

A stroke is defined as rapid loss of brain function caused by the sudden death of brain cells. The brain requires a constant supply of blood for proper function. The blood carries much needed oxygen and nutrients to the brain via arterial blood vessels. A stroke occurs when the blood flow to the brain is interrupted, either due to a blockage of the blood vessel resulting in the brain not receiving the blood it needs to function, or a rupture of the blood vessel, spilling blood into the brain. The traumatized brain cells usually die resulting in loss of function.

Other common terms for stroke include cerebral vascular disease (CVD), cerebral vascular accidents (CVA), and older terms like cerebral apoplexy. With high fatality and disability rates following strokes, it is estimated that about 800,000 people suffer strokes each year. It is a leading cause of long term disability in the United States and the 4th leading cause of death in the United States.

The signs and symptoms of a stroke will be sudden and are dependent on the location of the stroke in the brain. Signs and symptoms may include weakness or numbness of an arm, leg, or face on one side of the body, difficulty walking or loss of balance, dizziness, loss of vision in one eye, inability to form or comprehend speech, severe headaches, fainting, loss of consciousness, and coma.

Strokes can be very individualized, the signs and symptoms of a stroke depend upon which artery is affected and where the artery is affected in relation to the area of the brain that the artery supplies blood to. A basic understanding of the anatomy and physiology of the brain as well as the arteries that supply the brain is useful. By knowing where the stroke has occurred, one can better understand how the patient will be affected by the stroke.

Understanding the left and right hemispheres of the brain provides greater insight to the functions that have been

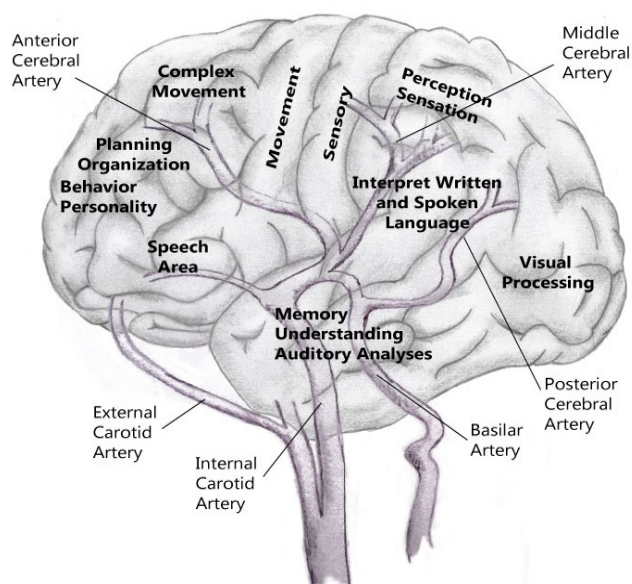
impaired due to a stroke. There are differences on how each side processes information. It is generally stated that the left hemisphere of the brain controls the right side of the body. It controls the feelings and movement of right side of the body and is responsible for linear thinking and analytical thought processes, logic, writing, language, math, and science. Similarly, the right hemisphere controls the left side of the body. It is responsible for holistic thinking; artistic, musical, and creative processing; awareness, insight, and intuition; spatial perception and whole picture understanding. Both hemispheres are designed to always work together. This can best be understood with examples. Visually the left hemisphere defines details of objects and the right hemisphere sees whole shapes. Together the entire picture becomes clear and complete. Another example is how we understand language. The left side of the brain is responsible for grammar; understanding letters, words, and sentence structure. The right side of the brain focuses on the implied meanings, metaphors, tonal changes, facial and body expressions. Together a complete understanding occurs and it can easily be seen how when one side of the brain becomes impaired, the entire message becomes confusing and possibly unintelligible.

WESTERN MEDICINE

Types / Causes of stroke

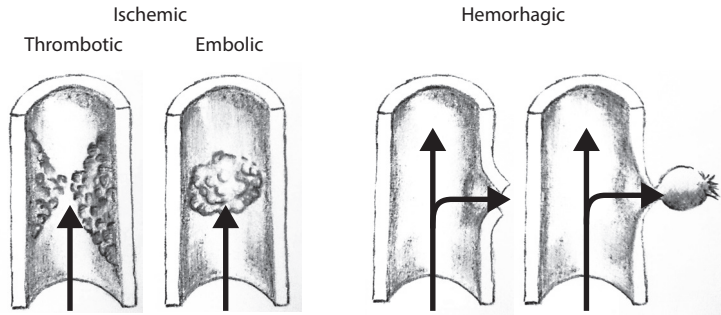
There are two main types of stroke: ischemic stroke and hemorrhagic stroke. Ischemic strokes are also known as cerebral infarctions. This type of stroke is defined as the lack of blood flow to a part of the brain. It is caused by a blockage either due to buildup of plaque or from a blood clot that obstructs or restricts the blood flow to the brain. The brain tissue that is further down from the obstruction does not receive the blood and oxygen, causing the brain tissue to infarct or die. Ischemic strokes count for 85% to 90% of all strokes. Ischemic stroke can be broken down further to embolic stroke and thrombotic stroke. An embolic stroke is a clot that, if formed elsewhere in the body (usually the heart or a large artery that leads to the brain) travels through the arteries to the brain where the clot gets stuck in an intracranial artery as the diameter of the arteries become smaller. This occludes the blood vessel and causes the stroke. A thrombotic stroke is a blood clot that does not travel, but forms inside the artery, blocking the blood supply to the brain. This is usually due to atherosclerosis, which is a buildup of plaque.

Hemorrhagic strokes are caused by a blood vessel in the brain, rupturing and spewing blood into the brain, causing neurons and brain tissue to malfunction and die. In addition to the local trauma, the lack of blood and oxygen can cause damage to other areas of the brain further down the artery. Hypertension is a leading cause of this type of stroke and is known as an intracerebral hemorrhage. An aneurysm, a ballooning of an arterial wall due to the wall's weakness, is another cause of a hemorrhagic stroke. Another type of



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hemorrhagic stroke is a subarachnoid hemorrhage. This type of hemorrhage occurs in a blood vessel in the subarachnoid space—the space between the brain and tissue that covers the brain—causing pressure to increase, which in turn damages brain cells. The main cause of this type of hemorrhagic stroke is a ruptured aneurysm. A less common type of hemorrhagic stroke is an arteriovenous malformation (AVM) which is usually a congenital condition caused by malformed, weakened, blood vessels. Hemorrhagic strokes are usually more severe than ischemic strokes.



Transient Ischemic Attacks (TIA) are cerebrovascular events, which are often called “mini strokes” and can be precursors to strokes. Transient ischemic attacks occur when the artery in the brain or leading to the brain becomes temporarily blocked, causing decreased blood and oxygen to the brain, resulting in signs and symptoms like temporary numbness, problems with balance and coordination, and speech difficulties. These attacks usually last from a couple of minutes up to a day, and the brain cells usually fully recover, leaving no permanent damage. Transient ischemic attacks may be an indicator or precursor of a stroke.

