Acupuncture and Chinese herbs in the integrative management of post-COVID syndrome

On December 31, 2019, the Wuhan Municipal Health and Sanitation Commission, China, informed the World Health Organization (WHO) about a group of 27 cases of pneumonia, today a disease known as coronavirus disease 19 (COVID-19), caused by the etiological agent SARS-CoV-2.

Epidemiology
As of August 16, 2022, 558,757,628 new confirmed cases and 6,433,794 deaths have been reported worldwide. The global lethality is 1.1%. In Mexico, 6,939,755 total cases and 328,798 deaths have been confirmed [4].

The statistics in patients with symptoms have been observed as follows:
- 80% mild cases
- 16.2% have a serious course
- 2.5% have a severe course (die)

Pathophysiology of COVID-19
Infection of the respiratory system by SARS-CoV-2 can be classified by the degree of severity into three phases that the patient can go through, depending on their health condition:
- early phase or stage I
- pulmonary phase or stage II
- hyperinflammatory phase or stage III

Post-COVID syndrome
Definition
The term “post-COVID syndrome” is defined as a multiorgan symptom complex which affects patients who have suffered from COVID-19 (diagnosis confirmed by laboratory tests) and persists with symptoms 4–12 weeks after the acute phase of the disease and is not explained by an alternative diagnosis. It is estimated to occur in 10–20% of patients, mainly in those who presented moderate to severe symptoms and required hospitalization and/or intensive care.

Pathophysiology hypothesis of post-COVID syndrome
Numerous studies have observed probable pathophysiological mechanisms that explain the persistence of symptoms:
- virus persistence
- inflammatory cytokine storm
- existence of autoantibodies

Frequent symptomatology in post-COVID syndrome
The clinical manifestations are generally heterogeneous and fluctuate over time. The most frequent symptoms are asthenia (95%), dyspnea (93.3%), headache (85.5%), fatigue (77.7%), cough (74.3%), post-exertional malaise (72.2%), cognitive dysfunction (55.4%), emotional symptoms (88.3%), and digestive disorders (85.5%); however, other sequelae have occurred in different organs and systems.

Pulmonary effects
In up to 39% of patients, a persistent impairment in pulmonary diffusion and development of fibrosis is observed.

Common signs and symptoms
- cough
- dyspnea
- chest tightness
- laryngospasm

Effects on the musculoskeletal system
After viral replication, cell death, and activation of the inflammatory response, muscle fiber proteolysis is induced, increasing the proliferation of muscle fibroblasts.

Frequent signs and symptoms
- muscular weakness
- atrophy
- myalgia
- arthralgia

Effects on the cardiovascular system
Cases with pericardial inflammation due to cytotoxic mechanisms, pericardial effusion, and tamponade have been observed.

Common signs and symptoms
- chest tightness
- orthostatic hypotension
- tachycardia

Effects on the neurological system
Expression of ACE2 in endothelial cells of the brain and the inflammatory response cause the virus to directly damage the blood–brain barrier (BBB), spreading to the brain through synaptic transfer.

Common signs and symptoms
- headache
- low mood
- lack of concentration
- anxiety
- paresthesia
- vertigo
- olfactory dysfunction
- taste dysfunction
- tremors
- disorientation

Effects on the gastrointestinal system
Related to the infiltration of the lamina propria by plasma cells and lymphocytes, which produce edema in the stomach, duodenum, and rectum.

Common signs and symptoms
- dry mouth
Abstract · Zusammenfassung

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Abstract
Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an RNA-type virus causing an acute respiratory infection (ARI) with different levels of severity ranging from a mild condition, like a common cold, to severe pneumonia and death. A clinical condition presenting 4–12 weeks after coronavirus disease 19 (COVID-19) infection, with persistent symptoms such as fatigue, cough, dyspnea, headache, myalgia, brain fog, and diarrhea, has been frequently recognized and is known today as post-COVID syndrome or Long-COVID-19. Without a clear pathophysiology, research studies have proposed some secondary theories of SARS-CoV-2 infection. This entity has also been studied from the perspective of traditional Chinese medicine, recognizing syndromes or patterns in the different stages or phases of the disease and emphasizing a more individualized treatment according to the predominant pathological condition. It is concluded that the integrative and complementary use of acupuncture and Chinese herbal medicine is highly effective and could be a main resource for the treatment of this syndrome.

