adequate closed-chest drainage, repeated bronchial lavage, and appropriate respiratory support modes and parameter settings, but also from the precise pattern differentiation and treatment principles of Traditional Chinese Medicine (TCM), along with the use of appropriately formulated prescriptions. The subsequent significant relief of clinical symptoms highlights the therapeutic advantages of TCM.

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