Predisposition to stroke

Predisposition to stroke falls into two categories: risk factors that are controllable and risk factors that are uncontrollable. Controllable risk factors include high blood pressure, diabetes, high cholesterol, high triglycerides, irregular heartbeat, smoking and alcohol intake, obesity, poor diet, lack of exercise, and stress. Hypertension is the leading known risk factor of stroke. High blood pressure levels can cause damage to the arterial walls which can eventually lead to a stroke. Diabetes, if left untreated or poorly treated, increases the risk of vascular disease, thereby increasing the risk of stroke, particularly ischemic stroke. There is debate on whether high cholesterol does in fact increase the risk of stroke, but it is generally stated that high cholesterol is a factor in the buildup of plaques on the arterial walls blocking normal blood flow. Atrial fibrillation, or irregular heartbeat, while it can be a congenital condition, is more often associated with conditions like hypertension and coronary artery disease. Atrial fibrillation causes blood to pool in the heart, which can form clots that may lead to an embolic stroke. Smoking increases the risk of a stroke. Smoking is known to increase blood pressure, increase clotting, damage arterial cell walls, and reduce the oxygen in the blood, all of which increase the chance of clots forming in the arteries. Additionally, smok-

ing while taking birth control pills increases risk of stroke, especially after the age of 35. Excessive alcohol consumption is a precursor for stroke. Obesity increases the risk of stroke because it leads to a higher likelihood of developing conditions like hypertension, diabetes, high cholesterol, heart disease, etc. A poor diet and lack of exercise have the same implications as obesity. Excessive stress is a risk factor for stroke. A recent study showed that type A personalities were twice as likely to have a stroke, and that individuals with chronic stress were almost four times more likely to have a stroke compared to healthy individuals.¹ Other predispositions include a history of migraines and sleep apnea. People who have strokes generally have more than one of these risk factors.

Uncontrollable risk factors for stroke include age, gender, ethnicity, and family history. Age is a risk factor with three-quarters of all strokes occurring in individuals over 65. The chances of having a stroke doubles with each decade after 55, but a stroke can occur at any age. Males are at greater risk of having a stroke versus females and African Americans are almost twice as likely as Caucasians of having a stroke, with Hispanics and American Indians in the middle. A family history of stroke puts one at greater risk.

Prognosis

Predicting recovery can be challenging. The prognosis varies greatly, depending on the general health of the patient prior to the stroke, the location and severity of the stroke, timely emergency treatment, and the quality of treatment and care post-stroke. The greatest chance of recovery occurs in the first three to six months post stroke. However, patients have experienced improvement in condition 18 months post stroke and beyond.

Western Medicine Approach for Stroke Prevention

Western treatment therapies for stroke prevention include diet and lifestyle recommendations and the administration of Western pharmaceuticals. Western pharmaceuticals used for stroke prevention include platelet inhibitors, like aspirin, and anticoagulants, like warfarin, to help prevent blood clots. Other medications that are administered pay particular attention to predisposing risk factors. They include antihypertensive medications, HMG-CoA reductase inhibitors (statins), and antidiabetic medications, among others.

Warning Signs, Response, and Western Medicine Emergency Treatment

A stroke is a medical emergency. Quick action can minimize the severity and damage that the stroke is causing. The quicker the response, the better off the individual having the stroke will be. FAST is an acronym that has been created to help recognize the signs and symptoms of a stroke in order to facilitate rapid response.

F	Face	Face drooping. One side of the face droops or is numb, can't smile or the smile is uneven.
A	Arm	Arm weakness or numbness. One arm cannot be fully raised or remain raised.
S	Speech	Inability to speak or understand speech. Speech is slurred or strange speech.
T	Time	Time to call 911 if the above signs and symptoms are observed.

The more quickly an individual receives emergency medical attention, the less damage to the inflicted brain tissue, resulting in a quicker overall recovery. Western emergency treatment consists of the administration of thrombolytics (clot-busting drugs) upon confirmation of acute ischemic stroke and surgery for both ischemic and hemorrhagic strokes.

Western Medicine Post-Stroke Rehabilitation

Western medicine's approach to post stroke rehabilitation is to address disabilities that occurred as a result of the stroke. Besides care from physicians, rehabilitation specialists like physical and occupational therapists become key components in the rehabilitation process. Physical therapists help stroke patients relearn motor skills like standing, sitting, and walking. They also help to restore movement, balance, and coordination. Occupational therapists help patients to relearn daily activities and fine motor skills, like eating, drinking, grooming, toilet training, dressing, cooking, reading, and writing. Speech therapists help relearn language and communication skills, as well as treating dysphagia. Social workers help patients and their families return home, or to a new living environment, and help with their adjustment back into the community, focusing on emotional and social functioning. Psychiatrists address mental and emotional issues that patients experience post stroke, such as depression and anger.

ORIENTAL MEDICINE

In Oriental Medicine, stroke is known as wind-stroke or *zhong feng*. There is great difficulty in defining this term, which is literally translated as "struck by wind" or "penetrated by wind." *Zhong feng* is mentioned in the *Su Wen* and *Ling Shu*, as well as the *Shang Han Lun* and the *Jin Gui Yao Lue*. The nature of the word "wind-stroke" is used to describe the manifestation of the disease. Characteristics of wind in nature are rapidly changing and moving. Signs and symptoms of diseases that manifest as wind have similar qualities; they arise suddenly with rapid changes in conditions, like a stroke. Zhang Zhong-jing described a wind invasion of the channels as paralysis of the limbs and a wind invasion of the *zang-fu* as loss of consciousness or coma. This definition is still commonly used today.

Etiology

The counterflow of qi, blood, and phlegm lead to acute wind-stroke. This counterflow is usually the result of a combination of wind and fire, which is often due to an underlying deficiency of yin and qi. With age, yin declines, yin and yang become unbalanced, and the yin is unable to constrain yang, giving rise to hyperactive yang. Over time, this stirs

wind and causes fire to float up. When the yang rises, it brings with it both blood and phlegm. This can block the channels and collaterals, resulting in hemiplegia; or it can block the heart orifice, resulting in loss of consciousness. In a cyclical manner, fire burns up yin and consumes qi, congeals fluid into phlegm, and stirs internal wind, exacerbating all conditions.

Differentiation

Syndrome differentiation of wind-stroke according to Oriental Medicine is broken down into two categories: 1) wind-stroke affecting the channels and collaterals, 2) wind-stroke affecting the *zang-fu*. This is the main differentiation for wind-stroke. Secondly, wind-stroke can be defined by stage in relation to time. And finally, it can be broken down according to a primary pattern differentiation.