Keywords
Post COVID Syndrome · Traditional Chinese Medicine · Febrile disease · Integrative management · Acupuncture

Akupunktur und chinesische Heilpflanzen in der integrativen Behandlung des Post-COVID-Syndroms

Zusammenfassung
Das mit schwerem akutem respiratorischem Syndrom vergesellschaftete Coronavirus 2 (SARS-CoV-2) ist ein RNA-Virus, welches eine akute Atemwegserkrankung mit verschiedenen Ausprägungsgraden verursacht, von einer leichten Erkrankung, bis hin zu einer schweren Pneumonie und Tod. Eine klinische Symptomatik, die 4–12 Wochen nach einer Erkrankung mit COVID-19 („coronavirus disease 19“) auftritt, mit persistierenden Symptomen wie Fatigue, Husten, Dyspnoe, Kopfschmerzen, Myalgie, Gehirnlärm und Diarrhö, ist häufig festgestellt worden und heutzutage als Post-COVID-Syndrom oder Long-COVID-19 bekannt. Ohne dass die Pathophysiologie bisher bekannt wäre, sind in wissenschaftlichen Arbeiten einige sekundäre Theorien zur SARS-CoV-2-Infektion aufgestellt worden. Auch aus der Sicht der traditionellen chinesischen Medizin wurde diese Entität erforscht, dabei wurden Syndrome oder Muster in den unterschiedlichen Stadien oder Phasen der Erkrankung erkannt und der Fokus auf eine stärker individualisierte Behandlung gemäß den vorherrschenden pathologischen Veränderungen gelegt. Es wurde die Schlussfolgerung gezogen, dass der integrative und komplementäre Einsatz von Akupunktur und chinesischer Kräuterheilkunde hochgradig wirksam ist und eine wesentliche Ressource für die Behandlung dieses Syndroms darstellen könnte.

Schlüsselwörter
Post COVID Syndrom · Traditionelle chinesische Medizin · Fieberhafte Erkrankung · Integrative medizinische Versorgung · Akupunktur

- dysgeusia
- vomiting
- gastroesophageal reflux
- diarrhea

Traditional Chinese medicine approach to COVID-19
Within the framework of traditional Chinese medicine (TCM), three types of pathogenic factors are described: 1) external pathogenic factors, 2) internal pathogenic factors (overexcitement or disturbance of emotions), and 3) miscellaneous factors.

The existence of another pathogenic factor termed “febrile pathogenic factor” or “epidemic pathogenic factor,” which often represents severe or epidemic viral diseases, is recognized.

Severe viral infection usually manifests with fever and can affect the pulmonary system severely as well as the entire body; in particular, it can potentially become a highly contagious and epidemic disease, as in the case of COVID 19.

Thus, according to Chinese medicine, COVID-19 falls under the category of an epidemic febrile disease (wen bing 湿病). It has been studied as the very intense invasion of the body by a heat pathogen and is commonly described as very aggressive, destructive, and toxic (toxic heat). This febrile disease (wen bing 湿病) receives special attention, and specific diagnostic and treatment criteria are established based on an evolutionary process of four layers or levels: 1) wei “defensive” (wei fen 卫分), 2) qi “energetic” (qi fen 气分), 3) ying “nutritive” (ying fen 营分), and 4) xue “hematric” (xue fen 血分).

This way of evaluating the disease allows us to determine the level of penetration of the pathogen (toxic heat), the acuity, and the severity of the disease. The deeper, the more serious, and consequently the more difficult the treatment; the more likely it is to gather multiorgan damage, sequelae, post-COVID syndrome, and death.

Generally, epidemic febrile disease is characterized by a high degree of virulence and toxicity. Depending on the intensity (toxicity) and depth (level), it is possible for the patient’s body to defend itself (strong antipathogenic energy) and recover, especially if it is provided with adequate and timely care in a comprehensive manner.

Correlation of COVID-19 phases with febrile disease levels and post-COVID syndrome
Based on the above, we can consider that COVID-19 is an epidemic febrile disease and, according to each patient’s clinical condition, the following phases could be considered:

Phase 0 (preventive/no infection)
People are generally healthy or without evident disease and have resulted negative in a COVID 19 test. One could offer a preventive treatment to enhance the immune system and decrease the risk of becoming infected by COVID19.

Phase 1 (mild)
The patients in this phase were mostly affected at the “wei level” and frequently remain asymptomatic. Patients who become “symptomatic” in this phase generally re-
cover fully in a short time and only some are left with sequelae or post-COVID syndrome. Those “asymptomatic” and those who were treated opportunistically with acupuncture and/or Chinese herbal medicine have a low or zero probability of developing post-COVID syndrome (see below).

**Phase 2 (moderate)**
In this phase, the “febrile pathogen” has gone deeper, affecting the qi level. Patients who go through this phase often have some sequelae or post-COVID syndrome (see below). However, those who were treated with acupuncture and/or Chinese herbal medicine, in addition to integrative and complementary management with modern medicine, recover more quickly, with less chance of developing post-COVID syndrome or, if it does occur, it will be less severe.

**Phase 3 (severe)**
In this phase, the “febrile epidemic pathogen” has reached the “yin” and “xue” levels. Patients who go through this phase frequently develop a severe condition, or stage III in Western medicine. Patients who go through phase 3 take longer to recover despite the various aggressive treatments with drugs and hospital care. They can hardly be treated opportunistically with acupuncture and/or Chinese herbal medicine (some were able to incorporate herbal medicine, which contributed to a better and faster recovery). These patients will most often be left with sequelae or post-COVID syndrome (see below).

**Post-COVID syndrome in traditional Chinese medicine**
According to TCM, this syndrome is more prevalent in patients who had been affected by the “febrile qi” at the qi, ying, or xue levels (COVID 19 phases 2 and 3), as well as in those who did not receive comprehensive and complementary treatment with acupuncture and/or herbal medicine opportunistically.

Febrile disease in general and also COVID 19 can leave certain predominant deficiencies that will depend on the severity of the infection as well as on previously suffered conditions and individual predispositions. However, the main pathophysiological conditions that might occur with COVID infection and determine generation of the different post-COVID syndrome patterns are residual heat, fluid consumption, yin deficiency, residual phlegm, and blood stagnation, as well as deficiencies of lung, spleen, kidney, and heart, liver qi stagnation and liver yang increase.

A careful evaluation should always be made, and individualized treatment offered. Therefore, it is possible to identify some characteristics common to most patients as well as some predominant patterns that allow us to establish more specific treatments.

**Treatment of post-COVID syndrome with acupuncture and Chinese herbs**
As mentioned above, treatment of this syndrome should be based on a careful and individualized evaluation. Thus, the acupuncture points and Chinese herbal formulas will be structured accordingly.

There are two components of the treatment: 1) general (but individualized), to address the common pathophysiological process (Fig. 1); and 2) individualized, to address the predominant pattern.

**General treatment (therapeutic principles)**
General treatment comprises the following elements: a) cool residual heat; b) regenerate liquids; c) nourish the yin; e) transform residual phlegm; f) invigorate blood and break blood stagnation.

**Acupuncture points.** Xuehai (SP 10), Quchi (LI 11), and Geshu (BL 17) to refresh and invigorate the blood and cool the heat; Taixi (KI 3) and Shenshu (BL 23) to tonify kidney; Qihai (RM 6) and Guanyuan (RM 4) to regulate qi and tonify essential jing energy; Zhongwan (RM 12), Fenglong (ST 40), and Yinlingquans (SP 9) to transform phlegm and dampness.

**Chinese herbs.** Products that reinforce the above therapeutic principles will be included in the master formulas recommended for each predominant pattern.