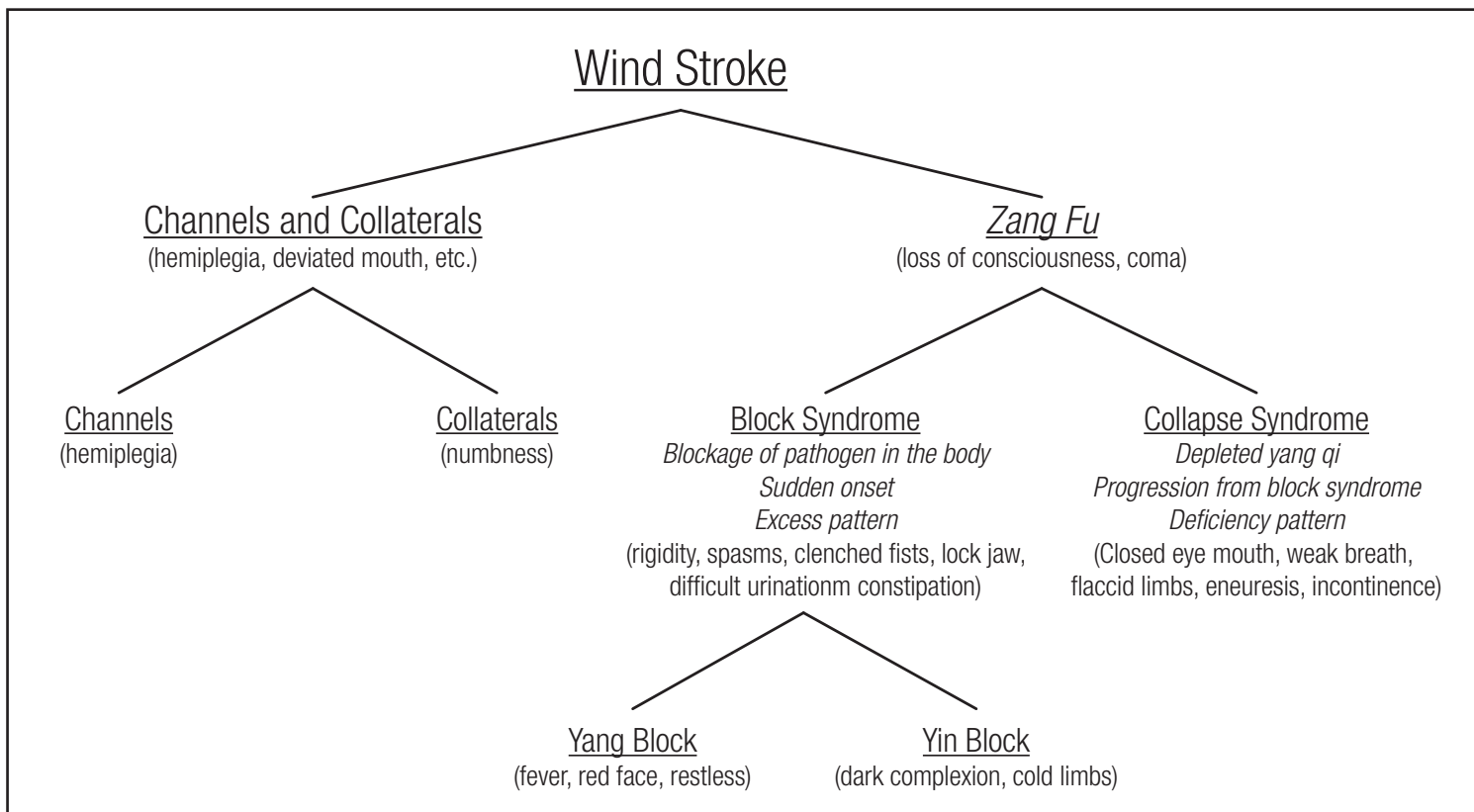
The main classification comes from Zhang Zhong-jing, who stated in the *Jin Gui Yao Lue (Essential Prescriptions of the Golden Cabinet)* that evil invasion of the channels is characterized by hemiplegia and difficult speech; evil invasion of *fu* organs is characterized by unconsciousness along with hemiplegia, and evil invasion of the *zang* organs is characterized by unconsciousness, aphasia, and drooling from the mouth, along with hemiplegia.

A wind-stroke involving the channels and collaterals is generally milder and presents as hemiplegia, one-sided weakness or numbness, difficult or slurred speech, deviated mouth and tongue, but without the loss of consciousness. A wind-stroke involving the *zang-fu* organs is more severe and presents as coma, loss of consciousness, and fainting, with the additional signs and symptoms of a wind-stroke involving the channels, like hemiplegia. A wind-stroke involving the channels can deteriorate if left untreated and as the condition worsens it can transform into a *zang-fu* wind-stroke. When this occurs, prognosis worsens.

Wind-stroke involving the channels and collaterals can be further refined depending on the primary signs and symptoms, with hemiplegia involvement belonging to the channels and numbness to the collaterals. Wind-stroke involving the *zang-fu* is further broken down into two subcategories: 1) block syndrome and 2) collapse syndrome (see Figure 1 on page 4).

Block syndrome, also known as "tense syndrome," is characterized as a blockage of the pathogen within the body, manifesting as general body rigidity, lock jaw, clenched fists, constipation and urinary retention. Block syndrome is subdivided into yang block and yin block. Yang block manifests as blockage due to heat, phlegm, and wind. It includes signs and symptoms like fever, a red face, restlessness, yellow greasy tongue coat, and a rapid slippery pulse. Yin block manifests as blockage due to cold, wind, and phlegm, with signs and symptoms like a dusky complexion, cold limbs, lying silently, a white greasy tongue coat, and a slippery pulse.

Collapse syndrome, also known as flaccid or desertion syndrome, is characterized as depleted yang qi, manifesting as closed eyes and mouth, faint weak breath, hands open, weak flaccid limbs, cold extremities, oily sweat, incontinence, and enuresis. Collapse syndrome usually occurs if block



syndrome is not addressed and indicates a progression of the disease.

Stage Differentiation

Wind-stroke can be broken down by stages: 1) The initial onset of wind-stroke is considered the **emergency stage**. 2) The **acute stage** is within two to three weeks of attack. 3) The **convalescent stage** is from two weeks up to six months post stroke. 4) The **sequelae stage** is considered six months post stroke and beyond. This differentiation is important to help determine appropriate treatment during each stage.

Pattern Differentiation

Wind-stroke is a complex disease of both deficiency and excess. Generally, a deficiency of yin and qi is present as the root condition. Excess conditions manifest as wind, turbid phlegm, phlegm-heat, liver fire, liver yang rising, and blood stasis. A study has shown that the most common pattern is wind and phlegm, with the least common pattern being liver yang rising due to yin deficiency. Additionally, the study showed that complex patterns were more common than one single pattern and wind-stroke that included a combination of three OM patterns was the most common.ⁱⁱ

All patterns will include general signs and symptoms of a wind-stroke like hemiplegia, deviated mouth and tongue, slurred speech, or one-sided numbness and weakness; but depending on the specific individual pattern, the following signs and symptoms will present.

- *Liver yang rising and stirring wind* will manifest with the additional signs and symptoms of headache, agitation, tinnitus, dizziness, red eyes, dry mouth and throat, bitter taste in the mouth, irritability, constipation, dark red tongue with a yellow coat, and a wiry pulse.

- *Liver fire stirring wind* will manifest with the additional signs and symptoms of headache, dizziness, flushed face, red eyes, restlessness, irritability, bitter taste in the mouth, bleeding, red tongue with a yellow coating, and a wiry rapid pulse.
- *Wind-phlegm obstructing the channels* manifests with the additional signs and symptoms of numb limbs, muscle spasms, vertigo, dizziness, headache, white greasy tongue coat, and a wiry slippery pulse.
- *Qi and blood stagnation* manifests with the additional signs and symptoms of irritability, hypochondriac pain, palpitations, bleeding issues, dull dark face, purple nails and lips, dusky tongue, and a tight, choppy, or wiry pulse.
- *Phlegm-fire obstructing the orifices* manifests with the additional signs and symptoms of sticky mouth, constipation, copious phlegm, restlessness, red tongue with yellow greasy coat, and a wiry or slippery pulse.
- *Qi deficiency* manifests with the additional signs and symptoms of spontaneous sweating, fatigue, cold weak limbs, pale complexion, shortness of breath, tired shen, loose stools, poor appetite, pale tongue, and a weak pulse.
- *Yin deficiency* manifests with the additional signs and symptoms of malor flush, tidal fever, five palm heat, restlessness, insomnia, headache, night sweats, thin red peeled tongue, and a thin rapid pulse.

The patterns that are most common for the sequelae stage post stroke include wind-phlegm, damp and phlegm accumulation, qi and blood stagnation, and yin deficiency with deficient heat.