**Herbal treatment**
1. 1.0 g (0.15 g/ml) of each extract, with a total of 1.5 ml per treatment.
2. The herbs are extracted with ethanol and then evaporated to dryness.
3. The resulting powder is then mixed with a carrier substance such as 
4. Prolonged use of this extract may cause liver damage.
5. The extract is then further formulated into a syrup or tablet form.
6. The syrup is typically taken orally twice daily.
7. The tablet is typically taken orally once daily.
8. The herbal medicine is typically taken orally once daily.
9. The herbal medicine is typically taken orally once daily.

**Predominance of spleen qi deficiency**
Patients who suffered COVID phase 2 or 3, who, in addition to presenting chronic residual heat and consumption of liquids and yin, were left with spleen deficiency.

**Symptoms.** Fatigue, asthenia, ageusia, poor appetite, weak voice, vomiting, bloating, loose stools, muscle aches, cramps.

**Pulse.** Weak, exhausted, slightly rapid.

**Tongue.** Slightly pale, with a slightly greasy coating. According to chronicity with dental impressions.

**Therapeutic principle.** Nourish and revitalize the spleen–stomach system.

**Acupuncture treatment**
Zhongwan 中院 (RM12). Regulates the function of the central heater, strengthens the spleen, promotes the elimination of dampness, regulates the dynamics of the energy of the stomach.

Zusanli 足三里 (ST 36). In tonification. Nourishes the spleen, harmonizes the stomach, strengthens antipathogenic zheng energy, strengthens origin yuan energy.

Pishu 脾俞 (BL 20). In tonification and with suspended moxibustion. Revitalizes and strengthens the spleen–stomach system, transforms humidity, nourishes the blood.

Sanyinjiao 三阴交 (SP 6). Tonifies the spleen and stomach, favors the distribution transformation process, drains the channels, promotes the collaterals, regulates and harmonizes blood and energy, nourishes the blood.

**Predominant of lung deficiency**
The tropism of SARS-CoV-2 for the pulmonary epithelium, and in relation to the theory of the persistence of the virus, the
The fact that the epidemic febrile pathogenic factor was not completely expelled generates a condition of residual heat, causing deficiency of lung qi.

If the qi is weak or insufficient, the descent and dispersion of the lung is disturbed, causing stagnation of organic liquids and accumulation of phlegm, if not resolved, the residual heat exacerbates the stagnation of phlegm, which will increase the consumption of liquids that will lead to the consumption of yin.

Persistent symptoms. Dry cough, constitutional weakness, dyspnea, tiredness, weak voice, daytime sweating at rest.

Tongue. Slightly red and dry, cracks.

Pulse. Weak.

Therapeutic principle. Tonify lung qi and yin, regenerate liquids, eliminate residual heat, eliminate phlegm and suppress cough.

Acupuncture treatment

Zhongfu 中府 (LU 1). Favors the process of diffusion of the energy of the lung, regulates the dynamics of the energy, mobilizes the liquids.

Feishu 肺俞 (BL 13). Tonifies qi of the lung, promotes the diffusion process of lung energy, controls cough, favors the circulation of energy.

Sanzhong 膻中 (RM 17). In tonification. Regulates the dynamics of energy, favors the process of diffusion of lung energy and controls its rebellious energy, expands the chest and transforms phlegm.

Chize 尺泽 (LU 5). Cools the heat of the lung, lubricates the lung, promotes the descent process, and regulates the dynamics of lung energy.

Tiantu 天突 (RM 22). Favors the lung purification process, controls cough, lowers the rise of rebellious energy, transforms phlegm, cleanses and lubricates the throat.

Fig. 1 Pathophysiological process of post-COVID syndrome
Taiyuan 太渊 (LU 9). In toning. Eliminates pathogenic wind energy, cools and cleanses the lung, controls cough, drains vessels.

Herbal treatment
1. Lonicer a flos, jin yin hua 金银花: 9 g
2. Eriobotryae folium, pi yao 枇杷叶: 9 g
3. Moutan cortex, mu dan pi 牡丹皮: 9 g
4. Adenophora radix nan sha shen, 南沙参: 12 g
5. Astragali radix, huang qi 黄芪: 12 g
6. Panacis quinquefolii radix, xi yang shen 西洋参: 12 g
7. Fructus trichosanthis, gua lou 瓜蒌: 9 g
8. Prunis persicae semen, tao ren 桃仁: 9 g
9. Glycyrrhizae radix, gancao 甘草: 6 g

Predominance of heart deficiency
Higher prevalence in the first 3 months of convalescence, in patients with pulmonary dysfunction and who had exuberance syndrome of heart fire and symptoms due to invasion of the xue level.

Persistent symptoms. Palpitations, dyspnea on minimal exertion, chest tightness, sweating at rest, insomnia, amnesia.

Tongue. Pale, opaque, scarce coating.

Pulse. Weak and/or irregular.

Therapeutic principle. Tonify heart qi, nourish yin, remove residual heat, calm the spirit “shen.”

Acupuncture treatment
Sanyinjiao 三阴交 (SP 6). Tonifies the spleen and stomach, favors the distribution transformation process, drains the channels, enlivens the collaterals, regulates and harmonizes blood and energy, tones the blood.

Shenmen 神门 (HT 7). Calms the heart, pacifies the spirit.

Xinshu 心俞 (BL 15). Drains and purifies the collaterals of the heart, regulates the dynamics of blood and energy, calms the heart, pacifies the spirit.

Tongli 通里 (HT 5). Pacifies the spirit (calms the blood because it pacifies the spirit), calms the wind and balances the ying blood region. Tonifies heart qi.

Herbal treatment
1. Lonicer a flos, jin yin hua 金银花: 9 g
2. Puerariae radix, ge gene 葛根: 9 g
3. Moutan cortex, mu dan pi 牡丹皮: 9 g
4. Ophiopogonis radix, mai men dong 麦冬: 12 g
5. Salviae miltiorrhizae radix, dan shen 丹参: 9 g
6. Schisandras fructus, wu wei zi 酸枣仁: 6 g
7. Corydalis rhizoma, yan hu suo 延胡索: 9 g
8. Trichosanthis fructus, gua lou 瓜蒌: 9 g
9. Ziziphi spinosae semen, suan zao ren 酸枣仁: 6 g
10. Glycyrrhizae radix, gancao 甘草: 6 g

Predominance of kidney yin deficiency
Higher prevalence in patients than during the illness, developed conditions of toxic heat and/or fire, typical of the febrile disease, and exacerbated by other conditions which generate a greater consumption of liquids and the consequent consumption of yin.

Persistent symptoms. Vertigo, tinnitus, memory difficulties, intermittent fever, memory difficulties, insomnia, nightmares, restlessness, easy anger.

Tongue. Red tongue, little or no coating, slightly yel- low.

Pulse. Thin, rapid, weak.

Therapeutic principle. Regenerate and tonify kidney yin, regenerate fluids, cool residual heat.

Acupuncture treatment
Zusanli 足三里 (ST 36). In tonification. Nourishes the spleen, harmonizes the stomach, promotes blood production, supports yuans energy, disperses pathogenic wind.

Shenshu 肾俞 (BL 23). Increases the energy of the kidney, nourishes kidney essence, strengthens the lumbar spine.

Herbal treatment
1. Anemarrhenae rhizoma, zhi mu 知母: 9 g
2. Rehmanniae radix sheng di huang 生地黄: 9 g
3. Rehmanniae praeparata radix shu di huang 熟地黄: 12 g
4. Liliium bulbos, bai he 白百合: 12 g
5. Acanthopanax pseudoginseng radix niu xi 牛膝: 9 g
6. Morinda cortex, du zhong 杜仲: 9 g
7. Glycyrrhizae radix, gancao 甘草: 6 g

Liver yang rising predominance
Conditioned by kidney and liver yin deficiency, which does not control liver yang, and is exacerbated by factors such as residual heat and liver energy stagnation.

Symptoms. Headache, tinnitus, irritability, insomnia, nightmares, restlessness, easy anger.

Tongue. Red, scanty coating, slightly yellow.

Pulse. Cordalis, flooded.

Therapeutic principle. Contain liver yang, tonify yin, cool residual heat, calm the spirit “shen.”

Acupuncture treatment
Gongsun 公孙 (SP 4). Regulates energy dynamics in combination with Neiguan (PC 6), harmonizes the stomach.