STROKE PREVENTION

A healthy lifestyle, including exercising regularly, adequate rest, regular acupuncture and herbal treatments, and most importantly diet, are key to stroke prevention. Avoiding controllable risk factors like not smoking (or quitting smoking), avoiding excessive alcohol intake, and managing stress are paramount. Working to prevent predisposing risk factors like diabetes and hypertension are also important.

Prevention through Nutrition

An overall healthy diet and maintaining a healthy weight are very important in prevention of stroke. Seeking assistance from a nutrition specialist is beneficial. (See **Table 2** for some general guidelines.)

Omega-3 fatty acids found in foods like salmon, trout, or tuna, have the ability to inhibit blood clots, help reduce inflammation in the body, and can help lower blood pressure. Magnesium is good for circulation and can be found in foods like spinach, pumpkin seeds, mackerel, avocado, bananas, and figs. Calcium can help lower blood pressure, and is found in foods like salmon, sardines, kale, spinach, collard greens, seaweed, and oranges. Vitamin B, found in fish, poultry, eggs, whole grains, fruits and vegetables, and vitamin D, found in foods like salmon, tuna, fish liver oils, liver, and eggs, may also lower the risk of stroke.^{iii, iv} Specific foods like dark chocolate, green tea and garlic have been found to help prevent blood clots, reduce inflammation, and lower blood pressure.

It is important to distinguish between good and bad fats to assess stroke risk. Healthy fats and oils can be used generously. They include low heat oils like olive oil, and sesame oil as well as high heat oils like coconut oil, butter, and ghee. Avoid trans-fats like hydrogenated oils and margarine, polyunsaturated fats like vegetable oils, canola oil, corn oil, or other highly processed fats like peanut oil.

The Cholesterol Debate

It is generally stated that elevated levels of cholesterol in the blood may lead to plaque buildup on the arterial walls,

increasing the risk of stroke by causing a restriction or blockage of normal blood flow. However, the link between high cholesterol and stroke has never been proven. A recent study showed no relationship between high cholesterol levels and increase incidence of stroke in women and no increased risk of stroke in men except when cholesterol levels were extremely high (348mg/dL or higher). The same study found a direct link between high triglyceride levels and an increased risk of stroke.^v Using high triglycerides as a marker can be useful in the prevention of stroke. Triglycerides are very closely linked to very low density lipoprotein (VLDL). The VLDL, which are mostly made up of triglycerides, carry triglycerides from the liver to adipose tissue. It is thought that the VLDL lodges itself in the arterial walls, resulting in decreased blood flow or complete occlusion. In people with poor diets or individuals with metabolic disorders like diabetes, the liver secretes more VLDL containing more triglycerides that are larger in size. One of the most effective ways to lower triglycerides and VLDL is to make dietary changes and exercise more.

It is important to note that cholesterol is vital to the human body. Weak blood vessels and damage to arterial walls (which can be caused by many things, like smoking or elevated insulin levels) drive up cholesterol levels in the body. Cholesterol strengthens the weakened areas, preventing the arteries from bursting. Cholesterol benefits many other areas of the body as well. Cholesterol is necessary for healthy brain function and development and contributes to a healthy nervous system, including benefiting nerve sheaths and white matter of the brain. Cholesterol benefits the adrenal glands and cell membranes. It is used to produce hormones such as estrogen, progesterone, testosterone, and adrenaline. It helps keep the gastrointestinal lining sealed. Low cholesterol levels, less than 150mg/dL, are just as dangerous as high cholesterol levels, increasing the incidences of stroke^{vi} as well as increasing the risk of cancer,^{vii} depression, anxiety,^{viii} memory loss, dementia,^{ix} Parkinson's disease,^x suicide,^{xi} and violent behavior.^{xii}

Table 2: General Nutrition Guidelines

Avoid	Beneficial Foods
Saturated fats and trans fats	Salmon, trout, tuna, sardines, mackerel
Sugar	Vegetables; especially spinach, kale, collard greens
Deep fried foods	Blueberries, cantaloupe, oranges, tomatoes
Soft drinks	Lentils, beans
White refined flour	Almonds, pecans, walnuts
Snack foods like chips, cookies, and crackers	Whole grains
Foods high in salt and sodium	Green tea, red wine (in moderation)
Excessive portion size	Dark chocolate
Excessive alcohol consumption	Garlic
<i>Eat organic, free range, grass fed whenever possible.</i>	

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Prevention with Acupuncture

Acupuncture can be a good preventative therapy for stroke. Acupuncture promotes healthy blood flow and circulation, as well as helping to control risk factors of stroke, like hypertension, ischemia, diabetes, and stress, thereby reducing the risk for stroke. There are multiple studies reporting that acupuncture benefits cerebral blood flow and increases microcirculation. LI 4, LI 11, ST 36, ST 42, PC 6, GB 20, DU 14, DU 20, and DU 26 are some of the common acupuncture points that have been included in modern research. Identified through research, specific acupuncture points were determined to have a focus on the blood flow of specific areas of the brain. Many of the acupuncture points listed above affect the middle cerebral artery. LI 4 affects the frontal region of the brain, the basilar artery, and the middle cerebral artery.^{xiii} LI 11 also has an effect on the frontal regions of the brain.^{xiv} ST 36 increases cerebral blood flow, affecting the middle cerebral artery and the basilar artery.^{xv, xvi} PC 6 stimulates vasodilation of middle cerebral artery.^{xvii, xviii} GB 20 affects the posterior cerebral circulation and the basilar artery.^{xix} DU 14, DU 20, and DU 26 improve blood flow in the cerebral cortex, with DU 20 specifically affecting the middle cerebral artery and anterior cerebral artery.^{xx} The majority of research studies cited used electroacupuncture or acupuncture with strong stimulation versus acupuncture without stimulation.

Prevention with Chinese Herbs

When using Chinese herbs to help lower the incidence of stroke, patients present in many different ways, as described above. It is important to diagnose according to a presenting OM pattern. Two commonly seen patterns and suggested treatments include formulas that extinguish liver wind and liver fire, and formulas that invigorate blood. The first set of formulas settle liver yang, extinguish wind, clear heat, dredge the meridians, and nourish blood and yin. This includes formulas like **Luo Bu Ma Formula** (*Luo Bu Ma Pian*), **Gastrodia and Uncaria Formula** (*Tian Ma Gou Teng Yin*), and Hematite and Scrophularia Combination (*Zhen Gan Xi Fang Tang*, KPC 4130). With the use of these formulas, the focus is on treating signs and symptoms of headache, dizziness, vertigo, hypertension, restlessness, insomnia, flushed face, and pressure behind the eyes. **Luo Bu Ma Formula** (*Luo Bu Ma Pian*) is the strongest to clear liver heat, focusing more on excess conditions. **Gastrodia and Uncaria Formula** (*Tian Ma Gou Teng Yin*) and Hematite and Scrophularia Combination (*Zhen Gan Xi Fang Tang*, KPC 4130) treats excess accompanied by deficiency, nourishing yin to subdue yang and extinguish wind. Uncaria (*gou teng*), one of the chief herbs in this formula, has anti-inflammatory, anti-apoptosis, and free radical-scavenging activities. It also exhibits antiplatelet and anti-hypertensive effects, making it particularly beneficial not only for treating stroke, but also effective for stroke prevention.^{xxi}

The next set of formulas addresses issues of blood stagnation. These formulas invigorate blood, dredge the meridians, and open the orifices; including formulas like **Blood Palace Formula** (*Xue Fu Zhu Yu Tang*), **Chong Release Formula**

(*Jia Wei Tao Hong Si Wu Tang*), and Persica and Ligusticum Combination (*Tong Qiao Huo Xue Tang*, KPC 2910). These formulas are used to help prevent thrombus formation. If working with granules, a custom formulation can be used for prevention and should include herbs like ginkgo (*yin guo ye*), salvia (*dan shen*), scrophularia (*xuan shen*), apocynum (*luo bu ma*), cyathula root (*chuan niu xi*), tang kuei (*dang gui*), dioscorea (*shan yao*), alisma (*ze xie*), notoginseng root (*san qi*), and acorus (*shi chang pu*).

Some individual herbs have become recognized and highly researched for helping to prevent and treat ischemic stroke. They include ginkgo (*yin guo ye*), salvia (*dan shen*). These herbs stimulate cerebral circulation, helping to prevent blood clots from forming in the brain. Ginkgo (*yin guo ye*) is indicated to decrease blood pressure and has strong antithrombotic and anti-oxidant effects.^{xxii} Salvia (*dan shen*) may have anti-hypertensive, anti-platelet aggregation, and anti-inflammatory effects. It also may reduce the development of atherosclerosis, which can prevent cerebral infarction.^{xxiii} Some formulas to consider with these herbs as chief include **Ginkgo Formula** (*Yin Guo Ye Wan*) and **Salvia 10 Formula** (*Dan Shen Jia Si Jun Zi Pian*). **Ginkgo Formula** (*Yin Guo Ye Wan*) is a modification of *Jian Nao Wan*, a modern patent known as “Healthy Brain Pill.” The formula’s actions are to supplement heart and liver blood, open the orifice, calm the shen, and sedate liver fire and liver wind.

Scutellaria (*huang qin*) is another herb that is being researched more and has been shown to have neuroprotective effects against ischemic stroke. A recent study found that this herb has an inhibitory effect on platelet aggregation close to that of aspirin, making it particularly suitable to be used as a preventative for ischemic stroke.^{xxiv}

Qigong for Stroke Prevention

Relaxation techniques like meditation, tai chi, and qigong can be used to calm the mind and body, lowering stress levels and blood pressure. This can be very important for stroke prevention. A 20-year controlled study with a 30 year follow-up was done showing the anti-aging effects of qigong. The study showed a 20.5% incidence of stroke for the qigong group and a 40.7% incidence of stroke for the control group. Additionally, the study showed a mortality rate due to stroke at 15.6% for the qigong group and 32.5% for the control group. The research also showed that blood pressure in the qigong group stabilized while the control group increased. The qigong group reduced pharmaceutical blood pressure medications, with 30% of patients able to be removed completely from the medications versus the control group whose medications were increased.^{xxv}

TREATMENT

Emergency OM Treatment for Initial Stroke Attack

Modern biomedicine has proven to be the most effective measure of initial life-saving treatment for an individual having a stroke. As outlined above, suggested protocols for recognizing a stroke and calling emergency medical personnel should be

headed. The following procedures can be used to support the patient in the interim or if emergency treatment is unavailable.

An acupuncture treatment protocol for wind-stroke is to puncture the twelve *jing*-well points with a lancet or 3-edge needle. This is used as an emergency treatment to bring down the yang and clear excess heat in order to decrease blood pressure, dredge meridian blockage, and open the orifice to restore consciousness. Additional acupuncture points that can be used include: DU 26 and PC 8 to revive consciousness, and DU 20 and GB 20 to quell internal wind. This protocol is not suitable for collapse syndrome. For collapse syndrome the following moxibustion treatment protocol is optimal. Moxa: Ren 4, Ren 6, Ren 8, ST 36, SP 6, KI 1. This treatment is used to revive yang collapse.

Emergency herbal treatment for wind-stroke is rarely used in the United States. Most Western practitioners of Oriental medicine will not be treating patients in this condition. This is mainly for two reasons. Primarily, Western medicine has shown to be effective in the emergency treatment of stroke and takes precedence over Oriental medicine in the West as the primary treatment. Secondly, many of the classical formulas that were deemed effective and used during this stage are no longer available in the United States.

The following is primarily informational and not intended to be a substitute for modern, allopathic emergency treatment. For emergency herbal treatment, use the classical primary syndrome differentiation: wind-stroke affecting the channels and collaterals or wind-stroke affecting the *zang-fu*. For wind-stroke affecting the channels, Myrrh and Aconite Formula (*Xiao Huo Luo Dan*) is used. For acute wind-stroke affecting the *zang-fu*, yang block, *An Gong Niu Huang Wan* was classically used. This formula was used to clear heat, eliminate phlegm and toxin, open the orifice and calm *shen*. It was a traditional formula for disorders of the brain, including wind-stroke. For wind-stroke affecting the *zang-fu*, yin block, *Su He Xiang Wan* was classically used. This formula was used to treat phlegm and cold obstructing the orifice. These two classical formulas are inaccessible in the West as they contain herbs that are restricted due to CITES endangered species, labeled as toxic substances, or other FDA restrictions. These obsolete substances include: rhinoceros horn (*xi jiao*), ox/cattle gallstones (*niu huang*), musk (*she xiang*), water buffalo horn (*shui niu jiao*), cinnabar (*zhu sha*), borneolum (*bing pian*), styrax (*su he xiang*), and realgar (*xiong huang*). There are modern modifications of these formulas; however with key ingredients removed, the effectiveness is not the same. The last syndrome differentiation is for wind-stroke affecting the *zang-fu*, collapse syndrome; *Shen Fu Tang* is the suggested herbal formula. This formula is not commonly produced by herbal companies, but can be easily made from granules. A good alternative to *Shen Fu Tang* is the formula combination of Aconite, Ginseng, and Ginger Combination (*Fu Zi Li Zhong Tang*, KPC 1760) combined with **Sheng Mai Formula** (*Sheng Mai San*).

Post-Stroke Recovery

Oriental Medicine excels as a treatment in the long-term rehabilitation and recovery from stroke. Acupuncture and herbal medicine, along with physical therapy, offer the best chance of post-stroke recovery. The focus is on helping the patients recover independence and function, pain management, managing emotions throughout the rehabilitation process and beyond, and reducing the side effects of pharmaceuticals. It is best to start acupuncture and Oriental medicine therapies as soon as possible after an individual has been stabilized, as the first six months are the most important for recovery.