Neiguan 内关 (PC 6). Calms the heart, pacifies the spirit, is anxiolytic and analgesic, regulates the dynamics of energy in combination with Gongsun (SP 4).

Fengchi 风池 (GB 20). Awakens the brain and opens the orifices, disperses the wind, cools the heat, quickens the blood, drains the channels, clears the eyes, increases clarity of thought.

Qihai 气海 (RM 6). Regulates energy dynamics.

Xingjian 行间 (LR 2). Promotes liver cleansing process, regulates energy dynamics, cools heat, controls tremors, controls liver yang.
Hegu 合谷 (LI 4). Cools the hot energy of the energetic qi region (in febrile illnesses). Promotes blood circulation, stops headaches, harmonizes the rise and fall of qi.

**Herbal treatment**

1. Lonicer a flos, jin yin hua 金银花: 9 g
2. Bupleuri radix, chai hu 柴胡: 12 g
3. Lycii fructus gou qi zi 枸杞子: 12 g
4. Paeoniae radix lactiflora, bai shao 白芍: 9 g
5. Pruni Armenicae semen, xing ren 杏仁: 9 g
6. Chuanxiong rhizoma, chuan xiong 川芎: 12 g
7. Uncariae ramulus cum uncis, gouteng 钩藤: 12 g
8. Ostrea shell, muli 牡蛎: 9 g
9. Glycyrrhiza radix, gancao 甘草: 6 g

**Concluding remarks**

The use of acupuncture and Chinese herbs in the management of patients with COVID-19 and post-COVID at the Guijii Integrative Medicine Center since the start of the pandemic in 2020 has allowed us to study and observe the behavior, evolution, and therapeutic response, as well as to accumulate valuable experiences to contribute to better integral treatment and control of this type of illness.

It is agreed that one of the most important functions and contributions of acupuncture and Chinese medicine in relation to COVID-19 and other viral diseases lies in its immunomodulatory, immunopotentiating effect, highlighting its value both in prevention and in risk reduction of contagion, as well as for decreasing the severity of the clinical condition in case of contracting the SARS CoV-2 infection.

Many of the patients who were treated with acupuncture and/or Chinese herbal medicine opportunely were not infected, and those infected remained asymptomatic or only developed mild symptoms.

In patients who were able to receive treatment with acupuncture and herbal medicine in combination with conventional medicine, a much faster and more favorable evolution was observed, considering that there was also a decrease in the occurrence of post-COVID syndrome.

It is important to point out that elaboration of individualized herbal formulas was often provided, designing the formulas based on the clinical information obtained electronically as well as on a picture of the patients’ tongue to establish the diagnosis and the therapeutic principle appropriately. In this way, the herbal formula was prepared and sent to their home.

In patients who had had severe symptoms only until they came out of the severe stage, an integral treatment with acupuncture and herbal medicine could be implemented, which also contributed to a faster and better recovery. Among these patients, where a large number developed post-COVID syndrome, more recently, with the easing of health restrictions, we have been able to attend to many more patients with post-COVID syndrome.

With the code of Chinese medicine, it is possible to make an integral diagnosis where a syndromic pattern is recognized and a more individualized treatment can be established, while maintaining common and general criteria to establish treatment models with acupuncture and Chinese herbs.

In our experience, we can conclude that a high percentage of patients with various modalities of the post-COVID syndrome treated with acupuncture and/or Chinese herbal medicine obtained a considerable improvement in the short term, mainly in patients who suffered the mild phase of COVID 19 or who were treated promptly in the moderate or severe phases.

In addition, it is important to point out that in the integral management of the post-COVID syndrome, the main therapeutic resource has always been acupuncture. The use of complementary Chinese herbal medicine is indicated predominantly for those more delicate and persistent cases.

A more detailed, specific, and deep analysis of all the elements of theory, diagnosis, and treatment according to Chinese medicine and integrative medicine exceeds the objectives of this article and will be reserved for future work.

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Declarations

Conflict of interest. F. Lozano and F. Alcala declare that they have no competing interests.

For this article no studies with human participants or animals were performed by any of the authors. All studies mentioned were in accordance with the ethical standards indicated in each case.