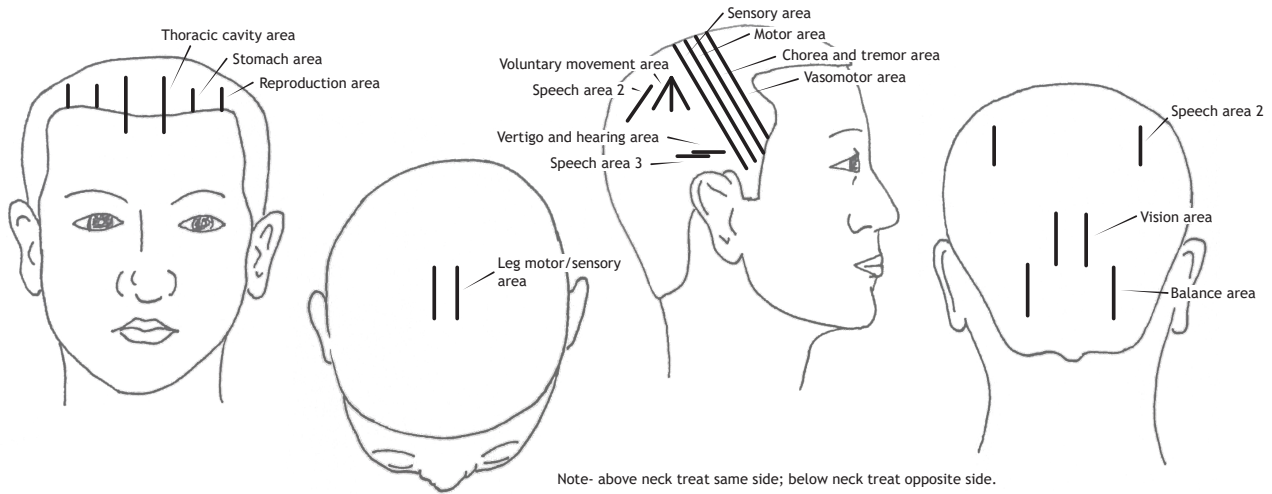
There are multiple ways to approach the treatment of stroke using Oriental Medicine. Acupuncture is the most common treatment modality. Many studies have been performed showing the efficacy of acupuncture for post-stroke recovery.^{xxvi, xxvii} Below are several of the more prominent treatments that are currently being used. Each treatment approach has celebrated success and popularity over the recent years.

Scalp Acupuncture for Post-Stroke Recovery

Scalp acupuncture is one of the most common treatment methods for post-stroke recovery. Scalp acupuncture is effective for acute or post-acute stages. Its focus is to stimulate the cerebral cortex, thereby stimulating the brain's neuroplasticity. Forms of scalp acupuncture have been practiced for thousands of years as part of the traditional acupuncture system, but it is within the last 30-40 years that a complete scalp acupuncture system has been developed. In the 1980s, scalp acupuncture became officially standardized, combining methods from several prominent Chinese practitioners, Dr. Jiao Shun-fa, Dr. Fang Yun-peng, and Dr. Tang Song-yan. Scalp acupuncture was developed on the principles and theories of traditional Chinese medicine in conjunction with modern anatomy and physiology and has a rich history of clinical data. The site of scalp acupuncture is close to the affected area, the brain. Based on location, the scalp acupuncture areas correspond and reflect brain function. It focuses on zones or lines rather than points. Needle insertion angles are usually transverse, and needling depth is greater than traditional acupuncture points on the head. Usually needles are strongly stimulated with rapid twirling or lifting and thrusting manipulation at 120-300 times per minute for one to three minutes. Retention of needles can be 20-45 minutes, or the patient may be sent home with needles for several hours up to a couple of days. Ideally, treatments occur on a daily basis and at a minimum of three times a week. Commonly used zones for stroke recovery depend on affected areas but often include motor, sensory, and speech areas (see scalp acupuncture chart on page 8). An excellent resource for a comprehensive understanding of scalp acupuncture is *Chinese Scalp Acupuncture* by Jason Ji-shun Hao and Linda Ling-zhi Hao.

There are several popular and effective variants of scalp acupuncture that include their own point/area location maps

Chinese Scalp Acupuncture



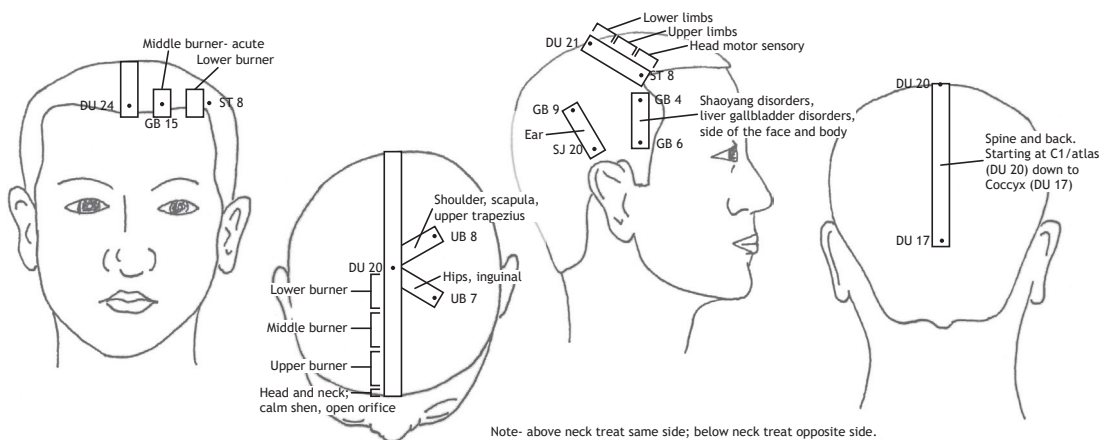
and treatment protocols. One particular scalp acupuncture system to note is Dr. Zhu's Scalp Acupuncture. Dr. Zhu's Scalp Acupuncture is based on clinical experience and derived from what is now standardized scalp acupuncture. It is becoming increasingly popular throughout the United States and Asia. His method was developed in the early 1970's. The treatments include small amplitude lift thrust needle technique used in conjunction with manual manipulation and massage of affected areas. Research studies indicate advanced clinical outcomes when acupuncture is combined with other rehabilitation modalities like physical therapy and movement. The studies show enhanced therapeutic effects and the quickening of the recovery process,^{xviii} as seen with Dr. Zhu's treatment style. Below are basic diagrams of his treatment zones and the affected body parts. For more information on Zhu's scalp acupuncture see *The Color Atlas of Zhu's Scalp Acupuncture* by Ming Qing-zhu.

Another popular scalp acupuncture system that is being used to treat stroke recovery is Yamamoto's New Scalp Acupuncture (YNSA), which was developed by Japanese practitioner Dr. Toshikatsu Yamamoto in the early 1970's. The points most commonly used are the YNSA yin points: basal ganglia point, cerebellum point, cerebrum point, and point C, as well as other affected body location points. For more information and detailed point locations look at *Yamamoto New Scalp Acupuncture: Principles and Practice* by Richard A Feely.

Body Acupuncture for Post-Stroke Recovery

Dr. Shi Xue-min is well known for his work with stroke, among his many accomplishments. He developed an acupuncture protocol in the early 1970's known as Xing Nao Kai Qiao (XNKQ), which translates as "conscious restoring, orifice opening," for the treatment of stroke. His work is featured in the documentary *9000 Needles*. Dr. Shi Xue-min's focus is on shen. He proposed that when a stroke occurs, it occludes the brain orifice and leads to hidden *shen*. This concept arose from a deep understanding of both traditional Chinese medicine as well as anatomy and physiology of the brain, bringing to light that the disease is located in the brain, but the manifestation is in the meridians and *zang-fu*. The treatment principle is to restore consciousness, brighten the *shen* and open the orifice, dredge the meridians, regulate qi and blood, tonify the liver and kidney, and supplement marrow. Standardized points with an emphasis on specific and defined needle manipulation, including direction and force, known as quantitative needle manipulation, have proven effective through clinical practice, showing an increased recovery rate. This treatment therapy can also be used for stroke prevention for high risk patients. Treatment course should consist of two treatments per day for ten days. Three to five treatment courses are usually needed, running continuously. For more information, read Shi Xue-min's *Comprehensive Textbook of Acupuncture and Moxibustion* by Shi Xue-min.

Dr. Zhu's Scalp Acupuncture



Dr. Shi Xue-min's Treatment Protocol

Primary Points		
PC 6	Perpendicular .5-1 cun	Use reducing lifting and thrusting technique for 1 minute
DU 26	Oblique toward nasal septum, .3-.5 cun	Use tonifying lifting and thrusting technique until eyes water
SP 6	Oblique, 1-1.5 cun	Use tonifying lifting and thrusting technique until affected side lower limb twitches three times
Secondary Points		
HT 1	Perpendicular 1-1.5 cun	Use reducing lifting and thrusting technique until affected side upper limb twitches three times
LU 5	With elbow bent, perpendicular 1 cun	Use reducing lifting and thrusting technique until affected side forearm and fingers twitch three times
UB 40	With leg bent, perpendicular .5-1 cun	Use reducing lifting and thrusting technique until affected lower limb twitches three times
Additions- GB 20, SJ 17, GB 12 (difficult swallowing), LI 4 (clenched fists), Ren 23, <i>Jin Jin</i> , <i>Yu Ye</i> (slurred speech)		

Wang Le-ting, also known as “Golden Needle Wang,” was a famous Chinese practitioner who is often considered one of the greatest practitioners of his time. With five decades of experience treating stroke, Wang Le-ting developed the 13 treatment methods for stroke. He created 13 different protocols to choose from, depending on how the patient is presenting at the time of treatment, allowing the practitioner to alternate protocols. Stroke patients are treated daily. For acute conditions, treatments should emphasize symptoms with a branch treatment, and then focus attention on the root. For more in depth information, read *Golden Needle Wang Le-ting* by Yu Hui-chan.

Golden Needle Wang's 13 Treatment Methods for Stroke

Protocol	Points
Tense symptoms	DU 26, Ren 24, GB 20, DU 16, LI 4, PC 8, LR 3, KI 1
Flaccid symptoms	Moxa- Ren 8, Ren 4, Ren 6, Needle- DU 20, ST 36, PC 6
Hemiplegia	LI 11, LI 4, PC 6, ST 36, GB 34, SP 6
Hemiplegia (alternate)	DU 20, DU 16, GB 20, GB 21, GB 30, GB 34, GB 39, GB 40, LI 4, LI 11, LI 15, LU 7, UB 40, LR 3
Long-term hemiplegia (rigid)	GB 20 -> DU 16, LI 15 -> LI 14, LI 11 -> HT 3, SJ 5 -> PC 6, SJ 4 -> PC 7, LI 4 -> PC 8, GB 30 -> GB 31, GB 33 -> LR 8, GB 34 -> SP 9, GB 39 -> SP 6, UB 60 -> KI 3, LR 3 -> KI 1

Facial paralysis (needle affected side)	DU 26, Ren 24, ST 2, ST 5, ST 6, ST 40, SI 18, GB 14
Facial paralysis, severe, long-term (needle affected side)	GB 14 -> Yu Yao, UB 2 -> SJ 23, ST 2 -> ST 1, GB 20 -> DU 16, Tai Yang -> SI 18, LI 19 -> ST 3, ST 4 -> ST 6, LI 11, LI 4
Yang deficiency, raise clear yang	DU 20, DU 16, DU 14, DU 13, DU 11, DU 9, DU 8, DU 6, DU 5, DU 4, DU 3, DU 1
Regulate <i>chong</i> and <i>ren</i>	Ren 24, Ren 23, Ren 22, Ren 19, Ren 17, Ren 15, Ren 13, Ren 12, Ren 10, Ren 6, Ren 4, Ren 3, moxa Ren 8
Deficiency of the 5 yin organs, deficiency of qi, blood, yin, yang	UB 13, UB 15, UB17, UB 18, UB 20, UB 23
Deficiency of the 6 yang organs	UB 19, UB 21, UB 22, UB 25, UB 27, UB 28; good protocol for symptoms like constipation and urinary retention
<i>Zang-fu</i> organ dysfunction	LU 1, Ren 17, Ren 14, LR 14, LR 13, Ren 12, ST 25, Ren 4, Ren 3
Digestion, spleen and stomach, disharmony	Ren 13, Ren 12, Ren 10, Ren 6, PC 6, ST 25, ST 36

General Acupuncture Points for Post-Stroke Recovery

Acupuncture points to consider using or adding to existing protocols include:	
DU 20 and DU 16	regulates and stimulates marrow and <i>shen</i> , expels wind from the head
DU 26	restores consciousness and revitalizes <i>shen</i>
PC 6	opens orifice and calms <i>shen</i> , improves circulation, benefits loss of memory following a stroke
<i>Si Shen Cong</i>	subdues interior wind and calms <i>shen</i>
GB 20	eliminates wind
PC 5, ST 40	treat wind-phlegm
ST 44, ST 40, LI 11	treat phlegm-heat
UB 17, SP 10	address blood stagnation
LR 3, KI 3	subdue liver yang rising
LR 3, LI 4	for close pattern
Ren 4, Ren 6, Ren 8 (moxa)	for collapse pattern
Suggested modifications include:	
PC 5, Ren 23	for aphasia
ST 7, LI 4	for clenched jaw
GB 12, GB 20	for drooping eyes
ST 8, GB 20, LI 4	for deviated face
GB 12, LU 7	for deviated mouth
ST 36, ST 41, GB 30, GB 34	for lower limb issues
LI 10, LI 15, SJ 5, LI 4, SJ 3	for upper limb issues

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A recent study showed that rapid needle manipulation, 180 times/min for a duration of one minute, achieved optimal effectiveness when treating ischemic stroke.^{xxix} Another study stated that a reinforcing / reducing needle manipulation method was superior to twisting.^{xxx}

Caution: Generally acupuncture is started as soon as the stroke patient has been stabilized. Caution is advised in the case of a hemorrhagic stroke and it is suggested to wait two weeks before beginning acupuncture treatments as acupuncture has been shown to dilate blood vessels, increase circulation, and decrease clotting and inflammation. In the case of a hemorrhagic stroke it is best to make sure the bleeding has been stopped and is not likely to resume before beginning treatments.

Chinese Herbs for Post-Stroke Recovery

The use of Chinese herbs post stroke, though not as well-known or widely practiced as acupuncture in the West, is a common treatment therapy. Herbal treatments are often used in conjunction with acupuncture. In the United States, Chinese herbal treatments are most often prescribed during the convalescent and sequelae stages of wind-stroke, and are rarely prescribed during the emergency stage. Pattern differentiation is important for correct herbal treatment. Key Chinese herbal formulas can be broken down into several groups.

The first group focuses on liver wind. **Gastrodia and Uncaria Formula** (*Tian Ma Gou Teng Yin*) calms the liver, extinguishes internal wind, and nourishes yin. Hematite and Scrophularia Combination (*Zhen Gan Xi Feng Tang*, KPC 4130) addresses wind due to yin deficiency. Dioscorea and Achyranthes Combination (*Jian Ling Tang*, KPC 2100) focuses on descending liver yang, dispelling liver wind, and nourishing qi, blood, and yin. *Jian Ling Tang* has a focus on treating the *shen*, **Gastrodia and Uncaria Formula** (*Tian Ma Gou Teng Yin*) clears more heat, and Hematite and Scrophularia Combination (*Zhen Gan Xi Feng Tang*, KPC 4130) is stronger to subdue yang.

Phlegm is often one of the primary patterns seen following a wind-stroke. Pinellia and Gastrodia Combination (*Ban Xia Bai Zhu Tian Ma Tang*, KPC 1150) treats wind-phlegm obstructing the head and face. If phlegm is accompanied by other patterns, the previous formula or **Citrus and Pinellia Formula** (*Er Chen Tang*) can be easily combined with other formulas.

Blood stagnation is seen as one of the presenting factors in many wind-stroke cases. **Blood Palace Formula** (*Xue Fu Zhu Yu Tang*) is an appropriate formula to address this presentation and can be easily combined with other formulas. Persica and Ligusticum Combination (*Tong Qiao Huo Xue Tang*, KPC 2910) is another formula that effectively treats blood stasis with a focus on the head and face.

Deficiency is often seen as the underlying pattern for wind-stroke. The more time that passes post stroke, the more you

will see the presence of a deficiency pattern. Astragalus and Peony Combination (*Bu Yang Huan Wu Tang*, KPC 3680) is probably the most well-known traditional formula used for post-stroke treatment. Over the years it has become one of the most effective formulas for treating patients post stroke when qi deficiency and blood stagnation are present. Other formulas that can be effective when deficiency is prominent include **Ginseng and Astragalus Formula** (*Bu Zhong Yi Qi Tang*) or Astragalus and Cinnamon Five Herb Combination (*Huang Qi Wu Wu Tang*, KPC 3220). These formulas all have large doses of astragalus (*huang qi*), with Astragalus and Peony Combination (*Bu Yang Huan Wu Tang*, KPC 3680) containing the largest percentage, which has been shown to be beneficial for post-stroke recovery. A blood moving formula like **Course and Quicken Formula** (*Shu Jing Huo Xue Tang*) can be easily added to any of these formulas. It is important to note that these formulas are never used immediately following a wind-stroke, but rather in the convalescent or sequelae stages, and are used for patients presenting with deficiency with no signs of excess liver patterns. For qi and yin deficiency, use **Sheng Mai Formula** (*Sheng Mai San*), and for yin deficiency with deficient heat, Phellodendron and Testudinis Formula (*Hu Qian Wan*, KPC 1770) or **Rehmannia and Scrophularia** (*Zhi Bai Di Huang Wan*) are good choices.

Qi and blood stagnation with damp-phlegm obstructing the meridians is a very common presentation of stroke. This diagnosis implements several key treatment strategies for treating wind-stroke. Myrrh and Aconite Formula (*Xiao Huo Luo Dan*, KPC 0440) invigorates qi and blood, dispels wind, eliminates phlegm, and unblocks and warms the meridians, treating post-stroke hemiplegia. Caution is advised when using this formula. It is not appropriate for long term use and is often combined with a constitutional formula. Additionally, this formula is contraindicated if the patient is taking antiarrhythmic medications or has a pacemaker. **Salvia 10 Formula** (*Dan Shen Jia Si Jun Zi Pian*) is an alternative to transition to, or to use solely from the beginning, as it strongly moves blood, resolves phlegm, calms *shen*, and has the added function to tonify and support qi. This addresses the underlying deficiency that is often present. The two chief herbs of this formula are Chinese salvia (*dan shen*) and turmeric (*yu jin*). Their main function is to invigorate blood. Additionally, turmeric (*yu jin*) has the added function of treating phlegm accumulation. **Salvia 10 Formula** (*Dan Shen Jia Si Jun Zi Pian*) has actions similar to *Hua Tuo Zai Zao Wan*, a modern formula currently undergoing clinical trials for acute ischemic stroke. These actions include supplementing qi and blood, promoting circulation of qi and blood, dispelling phlegm, dredging the channels and collaterals, and opening the orifices.

Single herbs

Several single herbs have been extensively researched and can play significant roles in stroke recovery by themselves or within a formula. Chinese salvia (*dan shen*) and ginkgo (*yin guo ye*), which were previously mentioned as key herbs for

stroke prevention, can also be used for post-ischemic stroke treatment, as they improve cerebral circulation and address blood clots. Pseudoginseng (*san qi*) is another herb that can be beneficial for the treatment of stroke. It is thought to be a good herb for prevention as well, but is lacking peer-reviewed research, and as such, was not mentioned previously. Pseudoginseng (*san qi*) stops bleeding while dispersing blood stasis. It enhances the body's ability to regulate coagulation and anticoagulation. This dual function makes this herb very valuable in the treatment of stroke. Studies have been done using this herb as treatment for both ischemic stroke as well as hemorrhagic stroke. An analysis of eight trials, involving 660 patients using pseudoginseng (*san qi*) for ischemic stroke was conducted. The pooled analysis indicated that pseudoginseng (*san qi*) may be beneficial and safe for acute ischemic stroke, indicating it appears to improve neurological deficit.^{xxxii} Another study used pseudoginseng (*san qi*) in addition to conventional treatments on 27 patients, all starting the treatment within five days of cerebral hemorrhage.^{xxxiii} After three weeks there was a significant difference in recovery compared to the control group, showing that pseudoginseng (*san qi*) can be an effective treatment post cerebral hemorrhage. A meta-analysis of 20 controlled trials with 984 patients receiving pseudoginseng (*san qi*) injections was done on intracerebral hemorrhage. The results showed better outcomes for the patients who received pseudoginseng (*san qi*) injections versus the control groups. The analysis stated that pseudoginseng (*san qi*) may exert multiple protective mechanisms against intracerebral hemorrhage induced brain damage including hemostasis, anti-coagulation, anti-thromboembolism, cerebral vasodilation, invigorated blood dynamics, anti-inflammation, anti-oxidation, and anti-hyperglycemic effects.^{xxxiii}

NEW FINDINGS

Until recently it was thought that the neurons that you were born with are the neurons that you have for life, and when they died, they could not be replaced. Research over the last 30-40 years has shown that neurogenesis can be achieved and that migration of these new neurons to other areas of the brain is possible. In this theory, the focus of post-stroke recovery is on neural reconstruction and regeneration. Neural damage is difficult to repair and can take a long time to achieve regeneration. While this process is slow, it is thought that acupuncture and Chinese medicine can play a pivotal role in this process. Neuron regeneration is thought to occur in areas of the brain that are rich in neural stem cells, like the subventricular, the hippocampus, and the olfactory bulb. ST 36 has been one of the most commonly researched acupuncture points as it is shown to enhance cell proliferation and neuronal differentiation. One study compared the effects of acupuncture and electrostimulation acupuncture on cell proliferation and neuroblast differentiation. The study needled ST 36 and DU 20 on rats once a day for three weeks. The results suggest that acupuncture increases neurogenesis, with electro-acupuncture having a greater effect on neuroblast plasticity in the dentate gyrus

of the hippocampus over regular acupuncture.^{xxxiv} Another study needled DU 16 and DU 8 in rats. This study concluded that electro-acupuncture can improve neural regeneration, neuron migration and maturation after a stroke.^{xxxv} One last research study to mention was conducted on mice. The study used DU 20 and DU 14 to determine if electro-acupuncture promotes functional recovery post ischemic stroke. The research results indicate that electro-acupuncture may promote post-stroke recovery via enhancement of proliferation and differentiation of neuronal stem cells in the hippocampus and subventricular zone.^{xxxvi}

CONCLUSION

Oriental Medicine is one of the most effective treatment approaches for post-stroke syndromes. Its core principles and knowledge can help in the prevention of stroke. Over the last several decades exciting advancements and refinement in acupuncture techniques have shown great results, increasing the efficacy of every treatment. Additionally, modern research continues to build upon the past, expanding acupuncture and herbal therapy in the treatment of stroke. With the growing acceptance of alternative treatment modalities in the United States, it is critical that acupuncture and Oriental Medicine therapies continue to become an integral part of the rehabilitation process for stroke recovery.

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